Fishers, IN - Corporate
8770 North St., Ste. 110
Fishers, IN 46038
317.588.1798

Project Manual for

TOWN OF SWEETSER, INDIANA

Sweetser Wastewater Improvements Project

October 2026



Registered Professional Engineer State of Indiana
No. PE11800762 Seal affixed
For Division 25 and
26 29 23 Variable Frequency Drives



Registered Professional Engineer State of Indiana
No. PE11900824 Seal affixed
For Division 1, 2, 8, 9, 31, 32, 33, 40, 43, and 46



Registered Professional Engineer State of Indiana
No. P11700794 Seal affixed
For Division 3, 5, and 6



Registered Professional Engineer State of Indiana
No. PE12200401 Seal affixed
For Divisions 23 and 26 except
26 29 23 Variable Frequency Drives

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SWEETSER WASTEWATER (WW) IMPROVEMENTS PROJECT

INVITATION FOR BIDS (IFB)
TOWN OF SWEETSER, INDIANA

The Town of Sweetser, Indiana, by and through its Town Council (the "Owner"), will receive sealed bids for the construction of the Sweetser Wastewater Improvements Project. This project is expected to be funded in part by the Indiana Office of Community and Rural Affairs (OCRA) through the State Community Development Block Grant (CDBG) program and the Rural Water Financing Agency.

The Owner is an Equal Opportunity Employer. Consistent with 2 CFR 200.321, all qualified firms, including small, minority-owned, women-owned, and veteran-owned enterprises, are encouraged to participate.

All bids must be submitted in a sealed envelope clearly marked with the project title and the bidder's name and address and must be received by the Owner no later than 7:00 P.M. (Local Time) on November 12th, 2026. Bids received as specified above will be publicly opened and read aloud at the public meeting on November 12th, 2026 at 7:00 P.M. at Sweetser Town Hall, 113 North Main Street, Sweetser, Indiana 46987. Late submissions will not be accepted and will be returned unopened. Bids shall be properly and completely executed on bid forms included in the Specifications and all bids must be submitted on the bid forms as identified in the Contract Documents and Specifications.

All interested citizens are invited to attend. Should any citizens require special provisions, such as handicapped modifications or non-English translation personnel, the Town will provide such provisions as long as the request is made by November 3rd, 2026.

The Owner reserves the right to reject any bid, or all bids, or to accept any bid or bids, or to make such combination of bids as may seem desirable, and to waive any and all informalities in bidding. Any bid may be withdrawn prior to the above scheduled time for the opening of bids or authorized postponement thereof. Any bid received after the time and date specified shall not be considered. No bid may be withdrawn after the scheduled closing time for receipt of bids for at least ninety (90) days, except as noted under Specification 00 21 13, Article 15 – Modification and Withdrawal of Bid.

A pre-bid meeting will be held on October 28, 2026 at 11:00 A.M (Local Time) at the Sweetser Town Hall. All prime contractors, subcontractors, small, minority or women owned enterprises, and other interested parties are invited to attend.

Questions or accommodation requests (including accessibility modifications or language assistance) must be submitted to Ricardo Paredes between 8:00 A.M. and 5:00 P.M. (Local Time) at (317) 588-1785 or at rparedes@dccm.com no later than November 4th, 2026. A final addendum will be issued no later than November 5th, 2026.

Summary of Project Scope
The project will be constructed in one (1) contract divisions, as follows:

- Sweetser WW Improvements Project: Base bid that covers mechanical, electrical, instrument and controls improvements to the existing wastewater treatment plant that includes, but is not limited to, a new electrical room, drum screen replacement, walkway extensions, wall improvements, lift station improvements, new screw press building and screw press equipment, and additional improved components as specified on the plans.

Project Plans, Specifications, and Contract Documents are available at:

- DCCM, 8770 North Street, Suite 110, Fishers, Indiana 46038
- www.dccm.com/public-documents/

Each bidder is responsible for reviewing the project site(s) and the Contract Documents and Specifications. Any failure to do so does not relieve the bidder of any obligations related to its bid. The work to be performed and the bid to be submitted shall include sufficient and proper sums for all general construction, mechanical installation, labor, materials, permits, licenses, insurance, and so forth incidental to and required for the construction of the facilities.

Bidders on this work shall be required to comply with the provisions of the President's Executive Order No. 11246, as amended. The Bidders shall also comply with the requirements of 41 CFR Part 60 - 4 entitled Construction Contractors - Affirmative Action Requirements. A copy of 41 CFR Part 60 - 4 may be found in the Supplemental General Conditions of the Contract Documents and Specifications.

Wage rates on the project shall not be less than the federal wage scale published by the U.S. Department of Labor.

Bidders shall be aware of the requirements set by the Bipartisan Infrastructure Law of 2021, which mandate that all iron and steel, manufactured products, and construction materials used in a federal project must be produced in the United States. Pursuant to HUD's Notice, "Public Interest Phased Implementation Waiver for FY 2022 and 2023 of Build America, Buy America Provisions as Applied to Recipients of HUD Federal Financial Assistance" (88 FR 17001), any funds obligated by HUD on or after the applicable listed effective dates, are subject to BABA requirements, unless excepted by a waiver.

Bid Contents
Each bid must include:

- Proper and complete execution of all forms provided in the Contract Documents and Specifications, along with all required supporting documents.
- A bid amount sufficient to cover all labor, materials, permits, licenses, insurance, and all other incidentals required for full and proper completion of the work.
- A certified check or acceptable bidder's bond payable to the Owner in an amount not less than five percent (5%) of the highest aggregate bid, which shall be held by the Owner as a guarantee of the awarded bidder's contract execution within ten (10) days of notice of award.
- List of Proposed subcontractors, suppliers, and vendors.
- List of Project References with Individual Contact Information.
- Bidder's License number demonstrating evidence of authority to do business in the state of Indiana.
- Required Bidder Qualification Statement (Form 96 – Revised 2013) with supporting data.
    - Under Section III of Form 96, the Bidder shall submit a financial statement. A copy of the proposed Financial Statement to be submitted with the bid is included in the bid documents section to these specifications. The Owner may make such investigations as deemed necessary to determine the ability of the Bidder to perform the work and the Bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy the Owner that such Bidder is properly qualified to carry out the obligations of the Agreement and to complete the work contemplated therein.
- E-Verify Affidavit

Award of Contract
The Owner may investigate a bidder's qualifications, including experience, personnel, equipment, financial capacity, and past performance, as necessary to determine the bidder's ability to perform the work. The

bidder shall provide the Owner with any information requested for this evaluation. The Owner may reject any bid if the bidder is deemed unqualified to fulfill the obligations of the contract.

The Owner reserves the right to accept or reject any or all bids, waive informalities, and award any combination of bids that is most advantageous. Conditional or qualified bids will not be accepted.

The contract will be awarded to the lowest, responsive, responsible bidder. The low, responsive, responsible bidder must not be debarred, suspended, or otherwise be excluded from or ineligible for participation in federally assisted programs under Executive Order 12549.

Approved performance and payment bonds in the amount of 100% of the contract price, executed by a surety authorized to do business in the State of Indiana, will be required at contract execution to guarantee faithful and proper performance of the work and payment of subcontractors, laborers, and suppliers. The bonds must remain in full force and effect throughout the contract term and for twelve (12) months after the date of substantial completion.

All applicable laws, ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the project throughout.

Contract Requirements
Contracts awarded under this IFB will be subject to all applicable OCRA, state, and federal requirements, including but not limited to:

- **Administrative Provisions:** Uniform Administrative Requirements (2 CFR Part 200); Record Retention and Access (2 CFR 200.334; 2 CFR 200.337); Conflict of Interest (24 CFR 570.489(g)–(h)); Procurement (2 CFR 200.317–327; IC 5-22; IC 36-1-12).
- **Debarment and Suspension:** Executive Order 12549; HUD Handbook 1344.1 REV-3, Chapter 5-5; Registration and eligibility verification via SAM.gov.
- **Labor Standards:** Davis–Bacon and Related Acts (29 CFR Part 5); Copeland Anti-Kickback Act (29 CFR Part 3); Contract Work Hours and Safety Standards Act (29 CFR Part 5). Wage rates shall not be less than those published by U.S. Department of Labor.
- **Civil Rights/Nondiscrimination:** Title VI of the Civil Rights Act of 1964; Section 504 of the Rehabilitation Act of 1973; Age Discrimination Act of 1975; Certification of Non-Segregated Facilities; Architectural Barriers Act; Americans with Disabilities Act; Executive Order 11063.
- **Economic Opportunity:** Section 3 of the Housing and Urban Development Act of 1968 (24 CFR Part 75); 2 CFR 200.321.
- **Domestic Preferences:** 2 CFR 200.322; Build America, Buy America Act (2 CFR Part 184; FR 17001; OMB M-24-02; HUD CPD-25-01).

Federal Funding Notice
Contracts awarded under this IFB are expected to be funded in part by the State CDBG program, as administered by OCRA. Neither the United States nor any of its departments, agencies, or employees is or will be a party to this IFB or any resulting contract.

INSTRUCTIONS TO BIDDERS

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ARTICLE 1 – DEFINED TERMS

1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:

A. *Issuing Office* – The office from which the Bidding Documents are to be issued. The Issuing Office is as stated in Section 00 11 13 - Advertisement for Bids.

ARTICLE 2 – COPIES OF BIDDING DOCUMENTS

2.01 Complete sets of the Bidding Documents may be obtained from the Issuing Office in the number and format stated in the advertisement to bid.

2.02 Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.03 Owner and Engineer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not authorize or confer a license for any other use.

ARTICLE 3 – QUALIFICATIONS OF BIDDERS

3.01 To demonstrate Bidder's qualifications to perform the Work, Bidder shall submit with its Bid (a) written evidence establishing its qualifications such as financial data, previous experience, and present commitments, and (b) the following additional information:

A. Evidence of Bidder's authority to do business in the state where the Project is located.

B. Bidder's state or other contractor license number, if applicable.

C. List of Project References with Individual Contact Information

D. Subcontractor, Vendors and Supplier qualification information; coordinate with provisions of Article 12 of these Instructions, "Subcontractors, Suppliers, and Others."

E. Contractor's Bid for Public Work - Form 96

F. E-Verify Affidavit

3.02 A Bidder's failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of the Contract. No requirement in this Article 3 to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder's qualifications.

3.03 Bidder is advised to carefully review those portions of the Bid Form requiring Bidder's representations and certifications.

ARTICLE 4 – SITE AND OTHER AREAS; EXISTING SITE CONDITIONS; EXAMINATION OF SITE; OWNER'S SAFETY PROGRAM; OTHER WORK AT THE SITE

4.01 *Site and Other Areas*

A. The Site is identified in the Bidding Documents. By definition, the Site includes rights-of-way, easements, and other lands furnished by Owner for the use of the Contractor. Any additional lands required for temporary construction facilities, construction equipment, or storage of

materials and equipment, and any access needed for such additional lands, are to be obtained and paid for by Contractor.

4.02 *Existing Site Conditions*

A. Subsurface and Physical Conditions;

1. In the preparation of the Contract Documents, Engineer relied upon the following reports of explorations and tests of subsurface conditions at the Site of the Work.

a. NOT APPLICABLE

2. No reports or drawings relating to Hazardous Environmental Conditions have been identified at or adjacent to the Site.

B. Underground Facilities: Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site are set forth in the Contract Documents and are based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.

C. Adequacy of Data: Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions, and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated subsurface or physical conditions appear in Paragraphs 5.03, 5.04, and 5.05 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work, appear in Paragraph 5.06 of the General Conditions.

4.03 *Site Visit and Testing by Bidders*

A. Bidder shall conduct the required Site visit during normal working hours and shall not disturb any ongoing operations at the Site. Bidders must advise Patrick Kendall at 765-667-6136 of the date and time they desire to conduct their Site visit.

B. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.

C. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a successful Bid. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner's authority regarding the Site.

D. Bidder shall comply with all applicable Laws and Regulations regarding excavation and location of utilities, obtain all permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.

E. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies.

4.04 *Owner's Safety Program*

A. Site visits and work at the Site may be governed by an Owner safety program. As the General Conditions indicate, if an Owner safety program exists, it will be noted in the Supplementary Conditions.

4.05 *Other Work at the Site*

A. Reference is made to Article 8 of the Supplementary Conditions for the identification of the general nature of other work of which Owner is aware (if any) that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) and relates to the Work contemplated by these Bidding Documents. If Owner is party to a written contract for such other work, then on request, Owner will provide to each Bidder access to examine such contracts (other than portions thereof related to price and other confidential matters), if any.

ARTICLE 5 – BIDDER'S REPRESENTATIONS

5.01 It is the responsibility of each Bidder before submitting a Bid to:

A. examine and carefully study the Bidding Documents, and any data and reference items identified in the Bidding Documents;

B. visit the Site, conduct a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfy itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;

C. become familiar with and satisfy itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work; carefully study all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings;

D. consider the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs;

E. agree, based on the information and observations referred to in the preceding paragraph, that at the time of submitting its Bid no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents;

F. become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;

G. promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder;

H. determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work; and

I. agree that the submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

ARTICLE 6 – PRE-BID CONFERENCE

6.01 A Pre-Bid conference will be held at the time and location stated in the advertisement to bid. Representatives of Owner and Engineer will be present to discuss the Project. It is not mandatory for prospective Bidders to attend and participate in the conference. Engineer will transmit to all planholders of record such Addenda as Engineer considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

ARTICLE 7 – INTERPRETATIONS AND ADDENDA

7.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to Engineer in writing. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda delivered to all parties recorded as having received the Bidding Documents. Questions received less than seven days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

7.02 Addenda may be issued to clarify, correct, supplement, or change the Bidding Documents.

ARTICLE 8 – BID SECURITY

8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of 5 percent of Bidder's maximum Bid price and in the form of a certified check, bank money order, or a Bid bond (on the form included in the Bidding Documents) issued by a surety meeting the requirements of Paragraphs 6.01 and 6.02 of the General Conditions.

8.02 The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and such Bidder has executed the Contract Documents, furnished the required contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited. Such forfeiture shall be Owner's exclusive remedy if Bidder defaults.

8.03 The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven days after the Effective Date of the Contract or 90 days after the Bid opening, whereupon Bid security furnished by such Bidders will be released.

8.04 Bid security of other Bidders that Owner believes do not have a reasonable chance of receiving the award will be released within seven days after the Bid opening.

ARTICLE 9 – CONTRACT TIMES

9.01 The number of days within which, or the dates by which, the Work is to be substantially completed and ready for final payment are set forth in the Agreement.

ARTICLE 10 – LIQUIDATED DAMAGES

10.01 Provisions for liquidated damages, if any, for failure to timely attain Substantial Completion, or completion of the Work in readiness for final payment, are set forth in the Agreement.

ARTICLE 11 – SUBSTITUTE AND "OR-EQUAL" ITEMS

11.01 The Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration during the bidding and Contract award process of possible substitute or "or-equal" items. In cases in which the Contract allows the Contractor to request that Engineer authorize the use of a substitute or "or-equal" item of material or equipment, application for such acceptance may not be made to and will not be considered by Engineer until after the Effective Date of the Contract.

11.02 All prices that Bidder sets forth in its Bid shall be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, as supplemented by Addenda. Any assumptions regarding the possibility of post-Bid approvals of "or-equal" or substitution requests are made at Bidder's sole risk.

ARTICLE 12 – SUBCONTACTORS, SUPPLIERS AND OTHERS

12.01 A Bidder shall be prepared to retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of the Work if required by the Bidding Documents (most commonly in the Specifications) to do so. If a prospective Bidder objects to retaining any such Subcontractor, Supplier, or other individual or entity, and the concern is not relieved by an Addendum, then the prospective Bidder should refrain from submitting a Bid.

12.02 Subsequent to the submittal of the Bid, Owner may not require the Successful Bidder or Contractor to retain any Subcontractor, Supplier, or other individual or entity against which Contractor has reasonable objection.

12.03 The apparent Successful Bidder, and any other Bidder so requested, shall within five days after Bid opening, submit to Owner a list of the Subcontractors or Suppliers proposed for any work.

Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, or other individual or entity. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute, in which case apparent Successful Bidder shall submit a substitute, Bidder's Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.

12.04 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, or other individuals or entities. Declining to make requested substitutions will constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the

Notice of Award will be deemed acceptable to Owner and Engineer subject to subsequent revocation of such acceptance as provided in Paragraph 7.06 of the General Conditions.

ARTICLE 13 – PREPARATION OF BID

13.01 The Bid Form is included with the Bidding Documents.

A. All blanks on the Bid Form shall be completed in ink and the Bid Form signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each section, Bid item, alternate, adjustment unit price item, and unit price item listed therein.

B. If the Bid Form expressly indicates that submitting pricing on a specific alternate item is optional, and Bidder elects to not furnish pricing for such optional alternate item, then Bidder may enter the words "No Bid" or "Not Applicable."

13.02 A Bid by a corporation shall be executed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. The corporate seal must be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown.

13.03 A Bid by a partnership shall be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown.

13.04 A Bid by a limited liability company shall be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown.

13.05 A Bid by an individual shall show the Bidder's name and official address.

13.06 A Bid by a joint venture shall be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The official address of the joint venture shall be shown.

13.07 All names shall be printed in ink below the signatures.

13.08 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.

13.09 Postal and e-mail addresses and telephone number for communications regarding the Bid shall be shown.

13.10 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located, or Bidder shall covenant in writing to obtain such authority and qualification prior to award of the Contract and attach such covenant to the Bid. Bidder's state contractor license number, if any, shall also be shown on the Bid Form.

ARTICLE 14 – SUBMITTAL OF BID

14.01 A Bid shall be received no later than the date and time prescribed and at the place indicated in the advertisement to bid and shall be enclosed in a plainly marked package with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder, and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid shall be addressed to:

TOWN OF SWEETSER TOWN COUNCIL
113 N MAIN STREET P.O. BOX 329
SWEETSER, IN 46987

14.02 Bids received after the date and time prescribed for the opening of bids, or not submitted at the correct location or in the designated manner, will not be accepted and will be returned to the Bidder unopened.

ARTICLE 15 – MODIFICATION AND WITHDRAWAL OF BID

15.01 A Bid may be withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.

15.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 16.01 and submit a new Bid prior to the date and time for the opening of Bids.

15.03 If within 24 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, that Bidder will be disqualified from further bidding on the Work.

ARTICLE 16 – OPENING OF BIDS

16.01 Bids will be opened at the time and place indicated in the advertisement to bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

ARTICLE 17 – BIDS TO REMAIN SUBJECT TO ACCEPTANCE

17.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

ARTICLE 18 – EVALUATION OF BIDS AND AWARD OF CONTRACT

18.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to not be responsible. If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or attempts to alter the contents of the Contract Documents for purposes of the Bid, then the Owner will reject the Bid as nonresponsive; provided that Owner also reserves the right to waive all minor informalities not involving price, time, or changes in the Work.

18.02 If Owner awards the contract for the Work, such award shall be to the responsible Bidder submitting the lowest responsive Bid.

18.03 Evaluation of Bids

A. In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.

B. In the comparison of Bids, alternates will be applied in the same order of priority as listed in the Bid Form. To determine the Bid prices for purposes of comparison, Owner shall announce to all bidders a "Base Bid plus alternates" budget after receiving all Bids, but prior to opening them. After determination of the Successful Bidder based on this comparative process and on the responsiveness, responsibility, and other factors set forth in these Instructions, the award may be made to said Successful Bidder on its base Bid and any combination of its additive alternate Bids for which Owner determines funds will be available at the time of award.

18.04 In evaluating whether a Bidder is responsible, Owner will consider the qualifications of the Bidder and may consider the qualifications and experience of Subcontractors and Suppliers proposed for those portions of the Work for which the identity of Subcontractors and Suppliers must be submitted as provided in the Bidding Documents.

18.05 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders and any proposed Subcontractors or Suppliers.

ARTICLE 19 – BONDS AND INSURANCE

19.01 Article 6 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance, payment, and maintenance bonds and insurance. When the Successful Bidder delivers the Agreement (executed by Successful Bidder) to Owner, it shall be accompanied by required bonds and insurance documentation.

ARTICLE 20 – SIGNING OF AGREEMENT

20.01 When Owner issues a Notice of Award to the Successful Bidder, it shall be accompanied by the unexecuted counterparts of the Agreement along with the other Contract Documents as identified in the Agreement. Within 15 days thereafter, Successful Bidder shall execute and deliver the required number of counterparts of the Agreement (and any bonds and insurance documentation required to be delivered by the Contract Documents) to Owner. Within ten days thereafter, Owner shall deliver one fully executed counterpart of the Agreement to Successful Bidder, together with printed and electronic copies of the Contract Documents as stated in Paragraph 2.02 of the General Conditions.

ARTICLE 21 – SALES AND USE TAXES

21.01 Owner is exempt from Indiana state sales and use taxes on materials and equipment to be incorporated in the Work. Said taxes shall not be included in the Bid. Refer to Paragraph SC-7.09 of the Supplementary Conditions for additional information.

ARTICLE 22 – OCRA REQUIREMENTS

22.01 Davis-Bacon Wages

1. Bidder shall take not that wages paid throughout the project must meet or exceed those outlined in the Davis-Bacon Wage guidelines provided in Exhibit B to the Bidding Documents.

22.02 Build America Buy America Act

1. Bidder shall meet guidelines established by the appropriate federal regulations including Build America, Buy America Act (BABAA) requirements under Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. LO. 177-58.

BID FORM

Sweetser, IN

Sweetser Wastewater Improvements

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ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

Town of Sweetser Town Council

113 N Main Street, PO Box 329, Sweetser, IN 46987

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 – BIDDER'S ACKNOWLEDGEMENTS

2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 90 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

ARTICLE 3 – BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, and any data and reference items identified in the Bidding Documents, and hereby acknowledges receipt of the following Addenda:

Addendum No.	**Addendum, Date**
_____	_____
_____	_____
_____	_____
_____	_____

B. Bidder has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfied itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and has satisfied itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.

E. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and any Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2)

the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs.

F. Bidder agrees, based on the information and observations referred to in the preceding paragraph, that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.

G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents and confirms that the written resolution thereof by Engineer is acceptable to Bidder.

I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work.

J. The submission of this Bid constitutes an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, and that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

ARTICLE 4 – BIDDER'S CERTIFICATION

4.01 Bidder certifies that:

A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;

B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and

D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and

4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the e execution of the Contract.

ARTICLE 5 – BASIS OF BID

5.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

BASE BID					
Item No.	**Description**	**Unit**	**Estimated Quantity**	**Unit Price**	**Total Price**
1	Mobilization and Demobilization	LS	1		
2	Maintenance of Traffic	LS	1		
3	Construction Engineering	LS	1		
4	Erosion and Sediment Control	LS	1		
5	Site Grading and Restoration	LS	1		
6	Dewatering and Temporary Flow Control (Bypass)	LS	1		
7	Wastewater Improvements	LS	1		
8	Ceiling Improvements	LS	1		

Bidder acknowledges that (1) each Bid Unit Price includes an amount considered by Bidder to be adequate to cover Contractor's overhead and profit for each separately identified item, and (2) estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all unit price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

Total Base Bid Price $ _____

MANDATORY ALTERNATES					
Alternate Item No.	**Description**	**Unit**	**Estimated Quantity**	**Alternate Unit Price**	**Alternate Total Price**
1.	Screw Press and Building Improvements	LS	1		
2.	Case LS Decommission and Low Pressure Sewer Improvements	LS	1		

Total Mandatory Alternate Price $ _____

Proposed increase or decrease in price for the Bid Alternates listed above will be considered in determination of the lowest responsive and responsible bid.

The undersigned understands that after a contract is awarded, the Owner may select items of the Alternate Bids listed above. If awarded the contract, the Bidder agrees to furnish and install any Owner selected Alternate items for the add or deduct indicated. The total base bid will then be adjusted accordingly. The add or deduct amounts listed above are "installed" prices and take into consideration and include any cost of the design or construction changes that may be required as a result of selecting the Alternate.

Alternate Contract Item prices are subject to acceptance by the Owner, and rejection of one or more Alternate Contract Item prices will not invalidate acceptance of this Bid.

ARTICLE 6 – TIME OF COMPLETION

6.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

6.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 7 – ATTACHMENTS TO THIS BID

7.01 The following documents are submitted with and made a condition of this Bid:

A. Required Bid security;

B. List of Proposed Subcontractors;

C. List of Proposed Suppliers;

D. List of Project References;

E. Bidder's License No.: _____ demonstrating evidence of authority to do business in the state of Indiana.

F. Required Bidder Qualification Statement (Form 96) with supporting data;

G. E-Verify Affadavit;

SRF Required Documents

H. Wage/Fringe Benefit Certification (Exhibit J);

I. GPR Bid Breakdown (Exhibit E);

J. Nondiscrimination Compliance Form (Exhibit A);

K. Form OEE-1 (Exhibit D);

L. Form OEE-2 (Exhibit D);

M. Good Faith Efforts Worksheet (Exhibit D);

OCRA Required Documents

N. Davis-Bacon Act Provisions and Forms (Exhibit C)

O. BABA Compliance Forms (Exhibit K)

1. Forms are to be reviewed by Contractor.

2. Forms are to be filled out after Notice of Award has been issued to the selected bidder.

ARTICLE 8 – DEFINED TERMS

8.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 9 – BID SUBMITTAL

BIDDER: *[Indicate correct name of bidding entity]*

_____

By:
[Signature] _____

[Printed name] _____
(If Bidder is a corporation, a limited liability company, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest:
[Signature] _____

[Printed name] _____

Title: _____

Submittal Date: _____

Address for giving notices:

_____

_____

_____

Telephone Number: _____

Fax Number: _____

Contact Name and e-mail address: _____

_____

Bidder's License No.: _____
(where applicable)

(NO TEXT THIS PAGE)

BID BOND

Any singular reference to Bidder, Surety, Owner or other party shall be considered plural where applicable.

BIDDER *(Name and Address)*:

SURETY *(Name, and Address of Principal Place of Business)*:

OWNER *(Name and Address)*:

BID

Bid Due Date:

Description *(Project Name— Include Location)*:

BOND

Bond Number:

Date:

Penal sum _____ $ _____

(Words) (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

BIDDER	**SURETY**
_____ (Seal)	_____ (Seal)
Bidder's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature	Signature (Attach Power of Attorney)
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	Attest: _____
Signature	Signature
Title	Title

Note: Addresses are to be used for giving any required notice.
Provide execution by any additional parties, such as joint venturers, if necessary.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.

3. This obligation shall be null and void if:

3.1 Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or

3.2 All Bids are rejected by Owner, or

3.3 Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.

6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after the Bid due date.

7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

SECTION 00 45 13 – E-VERIFY AFFIDAVIT

LEGAL EMPLOYMENT DECLARATION

The State of Indiana, in IC §22-5-1.7, requires all state agencies and political subdivisions to seek verification from their contractors that the contractor's employees are legally eligible to work in the United States.

This Declaration serves as notice that all Contractors doing business with Sweetser must, as a term of their contract:

1. Enroll in and verify the work eligibility status of newly hired employees of the contractor through the United States government's E-Verify program (but is not required to do so if the E-Verify program no longer exists); and

2. Verify, by signature below, that the Contractor does not knowingly employ unauthorized aliens.

I, _____, a duly authorized agent of _____(name of Company), declare under penalties of perjury that _____(name of Company) has verified the work eligibility status of its employees and it does not employ unauthorized aliens to the best of its knowledge and belief.

_____
(Name of Company)

By:_____
(Authorized Representative of Company)

PLEASE SEE https://e-verify.uscis.gov/enroll/StartPage.aspx?JS=YES FOR INSTRUCTIONS AND ELECTRONIC REGISTRATION FOR E-VERIFY.

(NO TEXT FOR THIS PAGE)

CONTRACTOR'S BID FOR PUBLIC WORK - FORM 96

State Form 52414 (R2 / 2-13) / Form 96 (Revised 2013)
Prescribed by State Board of Accounts

PART I
(To be completed for all bids. Please type or print)

Date *(month, day, year):* _____

1. Governmental Unit (Owner): _____
2. County : _____
3. Bidder (Firm): _____

   Address: _____

   City/State/ZIPcode: _____
4. Telephone Number: _____
5. Agent of Bidder *(if applicable):* _____

Pursuant to notices given, the undersigned offers to furnish labor and/or material necessary to complete the public works project of _____

(Governmental Unit) in accordance with plans and specifications prepared by _____

_____ and dated _____ for the sum of

_____ $_____

The undersigned further agrees to furnish a bond or certified check with this bid for an amount specified in the notice of the letting. If alternative bids apply, the undersigned submits a proposal for each in accordance with the notice. Any addendums attached will be specifically referenced at the applicable page.

If additional units of material included in the contract are needed, the cost of units must be the same as that shown in the original contract if accepted by the governmental unit. If the bid is to be awarded on a unit basis, the itemization of the units shall be shown on a separate attachment.

The contractor and his subcontractors, if any, shall not discriminate against or intimidate any employee, or applicant for employment, to be employed in the performance of this contract, with respect to any matter directly or indirectly related to employment because of race, religion, color, sex, national origin or ancestry. Breach of this covenant may be regarded as a material breach of the contract.

CERTIFICATION OF USE OF UNITED STATES STEEL PRODUCTS
(If applicable)

I, the undersigned bidder or agent as a contractor on a public works project, understand my statutory obligation to use steel products made in the United States (I.C. 5-16-8-2). I hereby certify that I and all subcontractors employed by me for this project will use U.S. steel products on this project if awarded. I understand that violations hereunder may result in forfeiture of contractual payments.

ACCEPTANCE

The above bid is accepted this _____ day of _____, _____, subject to the following conditions: _____

_____

Contracting Authority Members:

_____ _____

_____ _____

_____ _____

PART II

(For projects of $150,000 or more – IC 36-1-12-4)

Governmental Unit: _____

Bidder (Firm) _____

Date *(month, day, year):* _____

These statements to be submitted under oath by each bidder with and as a part of his bid. Attach additional pages for each section as needed.

SECTION I EXPERIENCE QUESTIONNAIRE

1. What public works projects has your organization completed for the period of one (1) year prior to the date of the current bid?

Contract Amount	Class of Work	Completion Date	Name and Address of Owner

2. What public works projects are now in process of construction by your organization?

Contract Amount	Class of Work	Expected Completion Date	Name and Address of Owner

3. Have you ever failed to complete any work awarded to you? _____ If so, where and why?

_____

_____

_____

4. List references from private firms for which you have performed work.

_____

_____

_____

_____

_____

SECTION II PLAN AND EQUIPMENT QUESTIONNAIRE

1. Explain your plan or layout for performing proposed work. *(Examples could include a narrative of when you could begin work, complete the project, number of workers, etc. and any other information which you believe would enable the governmental unit to consider your bid.)*

_____

_____

_____

_____

_____

2. Please list the names and addresses of all subcontractors *(i.e. persons or firms outside your own firm who have performed part of the work)* that you have used on public works projects during the past five (5) years along with a brief description of the work done by each subcontractor.

_____

_____

_____

_____

_____

3. If you intend to sublet any portion of the work, state the name and address of each subcontractor, equipment to be used by the subcontractor, and whether you will require a bond. However, if you are unable to currently provide a listing, please understand a listing must be provided prior to contract approval. Until the completion of the proposed project, you are under a continuing obligation to immediately notify the governmental unit in the event that you subsequently determine that you will use a subcontractor on the proposed project.

4. What equipment do you have available to use for the proposed project? Any equipment to be used by subcontractors may also be required to be listed by the governmental unit.

5. Have you entered into contracts or received offers for all materials which substantiate the prices used in preparing your proposal? If not, please explain the rationale used which would corroborate the prices listed.

SECTION III CONTRACTOR'S FINANCIAL STATEMENT

Attachment of bidder's financial statement is mandatory. Any bid submitted without said financial statement as required by statute shall thereby be rendered invalid. The financial statement provided hereunder to the governing body awarding the contract must be specific enough in detail so that said governing body can make a proper determination of the bidder's capability for completing the project if awarded.

SECTION IV CONTRACTOR'S NON – COLLUSION AFFIDAVIT

The undersigned bidder or agent, being duly sworn on oath, says that he has not, nor has any other member, representative, or agent of the firm, company, corporation or partnership represented by him, entered into any combination, collusion or agreement with any person relative to the price to be bid by anyone at such letting nor to prevent any person from bidding nor to include anyone to refrain from bidding, and that this bid is made without reference to any other bid and without any agreement, understanding or combination with any other person in reference to such bidding.

He further says that no person or persons, firms, or corporation has, have or will receive directly or indirectly, any rebate, fee, gift, commission or thing of value on account of such sale.

SECTION V OATH AND AFFIRMATION

I HEREBY AFFIRM UNDER THE PENALTIES FOR PERJURY THAT THE FACTS AND INFORMATION CONTAINED IN THE FOREGOING BID FOR PUBLIC WORKS ARE TRUE AND CORRECT.

Dated at _____ this _____ day of _____, _____

_____
(Name of Organization)

By_____

_____
(Title of Person Signing)

ACKNOWLEDGEMENT

STATE OF _____)
) ss
COUNTY OF_____)

Before me, a Notary Public, personally appeared the above-named _____ and swore that the statements contained in the foregoing document are true and correct.

Subscribed and sworn to before me this _____ day of _____, _____.

_____
Notary Public

My Commission Expires:_____

County of Residence:_____

Part of State Form 52414 (R2 / 2-13) / Form 96 (Revised 2013)

BID OF

_____
(Contractor)

_____
(Address)

_____

FOR

PUBLIC WORKS PROJECTS

OF

_____

_____

_____

Filed _____, _____

Action taken _____

_____

NOTICE OF AWARD

Date of Issuance:

Owner: Owner's Contract No.:

Engineer: Engineer's Project No.:

Project: Contract Name:

Bidder:

Bidder's Address:

TO BIDDER:

You are notified that Owner has accepted your Bid dated [_____] for the above Contract, and that you are the Successful Bidder and are awarded a Contract for:

_____ .

[describe Work, alternates, or sections of Work awarded]

The Contract Price of the awarded Contract is: $_____ *[note if subject to unit prices, or cost-plus]*

[ ] unexecuted counterparts of the Agreement accompany this Notice of Award, and one copy of the Contract Documents accompanies this Notice of Award, or has been transmitted or made available to Bidder electronically. *[revise if multiple copies accompany the Notice of Award]*

☐ a set of the Drawings will be delivered separately from the other Contract Documents.

You must comply with the following conditions precedent within 15 days of the date of receipt of this Notice of Award:

1. Deliver to Owner [____]counterparts of the Agreement, fully executed by Bidder.
2. Deliver with the executed Agreement(s) the Contract security *[e.g., performance and payment bonds]* and insurance documentation as specified in the Instructions to Bidders and General Conditions, Articles 2 and 6.
3. Other conditions precedent (if any):

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award, and declare your Bid security forfeited.

Within ten days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions.

Owner**:**

Authorized Signature

By:

Title:

Copy: Engineer

(NO TEXT THIS PAGE)

AGREEMENT
BETWEEN OWNER AND CONTRACTOR
FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)

THIS AGREEMENT is by and between _____ ("Owner") and _____ ("Contractor").

Owner and Contractor hereby agree as follows:

ARTICLE 1 – WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

ARTICLE 2 – THE PROJECT

2.01 Mechanical and Electrical and Control Improvements in the Wastewater Treatment Plant. Mechanical improvements include the addition of a drum screen, screw press, walkway, and ceiling improvements. This project will also involve mechanical and electrical controls improvements to four lift stations and the decommissioning of one lift station. Additionally, three new grinder pits for connection to the existing sewer will be included in the project.

ARTICLE 3 – ENGINEER

3.01 The part of the Project that pertains to the Work has been designed by DCCM.

3.02 The Owner has retained DCCM ("Engineer") to act as Owner's representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 4 – CONTRACT TIMES

4.01 *Time of the Essence*

A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 *Contract Times: Dates*

A. The Work will be substantially completed within 395 days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within 425 days after the date when the Contract Times commence to run.

B. It is expressly understood and agreed, by and between the Contractor and Owner that the Contract Time for completion of the work described herein is a reasonable time, taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the Work and excludes the time for unavoidable delays which were beyond the control and without the fault of the Contractor.

4.03 *Liquidated Damages*

A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial and other losses if the Work is not completed and Milestones not achieved within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with the Contract. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty):

1. Substantial Completion: Contractor shall pay Owner $1,500 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified in Paragraph 4.02.A above for Substantial Completion until the Work is substantially complete.

2. Completion of Remaining Work: After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner $1,500 for each day that expires after such time until the Work is completed and ready for final payment.

3. Liquidated damages for failing to timely attain Substantial Completion and final completion are not additive and will not be imposed concurrently.

4.04 *Special Damages*

A. In addition to the amount provided for liquidated damages, Contractor shall reimburse Owner (1) for any fines or penalties imposed on Owner as a direct result of the Contractor's failure to attain Substantial Completion according to the Contract Times, and (2) for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in Paragraph 4.02 for Substantial Completion (as duly adjusted pursuant to the Contract), until the Work is substantially complete.

B. After Contractor achieves Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times, Contractor shall reimburse Owner for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in Paragraph 4.02 for Work to be completed and ready for final payment (as duly adjusted pursuant to the Contract), until the Work is completed and ready for final payment.

ARTICLE 5 – CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents the amounts that follow, subject to adjustment under the Contract, a fixed rate not to exceed: _____($)

ARTICLE 6 – PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

A. Contractor shall submit Applications for Payment in accordance with Article 15 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 *Progress Payments; Retainage*

A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the first day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract

a. 6 percent of Work completed (with the balance being retainage). If the Work has been 50 percent completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, there will be no additional retainage; and

B. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 95 percent of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions, and less 100 percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment.

6.03 *Final Payment*

A. Upon final completion and acceptance of the Work in accordance with Paragraph 15.06 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 15.06.

ARTICLE 7 – CONTRACTOR'S REPRESENTATIONS

7.01 In order to induce Owner to enter into this Contract, Contractor makes the following representations:

A. Contractor has examined and carefully studied the Contract Documents, and any data and reference items identified in the Contract Documents.

B. Contractor has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Contractor is familiar with and is satisfied as to all Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.

E. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (3) Contractor's safety precautions and programs.

F. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.

G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

H. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

J. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

ARTICLE 8 – CONTRACT DOCUMENTS

8.01 *Contents*

A. The Contract Documents consist of the following:

1. This Agreement, identified as Section 00 52 00.
2. Addenda (numbers ___ to ___, inclusive).
3. Notice of Award, identified as Section 00 51 00.
4. Notice to Proceed, identified as Section 00 55 00.
5. Performance bond, identified as Section 00 61 13.13.
6. Payment bond, identified as Section 00 61 13.16.
7. General Conditions, identified as Section 00 72 00.
8. Supplementary Conditions, identified as Section 00 73 00.
9. Drawings (not attached but incorporated by reference) bearing the title **Sweetser Wastewater Improvements**.
10. Specifications bearing the title **Sweetser Wastewater Improvements** as listed in the table of contents in the Project Manual.
11. Exhibits to this Agreement (enumerated as follows):
    a. Contractor's Bid (pages ___ to ___, inclusive).
    b. Documentation submitted by Contractor prior to Notice of Award.

12. Governing Order of Contract Documents – In the event that any provision in any of the above component parts of this Agreement conflicts with any provision in any other of the component parts, the provision in the component part first enumerated above shall govern over any other part which follows it numerically except as may be otherwise specifically stated.

13. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:

    a. Work Change Directives.

    b. Change Orders.

    c. Field Orders.

B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 9.

D. The Contract Documents may only be amended, modified, or supplemented as provided in the General Conditions.

ARTICLE 9 – MISCELLANEOUS

9.01 *Terms*

A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

9.02 *Assignment of Contract*

A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, money that may become due and money that is due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

9.03 *Successors and Assigns*

A. Owner and Contractor each binds itself, its successors, assigns, and legal representatives to the other party hereto, its successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

9.04 *Severability*

A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

9.05 *Contractor's Certifications*

A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 10.05:

1. “corrupt practice” means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process or in the Contract execution;
2. “fraudulent practice” means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
3. “collusive practice” means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and
4. “coercive practice” means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

9.06 *Other Provisions*

A. Owner stipulates that if the General Conditions that are made a part of this Contract are based on EJCDC® C-700, Standard General Conditions for the Construction Contract, published by the Engineers Joint Contract Documents Committee®, and if Owner is the party that has furnished said General Conditions, then Owner has plainly shown all modifications to the standard wording of such published document to the Contractor, through a process such as highlighting or “track changes” (redline/strikeout), or in the Supplementary Conditions.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.

This Agreement will be effective on _____ (which is the Effective Date of the Contract).

OWNER:	CONTRACTOR:
_____	_____
By: _____	By: _____
Title: _____	Title: _____
	(If Contractor is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)
Attest: _____	Attest: _____
Title: _____	Title: _____
Address for giving notices:	Address for giving notices:
_____	_____
_____	_____
_____	_____
	License No.: _____ *(where applicable)*

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EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

NOTICE TO PROCEED

Owner:	Click or tap here to enter text.	Owner's Contract No.:	Click or tap here to enter text.
Contractor:	Click or tap here to enter text.	Contractor's Project No.:	Click or tap here to enter text.
Engineer:	DCCM North America, LLC.	Engineer's Project No.:	Click or tap here to enter text.
Project:	Click or tap here to enter text.	Contract Name:	Click or tap here to enter text.
		Effective Date of Contract:	Click or tap here to enter text.

TO CONTRACTOR:

Owner hereby notifies Contractor that the Contract Times under the above Contract will commence to run on [_____, 20__]. *[see Paragraph 4.01 of the General Conditions]*

On that date, Contractor shall start performing its obligations under the Contract Documents. No Work shall be done at the Site prior to such date. In accordance with the Agreement, [the date of Substantial Completion is _____, and the date of readiness for final payment is_____] ***or*** [the number of days to achieve Substantial Completion is _____, and the number of days to achieve readiness for final payment is _____].

Before starting any Work at the Site, Contractor must comply with the following:
Comply with all requirements as stated in the Contract Documents.

Owner**:** Click or tap here to enter text.

By: Click or tap here to enter text.
Title: Click or tap here to enter text.
Date Issued: Click or tap to enter a date.

Copy: Engineer

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EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

PERFORMANCE BOND

CONTRACTOR *(name and address)*:
Click or tap here to enter text.

SURETY *(name and address of principal place of business)*:
Click or tap here to enter text.

OWNER *(name and address)*:
Click or tap here to enter text.

CONSTRUCTION CONTRACT
Effective Date of the Agreement: Click or tap to enter a date.
Amount: Click or tap here to enter text.
Description *(name and location)*: Click or tap here to enter text.

BOND
Bond Number: Click or tap here to enter text.
Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*: Click or tap to enter a date.
Amount: Click or tap here to enter text.
Modifications to this Bond Form: ☐ None ☐ See Paragraph 16

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

_____ *(seal)*
Contractor's Name and Corporate Seal

By: _____
Signature

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

SURETY

_____ *(seal)*
Surety's Name and Corporate Seal

By: _____
Signature *(attach power of attorney)*

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

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Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

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1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after:

3.1 The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

3.2 The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

3.3 The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:

7.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

7.2 additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and

7.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.

9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.

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10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

11. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

14. Definitions

14.1 Balance of the Contract Price: The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

14.2 Construction Contract: The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

14.3 Contractor Default: Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

14.4 Owner Default: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

14.5 Contract Documents: All the documents that comprise the agreement between the Owner and Contractor.

15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

16. Modifications to this Bond are as follows:

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PAYMENT BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (*Name and Address*):

SURETY (*Name, and Address of Principal Place of Business*):

OWNER (*Name and Address*):

CONTRACT

Effective Date of Agreement:
Amount:
Description *(Name and Location)*:

BOND

Bond Number:
Date (*Not earlier than Effective Date of Agreement*):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL	**SURETY**
_____ (Seal)	_____ (Seal)
Contractor's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature	Signature (Attach Power of Attorney)
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	Attest: _____
Signature	Signature
_____	_____
Title	Title

Note: Provide execution by additional parties, such as joint venturers, if necessary.

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner to pay for labor, materials, and equipment furnished by Claimants for use in the performance of the Contract, which is incorporated herein by reference.

2. With respect to Owner, this obligation shall be null and void if Contractor:

2.1 Promptly makes payment, directly or indirectly, for all sums due Claimants, and

2.2 Defends, indemnifies, and holds harmless Owner from all claims, demands, liens, or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials, or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens, or suits to Contractor and Surety, and provided there is no Owner Default.

3. With respect to Claimants, this obligation shall be null and void if Contractor promptly makes payment, directly or indirectly, for all sums due.

4. Surety shall have no obligation to Claimants under this Bond until:

4.1 Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

4.2 Claimants who do not have a direct contract with Contractor:

1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials or equipment were furnished or supplied, or for whom the labor was done or performed; and
2. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and
3. Not having been paid within the above 30 days, have sent a written notice to Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.

5. If a notice by a Claimant required by Paragraph 4 is provided by Owner to Contractor or to Surety, that is sufficient compliance.

6. Reserved.

7. Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by Surety.

8. Amounts owed by Owner to Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any performance bond. By Contractor furnishing and Owner accepting this Bond, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor and Surety under this Bond, subject to Owner's priority to use the funds for the completion of the Work.

9. Surety shall not be liable to Owner, Claimants, or others for obligations of Contractor that are unrelated to the Contract. Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

10. Surety hereby waives notice of any change, including changes of time, to the Contract or to related subcontracts, purchase orders, and other obligations.

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Paragraph 4.1 or Paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, Owner, or Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

13. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond.

14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

15. Definitions

15.1 Claimant: An individual or entity having a direct contract with Contractor, or with a first-tier subcontractor of Contractor, to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of Contractor and Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

15.2 Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

15.3 Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract, or to perform and complete or otherwise comply with the other terms thereof.

(NO TEXT THIS PAGE)

MAINTENANCE BOND

Bond No._____

KNOW ALL PEOPLE BY THESE PRESENTS:

That we, _____ (hereinafter called CONTRACTOR), and _____, a corporation organized under the laws of the State of _____ and authorized to do a surety business in the State of Indiana, (hereinafter called Surety), are held and firmly bound unto the Town of Sweetser (hereinafter called the OWNER) in the sum of (10% of Contract Price), lawful money of the United States of America, for the payment of which sum, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, said CONTRACTOR has performed improvements, which have been or are about to be completed and accepted by the OWNER for the project known as:

Sweetser Wastewater Improvements

AND WHEREAS, it is required that the CONTRACTOR should guarantee the project from defects caused by faulty or defective materials, workmanship, or design for a period of 1 years from and after the date of acceptance of the completed project by the OWNER.

NOW, THEREFORE, if the CONTRACTOR shall for a period of 1 years from and after the date of acceptance of the completed project by the OWNER replace any and all defects arising in said work whether resulting from faulty or defective materials, workmanship, or design, then the above obligation shall be null and void; otherwise the obligation shall remain in full force and effect for 1 years from the date of acceptance of the completed project by the OWNER.

The OWNER shall notify the CONTRACTOR in writing of any defects for which the CONTRACTOR is responsible and shall specify in said notice a reasonable time within which the CONTRACTOR shall have to correct said defects. If the CONTRACTOR fails to correct said defects within the time specified in said notice, the OWNER, in its discretion, may permit the Surety to correct said defects. If the OWNER allows the Surety to correct said defects, the Surety shall have sixty (60) days thereafter within which to take such action as it deems necessary to insure performance of the CONTRACTOR's obligation.

If such defects are not corrected after the time period specified in the notice or after the expiration of the sixty (60) day time period, whichever is applicable, the OWNER shall have the right to correct the defects, and the CONTRACTOR and Surety, jointly and severally, shall pay all costs and expenses incurred by the OWNER in correcting the defects, including, but not limited to, the ENGINEER, legal and other costs, together with any damages either direct or consequential, which the OWNER sustains, or may sustain, on account of the CONTRACTOR's failure to correct the defects. In addition, the OWNER shall have the right to contract for the correction of said defects and, upon acceptance of a bid in accordance with the OWNER's normal bidding process, the CONTRACTOR and Surety shall become immediately liable for the amount of the bid. In the event that the OWNER commences legal proceedings for the collection thereof, interest shall accrue on said amount at the rate of six (6) percent per annum, beginning at the commencement of said legal proceedings.

If the OWNER commences suit for collection of any sums due hereunder, the CONTRACTOR and Surety, jointly and severally, agree to pay all costs and expenses incurred by the OWNER, including, but not limited to, attorney's fees.

IN WITNESS WHEREOF, the parties have caused this instrument to be signed and sealed by their respective authorized officers this day of Click or tap to enter a date..

CONTRACTOR:

_____

By: _____

Title: _____

Address: _____

_____

SURETY:

_____

By: _____

Title: _____

Address:

_____

_____

WITNESS AS TO CONTRACTOR

_____

lThis document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. *Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.

3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

5. *Bidder*—An individual or entity that submits a Bid to Owner.

6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.

7. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.

8. *Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.

9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.

10. *Claim*—(a) A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein: seeking an adjustment of Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract; or (b) a demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision

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regarding a Change Proposal; or seeking resolution of a contractual issue that Engineer has declined to address. A demand for money or services by a third party is not a Claim.

11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. ("CERCLA"); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5101 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. ("RCRA"); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.

12. *Contract*—The entire and integrated written contract between the Owner and Contractor concerning the Work.

13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.

14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents. .

15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.

16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.

17. *Cost of the Work*—See Paragraph 13.01 for definition.

18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.

19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.

20. *Engineer*—The individual or entity named as such in the Agreement.

21. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.

22. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, does not establish a Hazardous Environmental Condition.

23. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

24. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.

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25. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date or by a time prior to Substantial Completion of all the Work.

26. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.

27. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.

28. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.

29. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

30. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

31. *Project Manual*—The written documents prepared for, or made available for, procuring and constructing the Work, including but not limited to the Bidding Documents or other construction procurement documents, geotechnical and existing conditions information, the Agreement, bond forms, General Conditions, Supplementary Conditions, and Specifications. The contents of the Project Manual may be bound in one or more volumes.

32. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative or "RPR" includes any assistants or field staff of Resident Project Representative.

33. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.

34. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals and the performance of related construction activities.

35. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

36. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.

37. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands furnished by Owner which are designated for the use of Contractor.

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38. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.

39. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.

40. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

41. *Successful Bidder*—The Bidder whose Bid the Owner accepts, and to which the Owner makes an award of contract, subject to stated conditions.

42. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.

43. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.

44. *Technical Data*—Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.

45. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including but not limited to those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

46. *Unit Price Work*—Work to be paid for on the basis of unit prices.

47. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

48. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

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1.02 *Terminology*

A. The words and terms discussed in the following paragraphs are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives*:

1. The Contract Documents include the terms "as allowed," "as approved," "as ordered," "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.

C. *Day*:

1. The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective*:

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

a. does not conform to the Contract Documents; or

b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or 15.04).

E. *Furnish, Install, Perform, Provide*:

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words "perform" or "provide," when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words

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"furnish," "install," "perform," or "provide," then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

A. *Bonds*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

B. *Evidence of Contractor's Insurance*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract), the certificates and other evidence of insurance required to be provided by Contractor in accordance with Article 6.

C. *Evidence of Owner's Insurance*: After receipt of the executed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or otherwise), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully executed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.

B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 *Before Starting Construction*

A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise specifically required by the Contract Documents), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

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2.04 *Preconstruction Conference; Designation of Authorized Representatives*

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.

B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 *Initial Acceptance of Schedules*

A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.03.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.

2.06 *Electronic Transmittals*

A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through access to a secure Project website.

B. If the Contract does not establish protocols for electronic or digital transmittals, then Owner, Engineer, and Contractor shall jointly develop such protocols.

C. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

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ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents.

C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic or digital versions of the Contract Documents (including any printed copies derived from such electronic or digital versions) and the printed record version, the printed record version shall govern.

D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.

E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

3.02 *Reference Standards*

A. Standards Specifications, Codes, Laws and Regulations

1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard specification, manual, reference standard, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*:

1. *Contractor's Verification of Figures and Field Measurements*: Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

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2. *Contractor's Review of Contract Documents*: If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies*:

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:

a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or

b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Requirements of the Contract Documents*

A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work thereunder.

B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.

C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly give written notice to Owner and Contractor that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

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3.05 *Reuse of Documents*

A. Contractor and its Subcontractors and Suppliers shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or

2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.

B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Contract or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Contract. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Contract, whichever date is earlier.

4.02 *Starting the Work*

A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to such date.

4.03 *Reference Points*

A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.

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2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 11.

B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 *Delays in Contractor's Progress*

A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times and Contract Price. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.

C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:

1. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;

2. abnormal weather conditions;

3. acts or failures to act of utility owners (other than those performing other work at or adjacent to the Site by arrangement with the Owner, as contemplated in Article 8); and

4. acts of war or terrorism.

D. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5.

E. Paragraph 8.03 governs delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

F. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor.

G. Contractor must submit any Change Proposal seeking an adjustment in Contract Price or Contract Times under this paragraph within 30 days of the commencement of the delaying, disrupting, or interfering event.

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ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

5.02 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas*:

1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.

2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.12, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or at law; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

B. *Removal of Debris During Performance of the Work*: During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste

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materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning*: Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading of Structures*: Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

5.03 *Subsurface and Physical Conditions*

A. *Reports and Drawings*: The Supplementary Conditions identify:

1. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site;

2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities); and

3. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

5.04 *Differing Subsurface or Physical Conditions*

A. *Notice by Contractor*: If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site either:

1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate; or

2. is of such a nature as to require a change in the Drawings or Specifications; or

3. differs materially from that shown or indicated in the Contract Documents; or

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4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

B. *Engineer's Review*: After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.

C. *Owner's Statement to Contractor Regarding Site Condition*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.

D. *Possible Price and Times Adjustments*:

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

    a. such condition must fall within any one or more of the categories described in Paragraph 5.04.A;

    b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,

    c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:

    a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise; or

    b. the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site

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and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or

c. Contractor failed to give the written notice as required by Paragraph 5.04.A.

3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

5.05 *Underground Facilities*

A. *Contractor's Responsibilities*: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or adjacent to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer do not warrant or guarantee the accuracy or completeness of any such information or data provided by others; and

2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:

a. reviewing and checking all information and data regarding existing Underground Facilities at the Site;

b. locating all Underground Facilities shown or indicated in the Contract Documents as being at the Site;

c. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and

d. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.

B. *Notice by Contractor*: If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer.

C. *Engineer's Review*: Engineer will promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the Underground Facility in question; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and advise Owner in writing of Engineer's findings, conclusions, and

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recommendations. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

D. *Owner's Statement to Contractor Regarding Underground Facility*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question, addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.

E. *Possible Price and Times Adjustments*:

1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, or both, to the extent that any existing Underground Facility at the Site that was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

a. Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated the existence or actual location of the Underground Facility in question;

b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;

c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times; and

d. Contractor gave the notice required in Paragraph 5.05.B.

2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

5.06 *Hazardous Environmental Conditions at Site*

A. *Reports and Drawings*: The Supplementary Conditions identify:

1. those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and

2. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer,

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or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.

D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.

E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.

F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.

G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off.

H. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special

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conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.

I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.I shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6 – BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of all of Contractor's obligations under the Contract. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the Supplementary Conditions, or other specific provisions of the Contract. Contractor shall also furnish such other bonds as are required by the Supplementary Conditions or other specific provisions of the Contract.

B. All bonds shall be in the form prescribed by the Contract except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (as amended and supplemented) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. A bond

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signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

C. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds in the required amounts.

D. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in any state or jurisdiction where any part of the Project is located, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the bond and surety requirements above.

E. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.

F. Upon request, Owner shall provide a copy of the payment bond to any Subcontractor, Supplier, or other person or entity claiming to have furnished labor or materials used in the performance of the Work.

6.02 *Insurance—General Provisions*

A. Owner and Contractor shall obtain and maintain insurance as required in this Article and in the Supplementary Conditions.

B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.

C. Contractor shall deliver to Owner, with copies to each named insured and additional insured (as identified in this Article, in the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Contractor has obtained and is maintaining the policies, coverages, and endorsements required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

D. Owner shall deliver to Contractor, with copies to each named insured and additional insured (as identified in this Article, the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Owner has obtained and is maintaining the policies, coverages, and endorsements required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

E. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor

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to identify a deficiency in compliance from the evidence provided, shall not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.

F. If either party does not purchase or maintain all of the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.

G. If Contractor has failed to obtain and maintain required insurance, Owner may exclude the Contractor from the Site, impose an appropriate set-off against payment, and exercise Owner's termination rights under Article 16.

H. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price shall be adjusted accordingly.

I. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests.

J. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner and other individuals and entities in the Contract.

6.03 *Contractor's Insurance*

A. *Workers' Compensation*: Contractor shall purchase and maintain workers' compensation and employer's liability insurance for:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts.

2. United States Longshoreman and Harbor Workers' Compensation Act and Jones Act coverage (if applicable).

3. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees (by stop-gap endorsement in monopolist worker's compensation states).

4. Foreign voluntary worker compensation (if applicable).

B. *Commercial General Liability—Claims Covered*: Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against:

1. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees.

2. claims for damages insured by reasonably available personal injury liability coverage.

3. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.

C. *Commercial General Liability—Form and Content*: Contractor's commercial liability policy shall be written on a 1996 (or later) ISO commercial general liability form (occurrence form) and include the following coverages and endorsements:

1. Products and completed operations coverage:

a. Such insurance shall be maintained for three years after final payment.

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b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.

2. Blanket contractual liability coverage, to the extent permitted by law, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.

3. Broad form property damage coverage.

4. Severability of interest.

5. Underground, explosion, and collapse coverage.

6. Personal injury coverage.

7. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together); or CG 20 10 07 04 and CG 20 37 07 04 (together); or their equivalent.

8. For design professional additional insureds, ISO Endorsement CG 20 32 07 04, "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.

D. *Automobile liability*: Contractor shall purchase and maintain automobile liability insurance against claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy shall be written on an occurrence basis.

E. *Umbrella or excess liability*: Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the paragraphs above. Subject to industry-standard exclusions, the coverage afforded shall follow form as to each and every one of the underlying policies.

F. *Contractor's pollution liability insurance*: Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result of pollution conditions arising from Contractor's operations and completed operations. This insurance shall be maintained for no less than three years after final completion.

G. *Additional insureds*: The Contractor's commercial general liability, automobile liability, umbrella or excess, and pollution liability policies shall include and list as additional insureds Owner and Engineer, and any individuals or entities identified in the Supplementary Conditions; include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds; and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis. Contractor shall obtain all necessary endorsements to support these requirements.

H. *Contractor's professional liability insurance*: If Contractor will provide or furnish professional services under this Contract, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance shall provide protection against claims arising out of performance of professional design or related services, and caused by a negligent error, omission, or act for which the insured party is legally liable. It shall be maintained throughout the duration of the Contract and for a minimum of two years after Substantial

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Completion. If such professional design services are performed by a Subcontractor, and not by Contractor itself, then the requirements of this paragraph may be satisfied through the purchasing and maintenance of such insurance by such Subcontractor.

I. *General provisions*: The policies of insurance required by this Paragraph 6.03 shall:

1. include at least the specific coverages provided in this Article.

2. be written for not less than the limits of liability provided in this Article and in the Supplementary Conditions, or required by Laws or Regulations, whichever is greater.

3. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 10 days prior written notice has been given to Contractor. Within three days of receipt of any such written notice, Contractor shall provide a copy of the notice to Owner, Engineer, and each other insured under the policy.

4. remain in effect at least until final payment (and longer if expressly required in this Article) and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract Documents.

5. be appropriate for the Work being performed and provide protection from claims that may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable.

J. The coverage requirements for specific policies of insurance must be met by such policies, and not by reference to excess or umbrella insurance provided in other policies.

6.04 *Owner's Liability Insurance*

A. In addition to the insurance required to be provided by Contractor under Paragraph 6.03, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

B. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

6.05 *Property Insurance*

A. *Builder's Risk*: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the full insurable replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the Owner and Contractor as named insureds, and all Subcontractors, and any individuals or entities required by the Supplementary Conditions to be insured under such builder's risk policy, as insureds or named insureds. For purposes of the remainder of this Paragraph 6.05, Paragraphs 6.06 and 6.07, and any corresponding Supplementary Conditions, the parties required to be insured shall collectively be referred to as "insureds."

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2. be written on a builder's risk "all risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire; lightning; windstorm; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; water damage (other than that caused by flood); and such other perils or causes of loss as may be specifically required by the Supplementary Conditions. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance may be provided through other insurance policies acceptable to Owner and Contractor.

3. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.

4. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects).

5. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).

6. extend to cover damage or loss to insured property while in transit.

7. allow for partial occupation or use of the Work by Owner, such that those portions of the Work that are not yet occupied or used by Owner shall remain covered by the builder's risk insurance.

8. allow for the waiver of the insurer's subrogation rights, as set forth below.

9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.

10. not include a co-insurance clause.

11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.

12. include performance/hot testing and start-up.

13. be maintained in effect, subject to the provisions herein regarding Substantial Completion and partial occupancy or use of the Work by Owner, until the Work is complete.

B. *Notice of Cancellation or Change*: All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this

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Paragraph 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured.

C. *Deductibles*: The purchaser of any required builder's risk or property insurance shall pay for costs not covered because of the application of a policy deductible.

D. *Partial Occupancy or Use by Owner*: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide notice of such occupancy or use to the builder's risk insurer. The builder's risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder's risk policy, while those portions of the Work not yet occupied or used by Owner shall remain covered by the builder's risk insurance.

E. *Additional Insurance*: If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.05, it may do so at Contractor's expense.

F. *Insurance of Other Property*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such property item will be responsible for deciding whether to insure it, and if so in what amount.

6.06 *Waiver of Rights*

A. All policies purchased in accordance with Paragraph 6.05, expressly including the builder's risk policy, shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all Subcontractors, all individuals or entities identified in the Supplementary Conditions as insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by,

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arising out of, or resulting from fire or other perils whether or not insured by Owner; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 6.06.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them.

D. Contractor shall be responsible for assuring that the agreement under which a Subcontractor performs a portion of the Work contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by builder's risk insurance and any other property insurance applicable to the Work.

6.07 *Receipt and Application of Property Insurance Proceeds*

A. Any insured loss under the builder's risk and other policies of insurance required by Paragraph 6.05 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.05 shall distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.

C. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the money so received applied on account thereof, and the Work and the cost thereof covered by Change Order, if needed.

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

7.01 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.

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B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.02 *Labor; Working Hours*

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

7.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.

B. All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

7.04 *"Or Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment, or items from other proposed suppliers under the circumstances described below.

1. If Engineer in its sole discretion determines that an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer shall deem it an "or equal" item. For the purposes of this paragraph, a proposed item of material or equipment will be considered functionally equal to an item so named if:

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a. in the exercise of reasonable judgment Engineer determines that:

1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;

3) it has a proven record of performance and availability of responsive service; and

4) it is not objectionable to Owner.

b. Contractor certifies that, if approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times; and

2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

B. *Contractor's Expense*: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.

C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal", which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request shall result in any change in Contract Price. The Engineer's denial of an "or-equal" request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents.

E. *Treatment as a Substitution Request*: If Engineer determines that an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer considered the proposed item as a substitute pursuant to Paragraph 7.05.

7.05 *Substitutes*

A. Unless the specification or description of an item of material or equipment required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment under the circumstances described below. To the extent possible such requests shall be made before commencement of related construction at the Site.

1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of material or equipment from anyone other than Contractor.

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2. The requirements for review by Engineer will be as set forth in Paragraph 7.05.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

3. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

    a. shall certify that the proposed substitute item will:

        1) perform adequately the functions and achieve the results called for by the general design,

        2) be similar in substance to that specified, and

        3) be suited to the same use as that specified.

    b. will state:

        1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times,

        2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and

        3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.

    c. will identify:

        1) all variations of the proposed substitute item from that specified, and

        2) available engineering, sales, maintenance, repair, and replacement services.

    d. shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.

B. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.

C. *Special Guarantee*: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

D. *Reimbursement of Engineer's Cost*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the

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Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.

F. *Effect of Engineer's Determination*: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.05.D, by timely submittal of a Change Proposal.

7.06 *Concerning Subcontractors, Suppliers, and Others*

A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner.

B. Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract to do so.

C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against which Contractor has reasonable objection.

D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable, during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within five days.

E. Owner may require the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors, Suppliers, or other individuals or entities for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor, Supplier, or other individual or entity so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity.

F. If Owner requires the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, or both, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.

G. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

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H. On a monthly basis Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.

I. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions.

J. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.

K. Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.

L. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

M. All Work performed for Contractor by a Subcontractor or Supplier shall be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.

N. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.

O. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier, or other individual or entity; nor

2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

7.07 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the

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performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.

C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

7.08 *Permits*

A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work

7.09 *Taxes*

A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

7.10 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It shall not be Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

C. Owner or Contractor may give notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if

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any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.11 *Record Documents*

A. Contractor shall maintain in a safe place at the Site one printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved Shop Drawings. Contractor shall keep such record documents in good order and annotate them to show changes made during construction. These record documents, together with all approved Samples, will be available to Engineer for reference. Upon completion of the Work, Contractor shall deliver these record documents to Engineer.

7.12 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify Owner; the owners of adjacent property, Underground Facilities, and other utilities; and other contractors and utility owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.

C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.

D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

E. All damage, injury, or loss to any property referred to in Paragraph 7.12.A.2 or 7.12.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly

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or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

F. Contractor's duties and responsibilities for safety and protection shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 15.06.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

G. Contractor's duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.13 *Safety Representative*

A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

7.14 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

7.15 *Emergencies*

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

7.16 *Shop Drawings, Samples, and Other Submittals*

A. *Shop Drawing and Sample Submittal Requirements*:

1. Before submitting a Shop Drawing or Sample, Contractor shall have:

a. reviewed and coordinated the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

c. determined and verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that submittal, and that Contractor approves the submittal.

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3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.

B. *Submittal Procedures for Shop Drawings and Samples*: Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals. Each submittal will be identified as Engineer may require.

1. *Shop Drawings*:

a. Contractor shall submit the number of copies required in the Specifications.

b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.D.

2. *Samples*:

a. Contractor shall submit the number of Samples required in the Specifications.

b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 7.16.D.

3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Other Submittals*: Contractor shall submit other submittals to Engineer in accordance with the accepted Schedule of Submittals, and pursuant to the applicable terms of the Specifications.

D. *Engineer's Review*:

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.

3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

4. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and

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Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order.

5. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 7.16.A and B.

6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.

7. Neither Engineer's receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall result in such item becoming a Contract Document.

8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.D.4.

E. *Resubmittal Procedures*:

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

2. Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.

3. If Contractor requests a change of a previously approved submittal item, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

7.17 *Contractor's General Warranty and Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on Contractor's warranty and guarantee.

B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

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1. observations by Engineer;
2. recommendation by Engineer or payment by Owner of any progress or final payment;
3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
4. use or occupancy of the Work or any part thereof by Owner;
5. any review and approval of a Shop Drawing or Sample submittal;
6. the issuance of a notice of acceptability by Engineer;
7. any inspection, test, or approval by others; or
8. any correction of defective Work by Owner.

D. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract shall govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.

B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 7.18.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

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7.19 *Delegation of Professional Design Services*

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable Laws and Regulations.

B. If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this paragraph, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 7.16.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria specified by Owner or Engineer.

ARTICLE 8 – OTHER WORK AT THE SITE

8.01 *Other Work*

A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.

B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any utility work at or adjacent to the Site, Owner shall provide such information to Contractor.

C. Contractor shall afford each other contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or

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alter others' work with the written consent of Engineer and the others whose work will be affected.

D. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 8, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

8.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:

1. the identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;

2. an itemization of the specific matters to be covered by such authority and responsibility; and

3. the extent of such authority and responsibilities.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

8.03 *Legal Relationships*

A. If, in the course of performing other work at or adjacent to the Site for Owner, the Owner's employees, any other contractor working for Owner, or any utility owner for whom the Owner is responsible causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment shall take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract. When applicable, any such equitable adjustment in Contract Price shall be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due to Contractor, and assign to such other contractor or utility owner the Owner's contractual

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rights against Contractor with respect to the breach of the obligations set forth in this paragraph.

C. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due to Contractor.

D. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

ARTICLE 9 – OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

9.02 *Replacement of Engineer*

A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents shall be that of the former Engineer.

9.03 *Furnish Data*

A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

9.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

9.05 *Lands and Easements; Reports, Tests, and Drawings*

A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.

B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.

C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

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9.06 *Insurance*

A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

9.07 *Change Orders*

A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.

9.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 *Limitations on Owner's Responsibilities*

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

9.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 *Evidence of Financial Arrangements*

A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.

B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract.

10.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On

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the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.08. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 *Project Representative*

A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 10.08. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent, or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

10.04 *Rejecting Defective Work*

A. Engineer has the authority to reject Work in accordance with Article 14.

10.05 *Shop Drawings, Change Orders and Payments*

A. Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, are set forth in Paragraph 7.16.

B. Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, are set forth in Paragraph 7.19.

C. Engineer's authority as to Change Orders is set forth in Article 11.

D. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.06 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

10.07 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.08 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, shall create, impose, or give rise to any duty in

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contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 15.06.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 10.08 shall also apply to the Resident Project Representative, if any.

10.09 *Compliance with Safety Program*

A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs (if any) of which Engineer has been informed.

ARTICLE 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK

11.01 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.

1. *Change Orders*:

a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.

b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, without the recommendation of the Engineer. Such an amendment shall be set forth in a Change Order.

2. *Work Change Directives*: A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents

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governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.

3. *Field Orders*: Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.02 *Owner-Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Such changes shall be supported by Engineer's recommendation, to the extent the change involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters. Such changes may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work shall be performed under the applicable conditions of the Contract Documents. Nothing in this paragraph shall obligate Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.03 *Unauthorized Changes in the Work*

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.

11.04 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment of Contract Price shall comply with the provisions of Article 12.

B. An adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.C.2); or

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3. where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.04.C).

C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee shall be 15 percent;

b. for costs incurred under Paragraph 13.01.B.3, the Contractor's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.04.C.2.a and 11.04.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;

e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 11.04.C.2.a through 11.04.C.2.e, inclusive.

11.05 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment in the Contract Times shall comply with the provisions of Article 12.

B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor's progress.

11.06 *Change Proposals*

A. Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; appeal an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under

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the Contract. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.

1. *Procedures*: Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal.

2. *Engineer's Action*: Engineer will review each Change Proposal and, within 30 days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

3. *Binding Decision*: Engineer's decision will be final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.

B. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

11.07 *Execution of Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders covering:

1. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;

2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;

3. changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.02, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and

4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.

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B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of this Paragraph 11.07, it shall be deemed to be of full force and effect, as if fully executed.

11.08 *Notification to Surety*

A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

ARTICLE 12 – CLAIMS

12.01 *Claims*

A. *Claims Process*: The following disputes between Owner and Contractor shall be submitted to the Claims process set forth in this Article:

1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;

2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and

3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.

B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim shall be stated in writing and submitted to the other party, with a copy to Engineer.

D. *Mediation*:

1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate shall stay the Claim submittal and response process.

2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process shall resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal

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and decision process shall resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.

E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action shall be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.

F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim shall be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.

G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim shall be incorporated in a Change Order to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

ARTICLE 13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 *Cost of the Work*

A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:

1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.

B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 13.01.C, and shall include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing

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Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

    a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

    b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

    c. Rentals of all construction equipment and machinery, and the parts thereof, whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

    d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.

    e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

    f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 6.05), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or

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indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

C. *Costs Excluded*: The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

D. *Contractor's Fee*: When the Work as a whole is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 11.04.C.

E. *Documentation*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

13.02 *Allowances*

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

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B. *Cash Allowances*: Contractor agrees that:

1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. *Contingency Allowance*: Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

13.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of the following paragraph.

E. Within 30 days of Engineer's written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price if:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement;

2. there is no corresponding adjustment with respect to any other item of Work; and

3. Contractor believes that it is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price, and the parties are unable to agree as to the amount of any such increase or decrease.

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ARTICLE 14 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

14.01 *Access to Work*

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

14.02 *Tests, Inspections, and Approvals*

A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.

B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:

1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;

2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;

3. by manufacturers of equipment furnished under the Contract Documents;

4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and

5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests shall be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.

F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to

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cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

A. *Contractor's Obligation*: It is Contractor's obligation to assure that the Work is not defective.

B. *Engineer's Authority*: Engineer has the authority to determine whether Work is defective, and to reject defective Work.

C. *Notice of Defects*: Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.

D. *Correction, or Removal and Replacement*: Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.

E. *Preservation of Warranties*: When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

F. *Costs and Damages*: In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work shall be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 *Uncovering Work*

A. Engineer has the authority to require additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.

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C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.

1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.

2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *Owner May Stop the Work*

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

14.07 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, then Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.

C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

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D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 *Progress Payments*

A. *Basis for Progress Payments*: The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.

B. *Applications for Payments*:

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens, and evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. *Review of Applications*:

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

a. the Work has progressed to the point indicated;

b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon

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Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and

c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

   a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or

   b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

   a. to supervise, direct, or control the Work, or

   b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

   c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

   d. to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price, or

   e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.

6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:

   a. the Work is defective, requiring correction or replacement;

   b. the Contract Price has been reduced by Change Orders;

   c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

   d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or

   e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

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D. *Payment Becomes Due*:

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

E. *Reductions in Payment by Owner*:

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:

    a. claims have been made against Owner on account of Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages on account of Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

    b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;

    c. Contractor has failed to provide and maintain required bonds or insurance;

    d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;

    e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;

    f. the Work is defective, requiring correction or replacement;

    g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

    h. the Contract Price has been reduced by Change Orders;

    i. an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;

    j. liquidated damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;

    k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

    l. there are other items entitling Owner to a set off against the amount recommended.

2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

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3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 15.01.C.1 and subject to interest as provided in the Agreement.

15.02 *Contractor's Warranty of Title*

A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than seven days after the time of payment by Owner.

15.03 *Substantial Completion*

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which shall fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.

E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.

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F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. At any time Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through E for that part of the Work.

2. At any time Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.05 regarding builder's risk or other property insurance.

15.05 *Final Inspection*

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 *Final Payment*

A. *Application for Payment*:

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.11), and other documents, Contractor may make application for final payment.

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2. The final Application for Payment shall be accompanied (except as previously delivered) by:

    a. all documentation called for in the Contract Documents;

    b. consent of the surety, if any, to final payment;

    c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

    d. a list of all disputes that Contractor believes are unsettled; and

    e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

B. *Engineer's Review of Application and Acceptance*:

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the Application for Payment to Owner for payment. Such recommendation shall account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to the provisions of Paragraph 15.07. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Completion of Work*: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment.

D. *Payment Becomes Due*: Thirty days after the presentation to Owner of the final Application for Payment and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer's recommendation, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor.

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15.07 *Waiver of Claims*

A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor's failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from outstanding Claims by Owner, or from Contractor's continuing obligations under the Contract Documents.

B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted or appealed under the provisions of Article 17.

15.08 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. correct the defective repairs to the Site or such other adjacent areas;

2. correct such defective Work;

3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

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ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

16.01 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension. Any Change Proposal seeking such adjustments shall be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);

2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;

3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or

4. Contractor's repeated disregard of the authority of Owner or Engineer.

B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) ten days written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to:

1. declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and

2. enforce the rights available to Owner under any applicable performance bond.

C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.

D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.

E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When

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exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.

G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate For Convenience*

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and

3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

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ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

A. *Disputes Subject to Final Resolution*: The following disputed matters are subject to final resolution under the provisions of this Article:

1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full; and

2. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents, and arising after final payment has been made.

B. *Final Resolution of Disputes*: For any dispute subject to resolution under this Article, Owner or Contractor may:

1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions; or

2. agree with the other party to submit the dispute to another dispute resolution process; or

3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18 – MISCELLANEOUS

18.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

18.02 *Computation of Times*

A. When any period of time is referred to in the Contract by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

18.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

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18.04 *Limitation of Damages*

A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

A. A party's non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

18.07 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.

18.08 *Headings*

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

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SECTION 00 73 00 - SUPPLEMENTARY CONDITIONS

GENERAL

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract, EJCDC® C-700 (2013 Edition). All provisions that are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

The address system used in these Supplementary Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added thereto.

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1) 1 – DEFINITIONS AND TERMINOLOGY

a) 1.01.A. Defined Terms

Add new paragraph 1.01.A.49 and 1.01.A.50 immediately after paragraph 1.01.A.48 of the General Conditions which shall read as follows:

49. "Additional Insureds", except where otherwise expressly defined, shall mean:

Town of Sweetser, Indiana
DCCM

2) 2 – PRELIMINARY MATTERS

a) 2.02 Copies of Documents

SC-2.02.A. Amend the first sentence of Paragraph 2.02.A. to read as follows:

Owner shall furnish to Contractor two (2) copies of the Contract Documents (including one fully executed counterpart of the Agreement), and one copy in electronic portable document format (PDF).

3) 3 – DOCUMENT: INTENT, REQUIREMENTS, REUSE

a) 3.01 Intent

SC-3.01.E. Add new Paragraph 3.01.E.1 immediately after Paragraph 3.01.E:

(1) Engineer will issue, within five working days of receipt, such written clarifications or interpretations of the requirement of the Contract Documents (in a form as determined by Engineer) as Engineer may determine necessary, which shall be consistent with the intent of and reasonably inferable from Contract Documents. If Engineer determines, based upon the nature of the requested clarification or interpretation, that the response cannot be

furnished in five working days, Engineer will advise the Contractor giving a schedule for furnishing the information.

SC-3.03.B. Add new Paragraph 3.03.B.1.c immediately after Paragraph 3.03.B.1.b:

1. In case of conflict, drawings shall govern over specifications.

4) 4 – COMMENCEMENT AND PROGRESS OF THE WORK

a) 4.01 Commencement of Contract Times; Notice to Proceed

SC-4.01.A Delete Paragraph 4.01.A. in its entirety and insert the following new paragraph in its place:

i) The Contract Times will commence on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement.

b) 4.04 Progress Schedule

SC-4.04.C Add new Paragraph 4.04.C. immediately after Paragraph 4.04.B.:

iii) Provide an updated Progress Schedule with each Application for Payment.

c) 4.05 Delay's in Contractor's Progress

SC-4.05.A Delete Paragraph 4.05.A. in its entirety and insert the following new paragraph in its place:

A. No claim for payment, compensation or adjustment of any kind (other than the extensions of time provided for herein) shall be made or asserted against the Owner or Engineer by the Provider for damages caused by hindrances or delays from any cause, whether such hindrances or delays be avoidable or unavoidable, and the Provider shall make no claim for damages by reason of any such hindrances or delays, and will accept in full satisfaction of such hindrances or delays an extension of time to complete the performance of the Work as specified.

5) 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

a) 5.03 Subsurface and Physical Conditions

SC-5.03 Add the following new paragraphs immediately after Paragraph 5.03.B:

C. The following reports of explorations and tests of subsurface conditions at or adjacent to the Site are known to Owner:

1. NOT APPLICABLE

b) 5.06 Hazardous Environmental Conditions

SC 5.06 Delete Paragraphs 5.06.A and 5.06.B in their entirety and insert the following:

A. No reports or drawings related to Hazardous Environmental Conditions at the Site are known to Owner.

B. Not Used.

6) 6 – BONDS AND INSURANCE

a) 6.01 Performance, Payment and Other Bonds

Add new paragraph 6.01.A.1. immediately after paragraph 6.01.A of the General Conditions which shall read as follows:

1. Contractor shall submit the Maintenance Bond within ten (10) days of acceptance of the project by the Owner, for an amount equal to ten percent (10%) of the final contract amount, guaranteeing for a period of one (1) years after the date of acceptance of the project by the Owner.

b) 6.02 Insurance—General Provisions

Add new paragraph 6.02.A.1. immediately after paragraph 6.02.A of the General Conditions which shall read as follows:

1. Contractor may obtain worker's compensation insurance from an insurance company that has not been rated by A.M. Best, provided that such company (a) is domiciled in the state in which the project is located, (b) is certified or authorized as a worker's compensation insurance provider by the appropriate state agency, and (c) has been accepted to provide worker's compensation insurance for similar projects by the state within the last 12 months.

c) 6.03 Contractor's Insurance

Add new paragraph 6.03.J immediately after paragraph 6.03.K of the General Conditions which shall read as follows:

K. The limits of liability for the insurance required by Paragraph 6.03 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. Workers' Compensation, and related coverages under Paragraphs 6.03.A.1 and A.2 of the General Conditions:

State:	Statutory
Federal, if applicable (e.g., Longshoreman's):	Statutory
Employer's Liability:	$1,000,000
Foreign voluntary worker compensation	Statutory

2. Contractor's Commercial General Liability under Paragraphs 6.03.B and 6.03.C of the General Conditions which shall include complete operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody and control of Provider:

General Aggregate	$ 3,000,000
Products - Completed Operations Aggregate	$ 2,000,000
Each Occurrence (Bodily Injury and Property Damage)	$ 1,000,000

3. Automobile Liability under Paragraph 6.03.D. of the General Conditions:

Bodily Injury:	
Each person	$ 500,000
Each accident	$ 1,000,000
Property Damage:	
Each accident	$ 1,000,000
Combined Single Limit of	$ 1,000,000

4. Excess or Umbrella Liability:

Per Occurrence	$ 1,000,000
General Aggregate	$ 3,000,000

5. Contractor's Professional Liability:

Each Claim	$ 1,000,000
Annual Aggregate	$ 3,000,000

d) 6.04 Owner's Liability Insurance

Delete Paragraphs 6.04.A and 6.04.B in their entirety and insert the following:

i) Contractor shall purchase and maintain until the date of final acceptance, Owner's and Contractor's Protective Liability Insurance to protect Owner, including its employees, officers, and agents against claims which may arise from the operations of the Contractor, or his subcontractors. The coverage shall be for not less than the following amounts or greater where required by law or regulation:

Combination of Primary and Umbrella Coverage	$ 5,000,000

This insurance shall also cover the Engineer, DCCM, DCCM's subconsultants or such other engineer or engineers as may act under the Contract, against similar claims.

ii) Not Used.

e) 6.05 Property Insurance

Delete Paragraphs 6.05.A.13 and 6.05.B in their entirety and insert the following:

13. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued.

ii) Not used.

7) 7 – CONTRACTOR'S RESPONSIBILITIES

a) 7.01 Supervision and Superintendence

Add new paragraphs 7.01.C and 7.01.D immediately after paragraph 7.01.B of the General Conditions which shall read as follows:

i) The Superintendent will be Contractor's representative at the Site and shall have authority to act on behalf of the Contractor. All communications given to or received from the Superintendent shall be binding on Contractor.

ii) Prior to the Acceptance of Contractor's Bid, the Owner will require Contractor to submit the identity and related experience of the Contractor's proposed Superintendent and Project Management Personnel to better evaluate the Contractor's past performance. Submitted information shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such individual. If Owner or Engineer, after due investigation, has objection to any proposed Personnel, Owner may, before the Notice of Award is given, request Contractor to submit a substitute, without an increase in the Bid Price. Any Personnel so listed and against which Owner or Engineer makes no written objection prior to the giving of Notice of Award will be deemed acceptable to Owner and Engineer. The Contractor's proposed replacement of the Superintendent or Project Management Personnel shall also be subject to these requirements.

b) 7.02 Labor; Working Hours

SC-7.02.B. Add the following new subparagraphs immediately after Paragraph 7.02.B:

1. Work Hours: Perform work between 7:00 AM and 7:00 PM Mondays through Fridays only. Emergency work may be performed anytime without the Owner's written consent required in paragraph 7.02.B.

2. Work After Hours: Night work may be established by Contractor as regular procedure with written consent of Owner. Such consent, however, may be revoked at any time by Owner if Contractor fails to maintain adequate equipment and supervision for proper prosecution and control of night work.

3. Owner's legal holidays are New Years Day, Martin Luther King Day, President's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Columbus Day, Veteran's Day, Thanksgiving Day, Day after Thanksgiving, Day before Christmas Eve, Christmas Eve Day, Christmas Day, Day after Christmas Day.

SC-7.02.C. Add the following new paragraph immediately after Paragraph 7.02.B:

Contractor is responsible for the cost of any overtime pay or other expense incurred by the Owner for Engineer's services (including those of the Resident Project Representative, if any), Owner's representative, and construction observation services,

occasioned by the performance of Work on Saturday, Sunday, any legal holiday, or as overtime on any regular work day. If Contractor is responsible but does not pay, or if the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under Article 15.

c) 7.08 Permits

SC 7.08 Add a new paragraph immediately after Paragraph 7.08.A:

B. Prior to construction beginning, Owner will have obtained the following permits:

(1) IDEM Construction Permit

(2) Easement Acquisition, if applicable

d) 7.09 Taxes

SC 7.09 Add a new paragraph immediately after Paragraph 7.09.A:

B. Owner is exempt from payment of sales and compensating use taxes (Indiana Gross Retail Tax) of the State of Indiana and of cities and counties thereof on all materials to be incorporated into the Work.

1. Owner will furnish the required certificates of tax exemption to Contractor for use in the purchase of supplies and materials to be incorporated into the Work.

2. Owner's exemption does not apply to construction tools, machinery, equipment, or other property purchased by or leased by Contractor, or to supplies or materials not incorporated into the Work.

e) 7.10 Laws and Regulations

SC 7.10 Add a new paragraph immediately after Paragraph 7.10.C:

D. Financing of the project will be through the State Revolving Fund administered by the Indiana Finance Authority.

E. Financing of the project will be through the Community Development Block Grant from Office of Community and Rural Affairs (OCRA).

f) 7.12 Safety and Protection

SC 7.12 Add the following new paragraphs 4., 5., 6., and 7. immediately after Paragraph 7.12.A.3.:

(4) No Duty. The duty of the Owner or Engineer to observe Contractor's performance does not include any review of the adequacy of Contractor's safety measures in, on, or near the Work site or sites. Engineer has not been retained or compensated to provide design and construction review services relating to Contractor's safety precautions required for Contractor to perform the Work.

(5) No Liability. Neither the Owner, nor an official or employee of the Owner, nor the Engineer, or any authorized assistant or agent of any of them, shall be responsible for safety precautions and programs in connection with the Work or any liability arising therefrom.

(6) Protection of Operations. The Contractor shall take all necessary precautions so as to cause no unauthorized interruption in any essential part of the distribution system operations. Shutdowns for construction Work shall be scheduled in advance (minimum 14 days notice), carefully planned, and shall be carried out in close cooperation with the Owner.

(7) Special Requirements for Structural Design. All structures to be provided by the Contractor, that require structural design shall be designed and constructed under the observation of a structural engineer, registered in the State of Indiana, acting for and retained by the Contractor. Drawings and calculations for such structures shall be prepared and sealed by the structural engineer and submitted to the Engineer and Owner for record. A clear outline of the proposed construction procedure shall be shown on the drawings. A statement in writing by the structural engineer attesting that said engineer has visited the Work site or sites, that the design does satisfy the conditions as actually encountered and that the actual construction conforms to the drawings and calculations, as submitted, must be submitted to the Engineer before the Work related to such structures will be considered complete.

All temporary structures, including sheeting and bracing for excavations, that affect the safety of the public, workmen, inspectors, or Owner's or Engineer's personnel shall be regarded as structures that require structural design.

g) 7.16 Shop Drawings, Samples, and Other Submittals

SC 7.16 Delete paragraph 7.16.D.8. in its entirety and insert the following: Furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than two submittals. Engineer will record Engineer's time for reviewing a third or subsequent submittal of a Shop Drawing, sample, or other item requiring approval, and Provider shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due to Provider to secure reimbursement for such charges.

SC 7.16 Add the following new paragraph 9. immediately after Paragraph 7.16.D.8.:

(9) Engineer, generally, will process shop drawings and return them to the Contractor in not more than 10 working days from day of receipt. If the nature of the shop drawings is such that the review cannot be completed in 10 working days, Engineer will advise the Contractor giving a schedule for performing the review.

8) 8 – OTHER WORK AT THE SITE

a) 8.02 Coordination

SC-8.02 Add the following new Paragraph 8.02.C. immediately after Paragraph 8.02.B.:

C. Should Contractor cause damage to the Work or property of any separate contractor at the site, or should any claim arising out of Contractor's performance of the Work at the site be made by any separate contractor against Contractor, Owner, Engineer, Engineer's Consultants, or any other person, Contractor shall promptly attempt to settle with such other contractor by agreement, or to otherwise resolve the dispute by arbitration or at law. Contractor shall, to the fullest

extent permitted by Laws and Regulations, indemnify and hold Owner, Engineer, and Engineer's Consultants harmless from and against all claims, damages, losses and expenses (including, but not limited to, fees of engineers, architects, attorneys and other professionals and court and arbitration costs) arising directly, indirectly or consequentially out of any action, legal or equitable, brought by any separate contractor against Owner, Engineer, or Engineer's Consultants to the extent based on a claim arising out of Contractor's performance of the Work. Should a separate contractor cause damage to the Work or property of Contractor or should the performance of Work by any separate contractor at the site give rise to any other claim, Contractor shall not institute any action, legal, or equitable, against Owner, Engineer, or Engineer's Consultants or permit any action against any of them to be maintained and continued in its name of for its benefit in any court or before any arbiter which seeks to impose liability on or to recover damages from Owner, Engineer, or Engineer's Consultants on account of any such damage or claim. If Contractor is delayed at any time in performing or furnishing Work by any act or neglect of a separate contractor and Owner and Contractor are unable to agree as to the extent of any adjustment in Contract Times attributable thereto, Contractor may make a claim for an extension of times in accordance with Article 11. An extension of the Contract Times shall be Contractor's exclusive remedy with respect to Owner, Engineer, and Engineer's Consultants for any delay, disruption, interference, or hindrance caused by any separate contractor. This paragraph does not prevent recovery from Owner, Engineer, or Engineer's Consultants for activities that are their respective responsibilities.

9) 10 – ENGINEER'S STATUS DURING CONSTRUCTION

a) 10.03 Project Representative

SC-10.03 Add the following new paragraphs immediately after Paragraph 10.03.A:

B. The Resident Project Representative (RPR) will be Engineer's representative at the Site, will act as directed by and under the supervision of Engineer, and will confer with Engineer regarding RPR's actions.

1. General: RPR's dealings in matters pertaining to the Work in general shall be with Engineer and Contractor. RPR's dealings with Subcontractors shall only be through or with the full knowledge and approval of Contractor. RPR shall generally communicate with Owner only with the knowledge of and under the direction of Engineer.

2. Liaison:

a. The RPR will generally serve as the Engineer's liaison with Contractor. Working principally through Contractor's authorized representative or designee, assist in providing information regarding the provisions and intent of the Contract Documents.

b. Assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-Site operations.

c. Assist in obtaining from Owner additional details or information, when required for proper execution of the Work.

3. Review of Work and Rejection of Defective Work:

    a. Conduct on-Site observations of Contractor's work in progress to assist Engineer in determining if the Work is in general proceeding in accordance with the Contract Documents.

    b. Report to Engineer whenever RPR believes that any part of Contractor's work in progress is defective, will not produce a completed Project that conforms generally to the Contract Documents, or will imperil the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise Engineer of that part of work in progress that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.

4. Inspections, Tests, and System Start-ups:

    a. Verify that tests, equipment, and systems start-ups and operating and maintenance training are conducted in the presence of appropriate Owner's personnel, and that Contractor maintains adequate records thereof.

    b. Observe, record, and report to Engineer appropriate details relative to the test procedures and systems start-ups.

5. Records:

    a. Prepare a daily report or keep a diary or log book, recording Contractor's hours on the Site, Subcontractors present at the Site, weather conditions, data relative to questions of Change Orders, Field Orders, Work Change Directives, or changed conditions, Site visitors, deliveries of equipment or materials, daily activities, decisions, observations in general, and specific observations in more detail as in the case of observing test procedures; and send copies to Engineer.

    b. Record names, addresses, fax numbers, e-mail addresses, web site locations, and telephone numbers of all Contractors, Subcontractors, and major Suppliers of materials and equipment.

    c. Maintain records for use in preparing Project documentation.

6. Payment Requests: Review applications for payment with Contractor for compliance with the established procedure for their submission and forward with recommendations to Engineer, noting particularly the relationship of the payment requested to the Schedule of Values, Work completed, and materials and equipment delivered at the Site but not incorporated in the Work.

7. Completion:

    a. Participate in Engineer's visits to the Site to determine Substantial Completion, assist in the determination of Substantial Completion and the preparation of a punch list of items to be completed or corrected.

b. Participate in Engineer's final visit to the Site to determine completion of the Work, in the company of Owner and Contractor, and prepare a final punch list of items to be completed and deficiencies to be remedied.

c. Observe whether all items on the final list have been completed or corrected and make recommendations to Engineer concerning acceptance and issuance of the notice of acceptability of the work.

C. The RPR shall not:

1. Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).

2. Exceed limitations of Engineer's authority as set forth in the Contract Documents.

3. Undertake any of the responsibilities of Contractor, Subcontractors, or Suppliers.

4. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of Contractor's work.

5. Advise on, issue directions regarding, or assume control over security or safety practices, precautions, and programs regarding the activities or operations of Owner or Contractor.

6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.

7. Accept Shop Drawing or Sample submittals from anyone other than Contractor.

8. Authorize Owner to occupy the Project in whole or in part.

10) 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK

a) 11.07 Execution of Change Orders

SC 11.07.C Add the following new paragraph immediately after Paragraph 11.07.C.:

D. After execution of a Change Order, Contractor shall update the Project Schedule and/or Schedule of Values to reflect the agreed upon changes in Contract Price and/or Contract Time.

13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

b) 13.03 Unit Price Work

SC 13.03.E Delete Paragraph 13.03.E in its entirety.

14 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

c) 14.02 Tests, Inspections, and Approvals

SC 14.02.B Delete Paragraph 14.02.B. in its entirety and insert the following in its place:

B. Contractor shall employ and pay for the services of an independent testing laboratory to perform all inspections, test or approvals required by the Contract Documents except as otherwise specifically provided in the Contract Documents.

15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

d) 15.01 Progress Payments:

SC 15.01.B Add the following new subparagraph to Paragraph 15.01.B.1.:

a. Submit three copies of each application on a form approved by the Owner. Present required information in typewritten form or on electronic media printout.

SC 15.01.B Add the following new Paragraph 15.01.B.4. immediately after Paragraph 15.01.B.3.:

4. Stored Materials - Individual items with value of not less than $10,000 are eligible for payment by Owner as stored materials. Contractor may request payment of stored materials as approved by the Owner, submit a separate schedule for Materials Stored showing line item, description, previous value received, value incorporated into the work, and present value. Payment for stored materials is not guaranteed.

SC 15.01.C Add the following new Paragraph 15.01.C.7. immediately after Paragraph 15.01.C.6.:

7. Keep all record drawings up to date. Engineer's review and recommendation for payment to the Owner is subject to the Contractor maintaining all record drawings are in alignment with the progress of the Work.

SC 15.01.D Delete Paragraph 15.01.D in its entirety and insert the following in its place:

1. Thirty days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

e) 15.03 Substantial Completion

SC 15.03.B Add the following new subparagraph to Paragraph 15.03.B:

(1) If some or all of the Work has been determined not to be at a point of Substantial Completion and will require re-inspection or re-testing by Engineer, the cost of such re-inspection or re-testing, including the cost of time, travel and living expenses, shall be paid by the Contractor to Owner. If Contractor does not pay, or the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under Article 15.

11) 18 – MISCELLANEOUS

a) 18.09 Wage Rates

SC-18.09 Add the following new paragraph immediately after Paragraph 18.08.

18.09 Wage Rates

A. Wage rates for the Work shall be not less than the prescribed United States Department of Labor rates attached to these Supplementary Conditions, as

modified an in effect on the effective date of the Agreement. Contractor may obtain the wage rates from the following website:

https://www.wdol.gov/dba.aspx

2. Browse All Determinations by State
3. Click on Indiana
4. Select Grant County – Heavy or Highway

SC-18.11 Office of Community and Rural Affairs (OCRA) Requirements

SC-18.11 Add the following new paragraph immediately after Paragraph 18.10.

18.11 OCRA requirements

A. OCRA materials regarding general compliance with bidding and Contract Documents applicable to this project are attached as exhibits to the Contract Documents.

SC-18.13 Disadvantaged Business Enterprise

SC-18.13 Add the following new paragraph immediately after Paragraph 18.12.

18.13 Disadvantaged Business Enterprise

A. Take all necessary affirmative steps to assure that minority and women's business enterprises are used when possible. Affirmative steps shall include taking the following actions for all of these two (2) types of enterprises:

(1) Placing qualified enterprises on solicitation lists:

(2) Assuring that these enterprises are solicited whenever they are potential sources.

(3) Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by these enterprises.

(4) Establishing delivery schedules, where the requirement permits, which encourage participation by these enterprises.

(5) Using the services and assistance of the Small Business Administration and the Minority Business Development Agency of the Department of Commerce.

(6) Requiring each subcontractor to take the affirmative steps 1. through 5. above.

Disadvantaged Business Enterprise forms and guidance are attached as Exhibit E to the Supplementary Conditions.

b) 18.14 Prohibition of Discrimination

SC-18.14 Add the following new paragraph immediately after Paragraph 18.13.

18.14 Prohibition of Discrimination

B. The Contractor agrees:

1. That in the hiring of employees for the performance of work under this Contract or any subcontract hereunder, no contractor, or subcontractor, nor any person acting on behalf of such contractor or subcontractor, shall, by reason of race, religion, color, sex, national origin or ancestry, discriminate against any citizen of the State of Indiana who is qualified and available to perform the work to which the employment relates;

(2) That no contractor, subcontractor, or any person on his/her behalf shall in any manner, discriminate against or intimidate any employee hired for the performance of work under this Contract on account of race, religion, color, sex, national origin or ancestry;

(3) That there may be deducted from the amount payable to the Contractor under this Contract, a penalty of five dollars [$5.00] for each person for each calendar day during which such person was discriminated against or intimidated in violation of the provisions of the Contract; and

(4) That this Contract may be cancelled or terminated by the Owner and all money due to become due hereunder may be forfeited, for a second or any subsequent violation of the terms or conditions of this section of the Contract.

c) 18.15 Severability

SC-18.15 Add the following new paragraph immediately after Paragraph 18.14.

18.15 Severability

i) If any portion of the Contract Documents is invalid or unenforceable pursuant to applicable law, such portion shall be void in the jurisdiction where it is invalid or unenforceable, and the remainder of the Contract Documents shall remain binding upon the parties hereto.

d) 18.16 Compliance with E-Verify Program

SC-18.16 Add the following new paragraph immediately after Paragraph 18.15.

18.16 Compliance with E-Verify Program

i) Pursuant to IC 22-5-1.7, Contractor shall enroll in and verify the work eligibility status of all newly hired employees of Contractor through the E-Verify Program ("Program"). Contractor is not required to verify the work eligibility status of all newly hired employees through the Program if the Program no longer exists.

ii) Contractor and its subcontractors shall not knowingly employ or contract with an unauthorized alien or retain an employee or contract with a person that Contractor or its subcontractor subsequently learns is an unauthorized alien. If Contractor violates this Section 18.16, Owner shall require Contractor to remedy the violation not later than thirty (30) days after Owner notifies Contractor. If Contractor fails to remedy the violation within the thirty (30) day period, Owner shall terminate the Contract for breach of contract. If Owner terminates the Contract, Contractor shall, in addition to any other contractual remedies, be liable to Owner for actual damages. There is a rebuttable presumption that Contractor did not knowingly employ an unauthorized alien if Contractor verified the work eligibility status of the employee through the Program.

iii) If Contractor employs or contracts with an unauthorized alien but Owner determines that terminating the Contract would be detrimental to the public interest of public property, Owner may allow the Contract to remain in effect until Owner procures a new contractor.

iv) Contractor shall, prior to performing any work, require each subcontractor to certify to Contractor that the subcontractor does not knowingly employ or contract with an unauthorized alien and has enrolled in the Program. Contractor shall maintain on file a certification from each subcontractor throughout the duration of the Project. If Contractor determines that a subcontractor is in violation of this Paragraph 18.16, Contractor may terminate its contract with the subcontractor for such violation. Such termination may not be considered a breach of contract by Contractor or the subcontractor.

v) With the Agreement, Contractor shall submit executed affidavits stating they will not knowingly employ illegal aliens.

vi) Contractor's subcontractors shall, prior to performing any work, submit executed affidavits which state they will not knowingly employ illegal aliens.

e) 18.17 Engaging in Activities with Iran

SC-18.17 Add the following new paragraph immediately after Paragraph 18.16.

18.17 Engaging in Activities with Iran

i) Pursuant to IC 5-22-16.5, Contractor shall not engage in investment activities in the country of Iran.

(NO TEXT THIS PAGE)

ATTACHMENT A

Office of Community and Rural Affairs (OCRA)
Federal Construction Contract Provisions



Federal Construction Contract Provisions

COMMUNITY DEVELOPMENT BLOCK GRANT PROGRAM

Grant Services Division
One North Capitol,
Suite 600
Indianapolis, Indiana
46204

Revised November 2023

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***Note: This document is to be used as a guide for contractors and subcontractors working on Community Development Block Grant** projects in the State of Indiana. It is* not *verified to be all inclusive and the contractor is fully responsible for complying with all federal regulations applicable to the CDBG program.*

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SECTION 1 General Information

BONDING REQUIREMENTS: IC 36-1-12-4.5, IC 36-1-12-13.1, IC 361-12-14 e

The minimum requirements for contracts exceeding $100,000 for construction shall be as follows:

A Bid Bond or a certified check shall be filed with each bid equivalent to 5% of the bid price as assurance that the bidder will, upon acceptance of their bid, execute such contractual documents as may be required within the time specified.

A Performance Bond for 100% of the contract price to assure fulfillment of the contractor's obligations under the contract.

A Payment Bond for 100% of the contract price to assure payment of all persons supplying labor and material in the execution of the work provided for in the contract.

NOTE: The Bid Bond must be submitted with the bid and the Performance Bond and Payment Bond must be provided to the project owner *before* construction begins on the project.

RETAINAGE: IC 36-1-12-14

Public work contracts in excess of $100,000 require the retainage of 5% *of* the dollar value *of* all work satisfactorily completed by the contractor(s). The escrow agent shall be selected by mutual agreement between the board of the awarding agency and the contractor(s). The contractor shall be paid in full within sixty one (61) days after the date of substantial completion. If upon substantial completion of the public work there remain uncompleted minor items, an amount equal to two hundred percent {200%) of the value of each item as determined by the architect/engineer shall be withheld until the item is completed.

CHANGE ORDERS: IC 36-1-12-18

A change order may not be issued before commencement of the actual construction except in the case of an emergency. In such a case, the board of awarding agency must make a declaration and the board's minutes must show the nature of the emergency. The total of all change orders issued that increase the scope of the project may not exceed twenty percent {20%) of the amount of the original contract. A change order issued as a result of circumstances that could not have been reasonably foreseen does not increase the scope of the project. All change orders must be prepared by the project engineer or architect and approved and signed by the board of the awarding agency and the contractor. All change orders must be directly related to the original public work project.

Contractor must ensure to procure domestic products for all federal assisted projects in compliance with the Buy American Build America Act. This shall include reviewing manufacture information determining and certifying that to the best of the contractor’s knowledge and belief all iron and steel products, manufactured products and construction materials referenced in any change orders comply with the provisions set by the Buy America Build America Act unless otherwise specified by a waiver.

CONFLICT OF INTEREST:
24 CFR 570.611

In the procurement of supplies, equipment, construction and/or services by recipients and subrecipients, any conflict of interest is prohibited. No persons who exercise or have exercised any functions or responsibilities with respect to CDBG activities assisted under this part or who are in a position to participate in a decision making process or gain inside information with regard to such activities, may obtain a financial interest or benefit from a CDBG-assisted activity, or have a financial interest in any contract, subcontract, or agreement with respect to a CDBG-assisted activity, or with respect to

the proceeds of the CDBG-assisted activity, either for themselves or those with whom they have business or immediate family ties, during their tenure or for one year thereafter.

MINORITY, WOMEN AND VETERAN BUSINESS PARTICIPATION: IC 4-13-16.5 IC 5-22-14-3.5

On each CDBG funded project, the grantee is required to maintain documentation supporting their best efforts to achieve the state goal of 10% MBE/WBE and 3% IVOSB participation. Only those businesses duly registered on IDOA's Minority and Women's Business Enterprises List may be counted toward the 10% goal and businesses participating in Indiana Veteran Owned Small Business Program may be counted toward the 3% goal. For IDOA's MBE/WBE List and IVOSB program the information is available at www.in.gov/idoa/2352.htm.

CODE OF CONDUCT: 24 CFR 84.42

The recipient of CDBG grant funds shall maintain written standards of conduct governing the performance of employees engaged in the award and administration of contracts stating that no employee, officer, or agent shall participate in the selection, award, or administration of a contract supported by Federal funds if a real or apparent conflict of interest would be involved.

RECORD RETENTION: 24 CFR 85.42

Financial records, supporting documents, statistical records and all other records pertinent to a grant shall be retained for a period of five years. If any litigation, claim, negotiation, audit or other action is started before the expiration of the five-year period, the records shall be retained until all litigations, claims or audit findings involving the records have been resolved. The retention period starts from the date of the submission of the final expenditure report or, from the date of the submission of the annual financial status report covering the last expenditure of grant funds for that year.

ACCESS TO RECORDS: 24 CFR 85.42-e

The awarding agency and the Comptroller General of the United States, or any of their authorized representatives, shall have the right of access to any pertinent books, documents, papers or other records which are pertinent to the grant in order to make audits, examinations, excerpts and transcripts. The right of access in this section must not be limited to the required retention period but shall last as long as the records are retained.

CONTRACT PROVISIONS:

In addition to provisions defining a sound and completed procurement contract, any recipient of federal funds shall include the following:

Contracts other than small purchases shall contain provisions or conditions which will allow for administrative, contractual, or legal remedies in instances where contractors violate or breach contract terms and provide for such sanctions and penalties as may be appropriate.

All contracts in excess of $25,000 shall contain suitable provisions for termination by the grantee including the manner by which it will be affected and the basis for settlement. In addition, such contract shall describe conditions under which the contract may be terminated for default as well as conditions where the contract may be terminated because of circumstances beyond the control of the contractor.

Contracts, subcontracts, and subgrants of amounts in excess of $100,000 shall contain a provision which requires compliance with all applicable standards, orders, or requirements issued under Section 306 of the Clean Air Act (42 USC 1857 (h), Section 508 of the Clear Water Act (33 USC 1368), Executive Order 11738, and Environmental Protection Agency regulations (40 CFR, Part 15), which prohibit

the use under non-exempt federal contracts, grants or loans of facilities included on the EPA List of Violating Facilities. The provision shall require reporting of violations to the grantor agency and to the US EPA Administrator for Enforcement (EN-329).

Contracts, subcontracts, and subgrants shall contain a provision which requires compliance with the requirements of the Build America, Buy America (BABA) Act, 41 USC 8301 note, and all applicable rules and notices, as may be amended, if applicable to the Grantee's infrastructure project. Pursuant to HUD's Notice, "Public Interest Phased Implementation Waiver for FY 2022 and 2023 of Build America, Buy America Provisions as Applied to Recipients of HUD Federal Financial Assistance" (88 FR 1700 I), any funds obligated by HUD on or after the applicable listed effective dates, are subject to BABA requirements, unless excepted by a waiver.

These contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract.

Except as otherwise provided for in each section, the contractor shall insert in each subcontract all of the stipulations contained in these Required Contract Provisions, and further require their inclusion in any lower tier subcontract that may in turn be made. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with these Required Contract Provisions.

A breach of any of the stipulations contained in these Required Contract Provisions shall be sufficient grounds for termination of the contract.

A breach of the Required Contract Provisions may also be grounds for debarment as provided in 29 CFR 5.12.

CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING:

(Applicable to all Federal-aid construction contracts and to all related subcontracts which exceed $100,000- 49 CFR 20)

The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief that:

No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-III, "Disclosure Form to Report Lobbying", in accordance with its instructions.

This certification is a material representation of fact upon which reliance was placed with this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

The prospective participant also agrees by submitting his or her bid or proposal that he or she shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000, and that all such recipients shall certify and disclose accordingly.

Any and all contractors, subcontractors, independent contractors, suppliers, facilitators or any person participating in any program or activity receiving federal financial assistance shall:

a. Prohibit discrimination based on race, color or national origin under Title VI of the Civil Rights Act of 1964;
b. Prohibit discrimination on the basis of sex under Title VII of the Civil Rights Act of 1964 and amended by the Equal Employment Opportunity Act of 1972;
c. Prohibit discrimination on the basis of age under the Age Discrimination Act of 1975;
d. Prohibit discrimination on the basis of disability under
e. Section 504 of the Rehabilitation Act of 1973;
f. Take affirmative action to employ and advance qualified disabled people under Section 503 of the Rehabilitation Act of 1973;
g. Promote and insure equal opportunity for all persons, w·1thout regard to race, color, religion, sex, or national origin under Executive Order 11246 as Amended;
h. Display posters which summarize the Federal laws prohibiting job discrimination based on race, color, sex, national origin, religion, age, equal pay and disability;
i. Prohibit discrimination based on disability under the Americans with Disabilities Act of 1990
j. Assure that all buildings assigned for public use be designed, constructed and altered so as to be accessible to and usable by persons with physical disabilities under the Architectural Barriers Act of 1968; and
k. Avoid maintaining or providing any segregated facilities.

Any and all contractors, subcontractors, independent contractors, suppliers, facilitators or any person participating in any program or activity receiving federal financial assistance shall:

Comply with the provisions for the elimination of Lead- Based paint hazards under 24 CFR Part 35;

Take all necessary precautions to guard against damages to property and injury to persons.

Comply with the provisions of the Build America Buy America Act. Contractors shall procure iron and steel, construction material, and manufactured products that are produced in the United States, unless a waiver is in effect.

SECTION 2 Equal Employment Opportunity Regulations

NONDISCRIMINATION:

(Applicable to all Federal-aid construction contracts and to all related subcontracts of $10,000 or more)

Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630 and 41 CFR 60) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The Equal Opportunity Construction Contractor Specifications set forth under 41 CFR 60-4.3 and the provisions of the American Disabilities Act of 1990 (42 U.S.D. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO.

The contractor will work with the awarding agency and the Federal Government in carrying out EEO obligations and in their review of his/her activities under the contract.

The contractor will accept as his operating policy the following statement: "It is the policy of this Company to assure that

applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability.

Such action shall include: employment, upgrading, demotion, or transfer, recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

EEO OFFICER:

The contractor will designate and make known to the awarding agency an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active contractor program of EEO and who must be assigned adequate authority and responsibility to do so.

DISSEMINATION OF POLICY:

All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO officer.

All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering al! major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minority employees.

Notices and posters identifying the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

RECRUITMENT OF EMPLOYEES:

When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minority groups in the area from which the project work force would normally be derived.

The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minority group applicants. To meet this requirement, the contractor will identify sources of potential minority group employees and establish with such identified sources procedures whereby minority group applicants may be referred to the contractor for employment consideration.

In the event the contractor has a valid bargaining agreement providing for exclusive hall referrals, he is expected to observe the provisions of that agreement to the extent that the system permits the contractor's compliance with EEO contract provisions. (The DOL has held that where implementations of such agreements have the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Executive Order 11246, as amended.)

The contractor will encourage his present employees to refer minority group applicants for employment. Information and procedures with regard to referring minority group applicants will be discussed with employees.

SELECTION OF SUBCONTRACTORS, PROCUREMENT OF MATERIALS AND LEASING OF EQUIPMENT:

The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment.

The contractor shall notify all potential subcontractors and suppliers of his/her EEO obligations under this contract.

Disadvantaged business enterprises (DBE) as defined in 49 CFR 23 and Veteran Owned business (VOB) as defined in 38 CFR 74, shall have equal opportunity to compete for and perform subcontracts which the contractor enters into pursuant to this contract. The contractor will use his best efforts to solicit bids from and to utilize DBE and VOB subcontractors or subcontractors with meaningful minority group and female representation among their employees.

The contractor will use his best efforts to ensure subcontractor compliance with their EEO obligations.

EEO RECORDS AND REPORTS:

The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives. The records kept by the contractor shall document the following:

The number of minority and non-minority group members and women employed in each work classification on the project;

The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women;

The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees; and

The progress and efforts being made in securing the services of DBE subcontractors or subcontractors with meaningful minority and female representation among their employees.

NONSEGREGATED FACILITIES:

Applicable to all Federal-aid construction contracts and to all related subcontracts of $10,000 or more.

By the execution of this contract or subcontract, or the consummation of this material supply agreement or purchase order, all parties certify that the firm does not maintain or provide for its employees any segregated facilities at any of its establishments, and that the firm does not permit its employees to perform their services at any location under its control, where segregated facilities are maintained. The contractor agrees that a breach of this certification is a violation of the EEO provisions of this contract. The contractor further certifies that no employee will be denied access to adequate facilities on the basis of sex or disability.

As used in this certification, the term "segregated facilities" refers to facilities provided for employees which are segregated by explicit directive, or on the basis of race, color, religion, national origin, age or disability, because of habit, local custom, or otherwise. The only exception will be for the disabled when the demands for accessibility override, (e.g. disabled parking).

The contractor agrees that it has obtained or will obtain identical certification from proposed subcontractors or material suppliers prior to award of subcontracts or consummation of material supply agreements of $10,000 or more and that it

will retain such certifications in its files.

FALSIFICATION Of DOCUMENTS:

The falsification of any of the above certifications may subject the contractor to civil or criminal prosecution under 18U.S.C. 1001and 31 U.S.C. 231.

The contractor or subcontractor shall make the records required available for inspection, copying, or transcription by authorized representatives of the awarding agency or the DOL, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the awarding agency, HUD or DOL, or all may, after written notice to the contractor, sponsor, applicant, or owner, take such actions as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds of debarment action pursuant to 29 CRF 5.12.

SECTION 3

The purpose of Section 3 requires that recipients of HUD funds and their contractors and subcontractors provide jobs and other economic opportunities to low-income persons. The CDBG project service area for Section 3 compliance will be the nonmetropolitan county.

Contractors and subcontractors participating in federally- assisted projects are required to track and report their activity relative to the hiring and training of low- and moderate-income persons and the use of local businesses owned by low-income persons. This information must be reported by all contractors and subcontractors, whose contract is $100,000 or greater, prior to project completion utilizing the "Section 3 Compliance form".

All Section 3 covered contracts shall include the following Section 3 clause:

"The work to be performed under this contract is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 170Iu (Section 3). The parties to this contract agree to comply with this Section and certify that they are under no contractual or other impediment that would prevent them from complying with these regulations.

The contractor agrees to notify each labor organization or representative workers with which the contractor has a collective bargaining agreement of the contractor's commitments under this Section 3 clause and include this clause in every subcontract subject to compliance with the Section 3 regulations. The contractor will certify that any vacant employment positions, including training positions, that are filled after the contractor is selected but before the contract is executed with persons other than those to whom the regulations of 24 CFR Part 135 require employment opportunities to be directed, were not filled to circumvent the contractors' obligations under this section of the Code of Federal Regulations. Noncompliance with HUD's regulations in this Part may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts."

OFFICE Of FEDERAL CONTRACT COMPLIANCE (OFCCP)

For federally assisted construction contracts, the OFCCP administers and enforces Executive Order 11246, as amended. This Order prohibits discrimination and requires affirmative action to ensure equal employment opportunity without regard to race, color, sex, religion and/or national origin; and the implementing regulations at 41 CFR Parts 60-1 through 60-50. Generally, all contractors and subcontractors holding non- exempt federally assisted construction contracts and subcontracts exceeding $10,000 must comply with Executive Order 11246.

A "Notice of Requirement for

Affirmative Action to Ensure Equal Employment Opportunity" (Executive Order 11246) is to be included in the bid solicitations for all federally assisted construction contracts and subcontracts in excess of $10,000. The Notice, which is published at 41 CFR 60-4.2, informs the contractor/bidder of the affirmative action requirements imposed under Executive Order 11246, including the specified goals for minority and female participation.

Covered federally assisted construction contracts and subcontracts must incorporate the equal opportunity clause found at 41 CFR 60-1.4(b).

The equal opportunity clause may be expressly included in each contract or subcontract or incorporated by reference. Importantly, the equal opportunity clauses are deemed to be a part of every covered construction contract and subcontract even if they are not physically incorporated in the contract documents.

In addition to the equal opportunity clauses, federally assisted construction contracts and subcontracts in excess of $10,000 must include the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" which are found at 41 CFR 60-4.3. The specifications describe the affirmative action obligations and set forth the specific affirmative action steps the construction contractor must implement in order to make a good faith effort to achieve the goals for minority and female participation that were listed in the bid solicitation.

Additional information regarding OFCCP Compliance may be found at www.dol.gov/esa/OFCCP or, at 1-800-397-6251. The Indiana office is located at 46 East Ohio Street, Suite 419, Indianapolis, IN 46204 and phone number is 317-226-5860.

SECTION 3 Federal Labor Standards Regulations

Any and all contractors, subcontractors, independent contractors, suppliers, facilitators or any person participating in any program or activity receiving federal financial assistance shall:

Comply with federal labor standards regulations as follows:

1. Davis-Bacon Act
2. Contract Work Hours and Safety Standards Act
3. Copeland Act (Anti-Kickback Act)
4. Fair Labor Standards Act

The U. S. Department of Labor has published rules and regulations corresponding to the above regulations at Title 29 CFR Parts 1, 3, 5, 6 and 7.

CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION PRIMARY COVERED TRANSACTIONS:

(Applicable to all Federal-aid contracts 49 CFR 29)

By signing and submitting this proposal, the prospective primary participant is providing the certification set out below.

The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective primary participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

The certification in this clause is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

The prospective primary participant shall provide immediate written notice to the

department or agency to which this proposal is submitted if any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

The terms "covered transaction", "debarred", "suspended", "ineligible", "lower tier covered transaction", "participant", "person", "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the department or agency to which this proposal is submitted for assistance in obtaining a copy of those regulations.

The prospective primary participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

The prospective primary participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," provided by the department or agency entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the non-procurement portion of the "Lists of Parties Excluded from Federal Procurement or Non procurement Programs" (Non-procurement List) which is compiled by the General Services Administration.

Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

If a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

Have not within a 3-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statement, or receiving stolen property.

Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in this certification; and

Have not within a 3-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

Where the prospective primary

participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION APPLICABLE TO ALL SUBCONTRACTS, PURCHASE ORDERS AND OTHER LOWER TIER TRANSASTIONS OF $25,000 OR MORE

By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

The terms "covered transaction," "debarred," "suspended," "ineligible," "primary covered transaction," "participant," "person," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contract the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.

The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Non-procurement List.

Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

If a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this

transaction by any Federal department or agency.

Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

PAYMENT OF PREVAILING WAGES:

Applicable to all Federal-aid (CDBG) construction contracts exceeding $2,000 and to all related subcontracts:

All mechanics and laborers employed or working upon the site of the work will be paid unconditionally and not less often than once a week and without subsequent deduction or rebate on any account except such payroll deductions as are permitted by regulations (29 CFR 3) issued by the Secretary of labor under the Copeland Act (40 U.S.C. 276c) the full amounts of wages and bona fide fringe benefits or cash equivalents thereof due at time of payment. The payment shall be computed at wage rates not less than those contained in the wage determination of the Secretary of Labor, hereinafter called "the wage determination", which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor or its subcontractors and such laborers and mechanics. The wage determination shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers. For the purpose of this Section, contributions made, or costs reasonably anticipated for bona fide fringe benefits under Section 1 (b)(2) of the Davis-Bacon Act {40 U.S.C. 276a) on behalf of laborers or mechanics are considered wages paid. Regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period: Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill.

Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein, provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed.

All rulings and interpretations of the Davis-Bacon Act and related acts contained in 29 CFR 1, 3 and 5 are herein incorporated by reference in this contract.

PERSONNEL ACTIONS:

Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age, or disability. The following procedures shall be followed:

The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.
The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with his obligations under this contract, will attempt to resolve such complaints, and will take appropriate

corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of his avenues of appeal.

The contractor will assist in locating, qualifying, and increasing the skills of minority group and women employees, and applicants for employment.

CONFORMANCE RATES:

The awarding agency shall require that any class of laborers or mechanics employed under the contract which is not listed in the wage determination shall be classified in conformance with the wage decision.

An additional classification, wage rate and fringe benefits may be approved only when the following criteria have been met:

1) The work to be performed by the additional classification is not performed by any other classification in the wage determination;
2) The additional classification is utilized in the area by the construction industry;
3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

If the contractor or subcontractor, laborers and mechanics, awarding agency and the contracting officer agree on the classification and conformance wage rate including the amount designated for fringe benefits where appropriate, the conformance rates shall be paid to al! workers performing work in that classification from the first day on which work is performed in the classification.

In the event the contractor or subcontractors, laborers and mechanics, awarding agency and the contracting officer do not agree on the proposed classification and wage rate including the amount designated for fringe benefits where appropriate, the contracting officer {OCRA Labor Standards Compliance Officer) shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. Said Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting agency or will notify within the 30-day period that additional time is necessary. Any work performed during the waiting period will be paid at the base wage and fringe benefit amount conditionally assigned by the contracting officer until a conformance rate is assigned by the Wage and Hour Administrator.

PAYMENT OF FRINGE BENEFITS:

Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor or subcontractors, as appropriate, shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly case equivalent thereof. If the contractor or subcontractor does not make payments to a trustee or other third person, he/she may consider as a part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided that the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met.

APPRENTICE PARTICIPATION:

Apprentices will be permitted to work at less than the predetermined rate for the work they perform when they are employed pursuant to and individually registered in a bona fide apprenticeship program duly registered with the DOL, Employment and Training Administration, Bureau of

Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau.

The allowable ratio of apprentices to journeyman-level employees on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any employee listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate listed in the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor or subcontractor is performing construction on a project in a locality other than that in which its program is registered, the rations and wage rates (expressed in percentages of the journeyman-level hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman- level hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator for the Wage and Hour Division determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Bureau of Apprenticeship and Training, or a State apprenticeship agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor or subcontractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the comparable work performed by regular employees until an acceptable program is approved.

OVERTIME REQUIREMENTS:

No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of labors, mechanics, watchmen, or guards (including apprentices) shall require or permit any laborer, mechanic, watchman, guard or apprentice in any workweek in which he/she is employed on such work, to work in excess of 40 hours in such workweek unless such laborer, mechanic, watchman, guard or apprentice receives compensation at a rate not less than one-and-one-half times his/her basic rate of pay for all hours worked in excess of 40 hours in such workweek.

WITHHOLDING PAYMENT FOR UNPAID WAGES:

The awarding agency shall upon its own action or upon written request of an authorized representative of the DOL withhold, or cause to be withheld, from the contractor or subcontractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements which is held by the same prime contractor, as much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

VIOLATIONS AND LIABILITY FOR UNPAID WAGES AND LIQUIDATED DAMAGES:

In the event of any violation of the requirements set forth in this document, the contractor, and any subcontractor responsible for the violation shall be liable to the affected employee for his/her unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States for liquidated damages.

STATEMENTS AND PAYROLLS:

Applicable to all Federally assisted construction contracts exceeding $2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural collectors, which are exempt.

The Contractor shall comply with the Copeland Regulations of the Secretary of Labor.

Payrolls and basic records relating thereto shall be maintained by the contractor and each subcontractor during the course of the work and preserved for a period of 3 years from the date of completion of the contract for all laborers, mechanics, apprentices, watchmen, helpers and guards working at the site of the work.

The payroll records shall contain the name and last four digits of the social security number of each such employee; his or her correct classification; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalent thereof the types described in Section 1(b)(2)(B) of the Davis Bacon Act); daily and weekly number of hours worked; deductions made; and actual wages paid. Whenever the Secretary of Labor has found that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis Bacon Act, the contractor and subcontractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, that the plan or program has been communicated in writing to the laborers or mechanics affected, and show the cost anticipated or the actual cost incurred in providing benefits. Contractors or subcontractors employing apprentices under approved programs shall maintain written evidence of the registration of apprentices and ratios and wage rates prescribed in the applicable programs.

Each contractor and subcontractor shall furnish, each week in which any contract work is performed, to the awarding agency or an agent thereof, a certified payroll report of wages paid each of its employees. The payroll submitted shall set out accurately and completely all of the information required to be maintained. This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal stock number 029-005-0014-1), U.S. Government Printing Office, Washington D.C. 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.

Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his/her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

That the payroll for the payroll period contains the information required to be maintained and that such information is correct and complete;

That such laborer or mechanic employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in the Regulations, 29 CFR 3;

That each laborer or mechanic has been paid not less than the applicable wage rate and fringe benefits or cash equivalent for the classification of work performed, as specified in the applicable wage

determination incorporated into the contract.

The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance".

SECTION 4 Health and Safety

SAFETY AND ACCIDENT PREVENTION:

In the performance of this contract the contractor shall comply with all applicable Federal, State and local laws governing safety, health and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the awarding agency may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3333).

Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).

IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT:

(Applicable to all Federally assisted construction contracts and to all related subcontracts of $100,000 or more.)

By submission of this bid or the execution of this contract, or subcontract, as appropriate, the bidder, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

That any facility that is or will be utilized in the performance of this contract, unless such contract is exempt under the Clean Air Act, as amended (42 U.S.C. 1857 et seq., as amended by Pub.L. 91-604), and under the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq. as amended by Pub.L. 92-500), Executive Order 11738, and regulations in implementation thereof (40 CFR 15) is not listed, on the date of contract award, on the U. S. Environmental Protection Agency (EPA) List of Violating Facilities pursuant to 40 CFR 15.20.

That the firm agrees to comply and remain in compliance with all the requirements of Section 114 of the Clean Air Act and Section 308 of the Federal Water Pollution Control Act and all regulations and guidelines listed thereunder.

That the firm shall promptly notify the awarding agency of the receipt of any communication from the Director, Office of Federal Activities, EPA, indicating that a facility that is or will be utilized for the contract is under consideration to be listed on the EPA List of Violating Facilities.

That the firm agrees to include or cause to be included the requirements of this Section in every nonexempt subcontract, and further agrees to take such action as the government may direct as a means of enforcing such requirements.

Equal Employment Opportunity is

THE LAW

Private Employers, State and Local Governments, Educational Institutions, Employment Agencies and Labor Organizations

Applicants to and employees of most private employers, state and local governments, educational institutions, employment agencies and labor organizations are protected under Federal law from discrimination on the following bases:

RACE, COLOR, RELIGION, SEX, NATIONAL ORIGIN

Title VII of the Civil Rights Act of 1964, as amended, protects applicants and employees from discrimination in hiring, promotion, discharge, pay, fringe benefits, job training, classification, referral, and other aspects of employment, on the basis of race, color, religion, sex (including pregnancy), or national origin. Religious discrimination includes failing to reasonably accommodate an employee's religious practices where the accommodation does not impose undue hardship.

DISABILITY

Title I and Title V of the Americans with Disabilities Act of 1990, as amended, protect qualified individuals from discrimination on the basis of disability in hiring, promotion, discharge, pay, fringe benefits, job training, classification, referral, and other aspects of employment. Disability discrimination includes not making reasonable accommodation to the known physical or mental limitations of an otherwise qualified individual with a disability who is an applicant or employee, barring undue hardship.

AGE

The Age Discrimination in Employment Act of 1967, as amended, protects applicants and employees 40 years of age or older from discrimination based on age in hiring, promotion, discharge, pay, fringe benefits, job training, classification, referral, and other aspects of employment.

SEX (WAGES)

In addition to sex discrimination prohibited by Title VII of the Civil Rights Act, as amended, the Equal Pay Act of 1963, as amended, prohibits sex discrimination in the payment of wages to women and men performing substantially equal work, in jobs that require equal skill, effort, and responsibility, under similar working conditions, in the same establishment.

GENETICS

Title II of the Genetic Information Nondiscrimination Act of 2008 protects applicants and employees from discrimination based on genetic information in hiring, promotion, discharge, pay, fringe benefits, job training, classification, referral, and other aspects of employment. GINA also restricts employers' acquisition of genetic information and strictly limits disclosure of genetic information. Genetic information includes information about genetic tests of applicants, employees, or their family members; the manifestation of diseases or disorders in family members (family medical history); and requests for or receipt of genetic services by applicants, employees, or their family members.

RETALIATION

All of these Federal laws prohibit covered entities from retaliating against a person who files a charge of discrimination, participates in a discrimination proceeding, or otherwise opposes an unlawful employment practice.

WHAT TO DO IF YOU BELIEVE DISCRIMINATION HAS OCCURRED

There are strict time limits for filing charges of employment discrimination. To preserve the ability of EEOC to act on your behalf and to protect your right to file a private lawsuit, should you ultimately need to, you should contact EEOC promptly when discrimination is suspected:

The U.S. Equal Employment Opportunity Commission (EEOC), 1-800-669-4000 (toll-free) or 1-800-669-6820 (toll-free TTY number for individuals with hearing impairments). EEOC field office information is available at www.eeoc.gov or in most telephone directories in the U.S. Government or Federal Government section. Additional information about EEOC, including information about charge filing, is available at www.eeoc.gov.

Employers Holding Federal Contracts or Subcontracts

Applicants to and employees of companies with a Federal government contract or subcontract are protected under Federal law from discrimination on the following bases:

RACE, COLOR, RELIGION, SEX, NATIONAL ORIGIN
Executive Order 11246, as amended, prohibits job discrimination on the basis of race, color, religion, sex or national origin, and requires affirmative action to ensure equality of opportunity in all aspects of employment.

INDIVIDUALS WITH DISABILITIES
Section 503 of the Rehabilitation Act of 1973, as amended, protects qualified individuals from discrimination on the basis of disability in hiring, promotion, discharge, pay, fringe benefits, job training, classification, referral, and other aspects of employment. Disability discrimination includes not making reasonable accommodation to the known physical or mental limitations of an otherwise qualified individual with a disability who is an applicant or employee, barring undue hardship. Section 503 also requires that Federal contractors take affirmative action to employ and advance in employment qualified individuals with disabilities at all levels of employment, including the executive level.

DISABLED, RECENTLY SEPARATED, OTHER PROTECTED, AND ARMED FORCES SERVICE MEDAL VETERANS
The Vietnam Era Veterans' Readjustment Assistance Act of 1974, as amended, 38 U.S.C. 4212, prohibits job discrimination and requires affirmative action to employ and advance in employment disabled veterans, recently separated veterans (within three years of discharge or release from active duty), other protected veterans (veterans who served during a war or in a campaign or expedition for which a campaign badge has been authorized), and Armed Forces service medal veterans (veterans who, while on active duty, participated in a U.S. military operation for which an Armed Forces service medal was awarded).

RETALIATION
Retaliation is prohibited against a person who files a complaint of discrimination, participates in an OFCCP proceeding, or otherwise opposes discrimination under these Federal laws.

Any person who believes a contractor has violated its nondiscrimination or affirmative action obligations under the authorities above should contact immediately:

The Office of Federal Contract Compliance Programs (OFCCP), U.S. Department of Labor, 200 Constitution Avenue, N.W., Washington, D.C. 20210, 1-800-397-6251 (toll-free) or (202) 693-1337 (TTY). OFCCP may also be contacted by e-mail at OFCCP-Public@dol.gov, or by calling an OFCCP regional or district office, listed in most telephone directories under U.S. Government, Department of Labor.

Programs or Activities Receiving Federal Financial Assistance

RACE, COLOR, NATIONAL ORIGIN, SEX
In addition to the protections of Title VII of the Civil Rights Act of 1964, as amended, Title VI of the Civil Rights Act of 1964, as amended, prohibits discrimination on the basis of race, color or national origin in programs or activities receiving Federal financial assistance. Employment discrimination is covered by Title VI if the primary objective of the financial assistance is provision of employment, or where employment discrimination causes or may cause discrimination in providing services under such programs. Title IX of the Education Amendments of 1972 prohibits employment discrimination on the basis of sex in educational programs or activities which receive Federal financial assistance.

INDIVIDUALS WITH DISABILITIES
Section 504 of the Rehabilitation Act of 1973, as amended, prohibits employment discrimination on the basis of disability in any program or activity which receives Federal financial assistance. Discrimination is prohibited in all aspects of employment against persons with disabilities who, with or without reasonable accommodation, can perform the essential functions of the job.

If you believe you have been discriminated against in a program of any institution which receives Federal financial assistance, you should immediately contact the Federal agency providing such assistance.

"EEO is the Law" Poster Supplement

Employers Holding Federal Contracts or Subcontracts Section Revisions

The Executive Order 11246 section is revised as follows:

RACE, COLOR, RELIGION, SEX, SEXUAL ORIENTATION, GENDER IDENTITY, NATIONAL ORIGIN

Executive Order 11246, as amended, prohibits employment discrimination based on race, color, religion, sex, sexual orientation, gender identity, or national origin, and requires affirmative action to ensure equality of opportunity in all aspects of employment.

PAY SECRECY

Executive Order 11246, as amended, protects applicants and employees from discrimination based on inquiring about, disclosing, or discussing their compensation or the compensation of other applicants or employees.

The Individuals with Disabilities section is revised as follows:

INDIVIDUALS WITH DISABILITIES

Section 503 of the Rehabilitation Act of 1973, as amended, protects qualified individuals with disabilities from discrimination in hiring, promotion, discharge, pay, fringe benefits, job training, classification, referral, and other aspects of employment. Disability discrimination includes not making reasonable accommodation to the known physical or mental limitations of an otherwise qualified individual with a disability who is an applicant or employee, barring undue hardship to the employer. Section 503 also requires that Federal contractors take affirmative action to employ and advance in employment qualified individuals with disabilities at all levels of employment, including the executive level.

The Vietnam Era, Special Disabled Veterans section is revised as follows:

PROTECTED VETERANS

The Vietnam Era Veterans' Readjustment Assistance Act of 1974, as amended, 38 U.S.C. 4212, prohibits employment discrimination against, and requires affirmative action to recruit, employ, and advance in employment, disabled veterans, recently separated veterans (i.e., within three years of discharge or release from active duty), active duty wartime or campaign badge veterans, or Armed Forces service medal veterans.

Mandatory Supplement to EEOC P/E-1(Revised 11/09) "EEO is the Law" Poster.

If you believe that you have experienced discrimination contact OFCCP: 1-800-397-6251 | TTY 1-877-889-5627 | www.dol.gov.

EMPLOYEE RIGHTS

EMPLOYEE POLYGRAPH PROTECTION ACT

The Employee Polygraph Protection Act prohibits most private employers from using lie detector tests either for pre-employment screening or during the course of employment.

PROHIBITIONS

Employers are generally prohibited from requiring or requesting any employee or job applicant to take a lie detector test, and from discharging, disciplining, or discriminating against an employee or prospective employee for refusing to take a test or for exercising other rights under the Act.

EXEMPTIONS

Federal, State and local governments are not affected by the law. Also, the law does not apply to tests given by the Federal Government to certain private individuals engaged in national security-related activities.

The Act permits polygraph (a kind of lie detector) tests to be administered in the private sector, subject to restrictions, to certain prospective employees of security service firms (armored car, alarm, and guard), and of pharmaceutical manufacturers, distributors and dispensers.

The Act also permits polygraph testing, subject to restrictions, of certain employees of private firms who are reasonably suspected of involvement in a workplace incident (theft, embezzlement, etc.) that resulted in economic loss to the employer.

The law does not preempt any provision of any State or local law or any collective bargaining agreement which is more restrictive with respect to lie detector tests.

EXAMINEE RIGHTS

Where polygraph tests are permitted, they are subject to numerous strict standards concerning the conduct and length of the test. Examinees have a number of specific rights, including the right to a written notice before testing, the right to refuse or discontinue a test, and the right not to have test results disclosed to unauthorized persons.

ENFORCEMENT

The Secretary of Labor may bring court actions to restrain violations and assess civil penalties against violators. Employees or job applicants may also bring their own court actions.

THE LAW REQUIRES EMPLOYERS TO DISPLAY THIS POSTER WHERE EMPLOYEES AND JOB APPLICANTS CAN READILY SEE IT.

WHD
WAGE AND HOUR DIVISION
UNITED STATES DEPARTMENT OF LABOR

1-866-487-9243
TTY: 1-877-889-5627
www.dol.gov/whd

WH1402 REV 07/16

SAFETY AND HEALTH PROTECTION ON THE JOB

I

INTRODUCTION:
The intent of the Indiana Occupational Safety and Health Act of 1974, Indiana Code 22-8-1.1, is to assure, so far as possible, safe and healthful working conditions for the workers in the State.

The Indiana Department of Labor has primary responsibility for administering and enforcing the Act and the safety and health standards promulgated under its provisions.

Requirements of the Act include the following:

O

EMPLOYERS:
Each employer shall establish and maintain conditions of work which are reasonably safe and healthful for employees and free from recognized hazards that are causing or likely to cause death or serious physical harm to employees. The Act further requires that employers comply with the Occupational Safety and Health Standards, Rules, and Regulations.

EMPLOYEES:
All employees shall comply with Occupational Safety and Health Standards and all rules, regulations, and orders issued under the Act, which are applicable to their own actions and conduct.

INSPECTION:
The Act requires that an opportunity be provided for employees and their representatives to bring possible safety and health violations to the attention of the Department of Labor inspector in order to aid the inspection. This requirement may be fulfilled by allowing a representative of the employees and a representative of the employer to accompany the inspector during inspection. Where there is no employee representative, the inspector shall consult with a reasonable number of employees.

S

COMPLAINT:
Employees have the right to file a complaint with the Department of Labor. There shall be an inspection where reasonable grounds exist for the Department of Labor to believe there may be a hazard. Unless permission is given by the employees complaining to release their names, they will be withheld from the employer. Telephone Number (317) 232-2693.

The Act provides that no employer shall discharge, suspend, or otherwise discriminate in terms of conditions of employment against any employees for their failure or refusal to engage in unsafe practices or for filing a complaint, testifying, or otherwise acting to exercise their rights under the Act.

H

Employees who believe they have been discriminated against may file a complaint with the Department of Labor within 30 days of the alleged discrimination. Please note that extensions of the 30-day filing requirement may be granted under certain special circumstances, such as where the employer has concealed or misled the employee regarding the grounds for discharge. However, a grievance-arbitration proceeding, which is pending, would not be considered justification for an extension of the 30-day filing period. The Commissioner of Labor shall investigate said complaint and upon finding discrimination in violation of the Act, shall order the employer to provide necessary relief to the employees. This relief may include rehiring, reinstatement to the job with back pay, and restoration of seniority.

All employees are also afforded protection from discrimination under Federal Occupational Safety and Health Act and may file a complaint with the U.S. Secretary of Labor within 30 days of the alleged discrimination.

VIOLATION NOTICE:

A

When an alleged violation of any provision of the Act has occurred, the Department of Labor shall promptly issue a written order to the employer, who shall be required to post it prominently at or near the place where the alleged violation occurred until it is made safe and required safeguards are provided or 3 days, whichever is longer.

PROPOSED PENALTIES:
The Act provides for CIVIL penalties of not more than $7,000 for each serious violation and CIVIL penalties of up to $7,000 for each non-serious violation. Any employer who fails to correct a violation within the prescribed abatement period may be assessed a CIVIL penalty of not more than $7,000 for each day beyond the abatement date during which such violation continues. Also, any employer who knowingly or repeatedly violates the Act may be assessed CIVIL penalties of not more than $70,000 for each violation. A minimum penalty of $5,000 may be imposed for each knowing violation. A violation of posting requirements can bring a penalty of up to $7,000.

VOLUNTARY ACTIVITY:
The Act encourages efforts by labor and management, before the Department of Labor inspections, to reduce injuries and illnesses arising out of employment.

The Act encourages employers and employees to reduce workplace hazards voluntarily and to develop and improve safety and health programs in all workplaces and industries.

Such cooperative action would initially focus on the identification and elimination of hazards that could cause death, injury, or illness to employees and supervisors.

The Act provides a consultation service to assist in voluntary compliance and give recommendations for the abatement of cited violations. This service is available upon a written request from the employer to INSafe. Telephone Number (317) 232-2688.

COVERAGE:
The Act does not cover those hired for domestic service in or about a private home and those covered by a federal agency. Those exempted from the Act's coverage include employees in maritime services, who are covered by the U.S. Department of Labor, and employees in atomic energy activities who are covered by the Atomic Energy Commision.

NOTE:
Under a plan approved March 6, 1974, by the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), the State of Indiana is providing job safety and health protection for workers throughout the State. OSHA will monitor the operation of this plan to assure that continued approval is merited. Any person may make a complaint regarding the State administration of this plan directly to the OSHA Regional Office, Regional Administrator, Region V, U.S. Department of Labor, Occupational Safety and Health Administration, 230 South Dearborn Street, Chicago, Illinois 60604, Telephone Number (312) 353-2220.

MORE INFORMATION:

INDIANA DEPARTMENT OF LABOR
402 West Washington Street, Room W195
Indianapolis, Indiana 46204
Telephone: (317) 232-2655
TT/Voice: (800) 743-3333
Fax: (317) 233-3790
Internet: http://www.in.gov/dol

EMPLOYERS: This poster must be displayed prominently in the workplace.

EMPLOYEE RIGHTS

UNDER THE DAVIS-BACON ACT

FOR LABORERS AND MECHANICS EMPLOYED ON FEDERAL OR FEDERALLY ASSISTED CONSTRUCTION PROJECTS

PREVAILING WAGES

You must be paid not less than the wage rate listed in the Davis-Bacon Wage Decision posted with this Notice for the work you perform.

OVERTIME

You must be paid not less than one and one-half times your basic rate of pay for all hours worked over 40 in a work week. There are few exceptions.

ENFORCEMENT

Contract payments can be withheld to ensure workers receive wages and overtime pay due, and liquidated damages may apply if overtime pay requirements are not met. Davis-Bacon contract clauses allow contract termination and debarment of contractors from future federal contracts for up to three years. A contractor who falsifies certified payroll records or induces wage kickbacks may be subject to civil or criminal prosecution, fines and/or imprisonment.

APPRENTICES

Apprentice rates apply only to apprentices properly registered under approved Federal or State apprenticeship programs.

PROPER PAY

If you do not receive proper pay, or require further information on the applicable wages, contact the Contracting Officer listed below:

or contact the U.S. Department of Labor's Wage and Hour Division.

WHD
WAGE AND HOUR DIVISION
UNITED STATES DEPARTMENT OF LABOR

1-866-487-9243
TTY: 1-877-889-5627
www.dol.gov/whd

WH1321 REV 10/17

U. S. Department of Housing and Urban Development



EQUAL HOUSING OPPORTUNITY

We Do Business in Accordance With the Federal Fair Housing Law

(The Fair Housing Amendments Act of 1988)

It is Illegal to Discriminate Against Any Person Because of Race, Color, Religion, Sex, Handicap, Familial Status, or National Origin

In the sale or rental of housing or residential lots

In advertising the sale or rental of housing

In the financing of housing

In the provision of real estate brokerage services

In the appraisal of housing

Blockbusting is also illegal

Anyone who feels he or she has been discriminated against may file a complaint of housing discrimination:

1-800-669-9777 (Toll Free)
1-800-927-9275 (TTY)
www.hud.gov/fairhousing

U.S. Department of Housing and Urban Development
Assistant Secretary for Fair Housing and Equal Opportunity
Washington, D.C. 20410

U.S. Department of Labor
Wage and Hour Division

PAYROLL

(For Contractor's Optional Use; See Instructions at www.dol.gov/whd/forms/wh347instr.htm)

Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number.

U.S. Wage and Hour Division

Rev. Dec. 2008

OMB No.: 1235-0008
Expires: 01/31/2015

NAME OF CONTRACTOR ☐ OR SUBCONTRACTOR ☐	ADDRESS	
PAYROLL NO.	FOR WEEK ENDING	PROJECT AND LOCATION / PROJECT OR CONTRACT NO.

(1) NAME AND INDIVIDUAL IDENTIFYING NUMBER (e.g., LAST FOUR DIGITS OF SOCIAL SECURITY NUMBER) OF WORKER	(2) NO. OF WITHHOLDING EXEMPTIONS	(3) WORK CLASSIFICATION	OT. OR ST.	(4) DAY AND DATE — HOURS WORKED EACH DAY	(5) TOTAL HOURS	(6) RATE OF PAY	(7) GROSS AMOUNT EARNED	(8) DEDUCTIONS: FICA	WITH-HOLDING TAX			OTHER	TOTAL DEDUCTIONS	(9) NET WAGES PAID FOR WEEK
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While completion of Form WH-347 is optional, it is mandatory for covered contractors and subcontractors performing work on Federally financed or assisted construction contracts to respond to the information collection contained in 29 C.F.R. §§ 3.3, 5.5(a). The Copeland Act (40 U.S.C. § 3145) contractors and subcontractors performing work on Federally financed or assisted construction contracts to "furnish weekly a statement with respect to the wages paid each employee during the preceding week." U.S. Department of Labor (DOL) regulations at 29 C.F.R. § 5.5(a)(3)(ii) require contractors to submit weekly a copy of all payrolls to the Federal agency contracting for or financing the construction project, accompanied by a signed "Statement of Compliance" indicating that the payrolls are correct and complete and that each laborer or mechanic has been paid not less than the proper Davis-Bacon prevailing wage rate for the work performed. DOL and federal contracting agencies receiving this information review the information to determine that employees have received legally required wages and fringe benefits.

Public Burden Statement

We estimate that is will take an average of 55 minutes to complete this collection, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. If you have any comments regarding these estimates or any other aspect of this collection, including suggestions for reducing this burden, send them to the Administrator, Wage and Hour Division, U.S. Department of Labor, Room S3502, 200 Constitution Avenue, N.W. Washington, D.C. 20210

(over)

Date _____

I, _____ _____
(Name of Signatory Party) (Title)

do hereby state:

(1) That I pay or supervise the payment of the persons employed by

_____ on the
(Contractor or Subcontractor)

_____; that during the payroll period commencing on the
(Building or Work)

_____ day of _____, _____, and ending the _____ day of _____, _____,

all persons employed on said project have been paid the full weekly wages earned, that no rebates have been or will be made either directly or indirectly to or on behalf of said

_____ from the full
(Contractor or Subcontractor)

weekly wages earned by any person and that no deductions have been made either directly or indirectly from the full wages earned by any person, other than permissible deductions as defined in Regulations, Part 3 (29 C.F.R. Subtitle A), issued by the Secretary of Labor under the Copeland Act, as amended (48 Stat. 948, 63 Start. 108, 72 Stat. 967; 76 Stat. 357; 40 U.S.C. § 3145), and described below:

_____

_____

_____

_____

(2) That any payrolls otherwise under this contract required to be submitted for the above period are correct and complete; that the wage rates for laborers or mechanics contained therein are not less than the applicable wage rates contained in any wage determination incorporated into the contract; that the classifications set forth therein for each laborer or mechanic conform with the work he performed.

(3) That any apprentices employed in the above period are duly registered in a bona fide apprenticeship program registered with a State apprenticeship agency recognized by the Bureau of Apprenticeship and Training, United States Department of Labor, or if no such recognized agency exists in a State, are registered with the Bureau of Apprenticeship and Training, United States Department of Labor.

(4) That:

(a) WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS, OR PROGRAMS

☐ – in addition to the basic hourly wage rates paid to each laborer or mechanic listed in the above referenced payroll, payments of fringe benefits as listed in the contract have been or will be made to appropriate programs for the benefit of such employees, except as noted in section 4(c) below.

(b) WHERE FRINGE BENEFITS ARE PAID IN CASH

☐ – Each laborer or mechanic listed in the above referenced payroll has been paid, as indicated on the payroll, an amount not less than the sum of the applicable basic hourly wage rate plus the amount of the required fringe benefits as listed in the contract, except as noted in section 4(c) below.

(c) EXCEPTIONS

EXCEPTION (CRAFT)	EXPLANATION

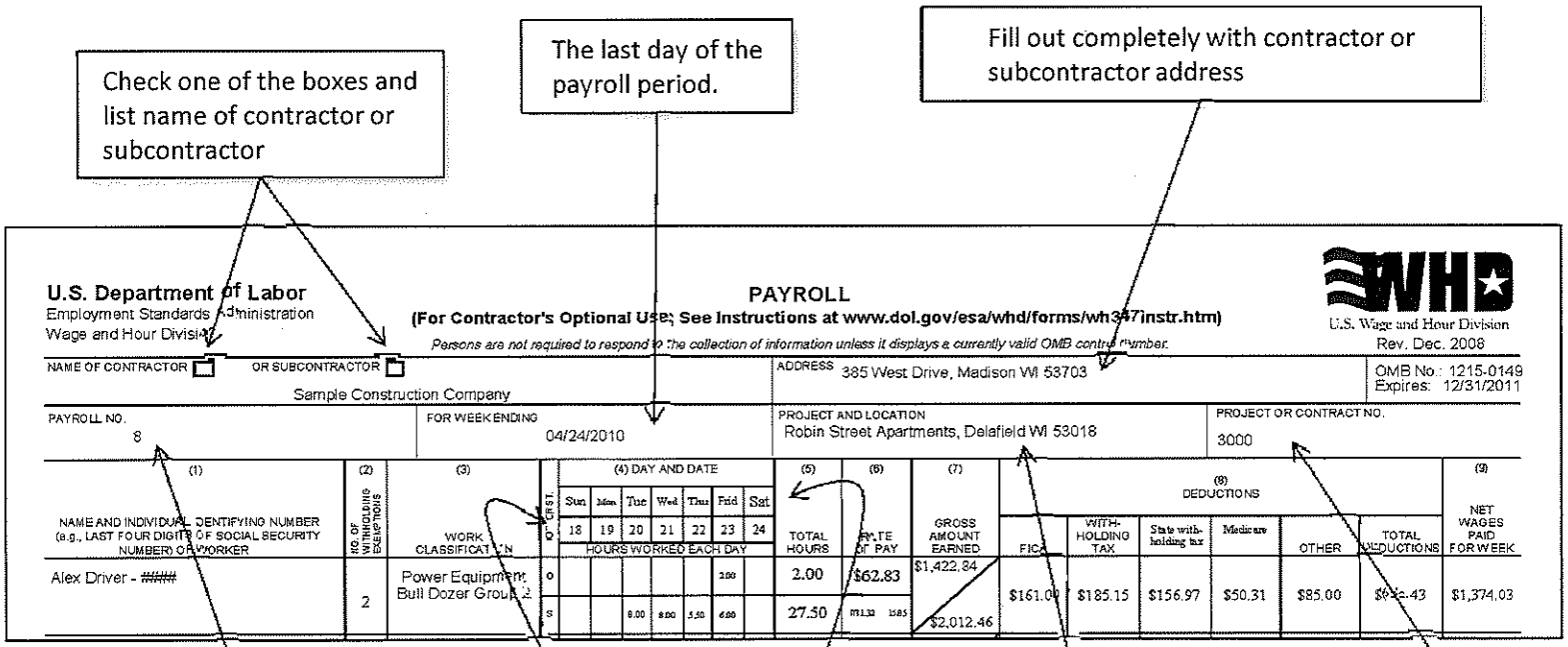
REMARKS:

NAME AND TITLE	SIGNATURE

THE WILLFUL FALSIFICATION OF ANY OF THE ABOVE STATEMENTS MAY SUBJECT THE CONTRACTOR OR SUBCONTRACTOR TO CIVIL OR CRIMINAL PROSECUTION. SEE SECTION 1001 OF TITLE 18 AND SECTION 231 OF TITLE 31 OF THE UNITED STATES CODE.

How to Correctly Fill Out a WH-347 Payroll Form

The completion of the WH-347 Payroll Form is optional; contractors may utilize their own payroll system as long as it conforms to the WH-347 Payroll Form and contains all the necessary information. If you utilize WH-347 Payroll Form as a pdf, saving it electronically aids in making any needed corrections.



Check one of the boxes and list name of contractor or subcontractor

The last day of the payroll period.

Fill out completely with contractor or subcontractor address

U.S. Department of Labor
Employment Standards Administration
Wage and Hour Division

PAYROLL

(For Contractor's Optional Use; See Instructions at www.dol.gov/esa/whd/forms/wh347instr.htm)

Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number.

U.S. Wage and Hour Division
Rev. Dec. 2008

OMB No.: 1215-0149
Expires: 12/31/2011

NAME OF CONTRACTOR ☐ OR SUBCONTRACTOR ☐ Sample Construction Company

ADDRESS 385 West Drive, Madison WI 53703

PAYROLL NO. 8

FOR WEEK ENDING 04/24/2010

PROJECT AND LOCATION Robin Street Apartments, Delafield WI 53018

PROJECT OR CONTRACT NO. 3000

(1) NAME AND INDIVIDUAL IDENTIFYING NUMBER (e.g., LAST FOUR DIGITS OF SOCIAL SECURITY NUMBER) OF WORKER	(2) NO. OF WITHHOLDING EXEMPTIONS	(3) WORK CLASSIFICATION	O/S/T	(4) DAY AND DATE Sun 18	Mon 19	Tue 20	Wed 21	Thu 22	Fri 23	Sat 24	(5) TOTAL HOURS	(6) RATE OF PAY	(7) GROSS AMOUNT EARNED	(8) DEDUCTIONS FICA	WITHHOLDING TAX	State withholding tax	Medicare	OTHER	TOTAL DEDUCTIONS	(9) NET WAGES PAID FOR WEEK
Alex Driver - #####	2	Power Equipment Bull Dozer Group 2	O						2.00		2.00	$62.83	$1,422.84	$161.00	$185.15	$156.97	$50.31	$85.00	$[illegible]43	$1,374.03
			S			8.00	8.00	5.50	6.50		27.50	[illegible]	$2,012.46							

Payrolls must be numbered sequentially and should be based on the weeks worked under a contract.

Type the word "Final" when the last payroll is submitted for the project.

Indicate the days and dates of the pay period. (should match week ending directly above)

The name and location of project.

The prime contractor should include the project number as listed in the loan

List each worker's name.

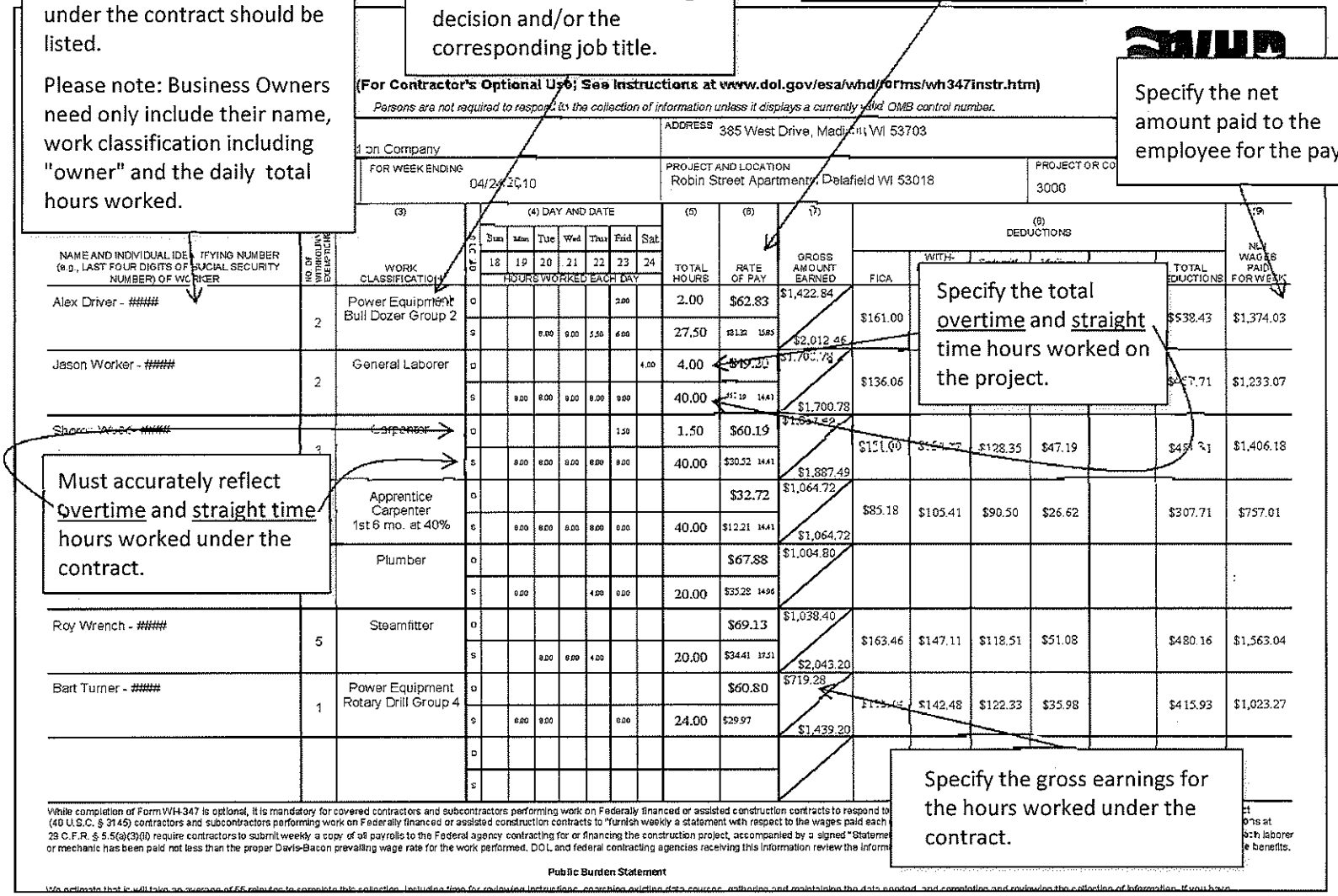
Only laborers and mechanics performing construction work under the contract should be listed.

Please note: Business Owners need only include their name, work classification including "owner" and the daily total hours worked.

Specify the job classification located in the contract wage decision and/or the corresponding job title.

List hourly wage rate and fringes paid in cash (not those paid to plans)

Specify the net amount paid to the employee for the pay



(For Contractor's Optional Use; See instructions at www.dol.gov/esa/whd/forms/wh347instr.htm)

Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number.

ADDRESS 385 West Drive, Madison WI 53703

FOR WEEK ENDING 04/24/2010

PROJECT AND LOCATION Robin Street Apartments Delafield WI 53018

PROJECT OR CO 3000

NAME AND INDIVIDUAL IDENTIFYING NUMBER (e.g., LAST FOUR DIGITS OF SOCIAL SECURITY NUMBER) OF WORKER	NO. OF WITHHOLDING EXEMPTIONS	(3) WORK CLASSIFICATION		(4) DAY AND DATE Sun 18	Mon 19	Tue 20	Wed 21	Thur 22	Fri 23	Sat 24	(5) TOTAL HOURS	(6) RATE OF PAY	(7) GROSS AMOUNT EARNED	(8) DEDUCTIONS FICA	WITH-			TOTAL DEDUCTIONS	NET WAGES PAID FOR WEEK
Alex Driver - #####	2	Power Equipment Bull Dozer Group 2	O						2.00		2.00	$62.83	$1,422.84						
			S			8.00	8.00	5.50	6.00		27.50		$2,012.46	$161.00				$538.43	$1,374.03
Jason Worker - #####	2	General Laborer	O							4.00	4.00	$49.50	$1,700.78						
			S		8.00	8.00	8.00	8.00	8.00		40.00		$1,700.78	$136.06				$467.71	$1,233.07
Sherry Welder - #####		Carpenter	O						1.50		1.50	$60.19	$1,887.49						
			S		8.00	8.00	8.00	8.00	8.00		40.00		$1,887.49	$151.00		$128.35	$47.19		$1,406.18
		Apprentice Carpenter 1st 6 mo. at 40%	O									$32.72	$1,064.72						
			S		8.00	8.00	8.00	8.00	8.00		40.00		$1,064.72	$85.18					
		Plumber	O									$67.88	$1,004.80						
			S		8.00			4.00	8.00		20.00								
Roy Wrench - #####	5	Steamfitter	O									$69.13	$1,038.40						
			S			8.00	8.00	4.00			20.00		$2,043.20	$163.46				$480.16	$1,563.04
Bart Turner - #####	1	Power Equipment Rotary Drill Group 4	O									$60.80	$719.28						
			S		8.00	8.00			8.00		24.00		$1,439.20						
			O																
			S																

While completion of Form WH-347 is optional, it is mandatory for covered contractors and subcontractors performing work on Federally financed or assisted construction contracts to respond to (40 U.S.C. § 3145) contractors and subcontractors performing work on Federally financed or assisted construction contracts to "furnish weekly a statement with respect to the wages paid each 29 C.F.R. § 5.5(a)(3)(ii) require contractors to submit weekly a copy of all payrolls to the Federal agency contracting for or financing the construction project, accompanied by a signed "Statemer or mechanic has been paid not less than the proper Davis-Bacon prevailing wage rate for the work performed. DOL and federal contracting agencies receiving this information review the inform

Public Burden Statement

We estimate that it will take an average of 55 minutes to complete this collection, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. If you have

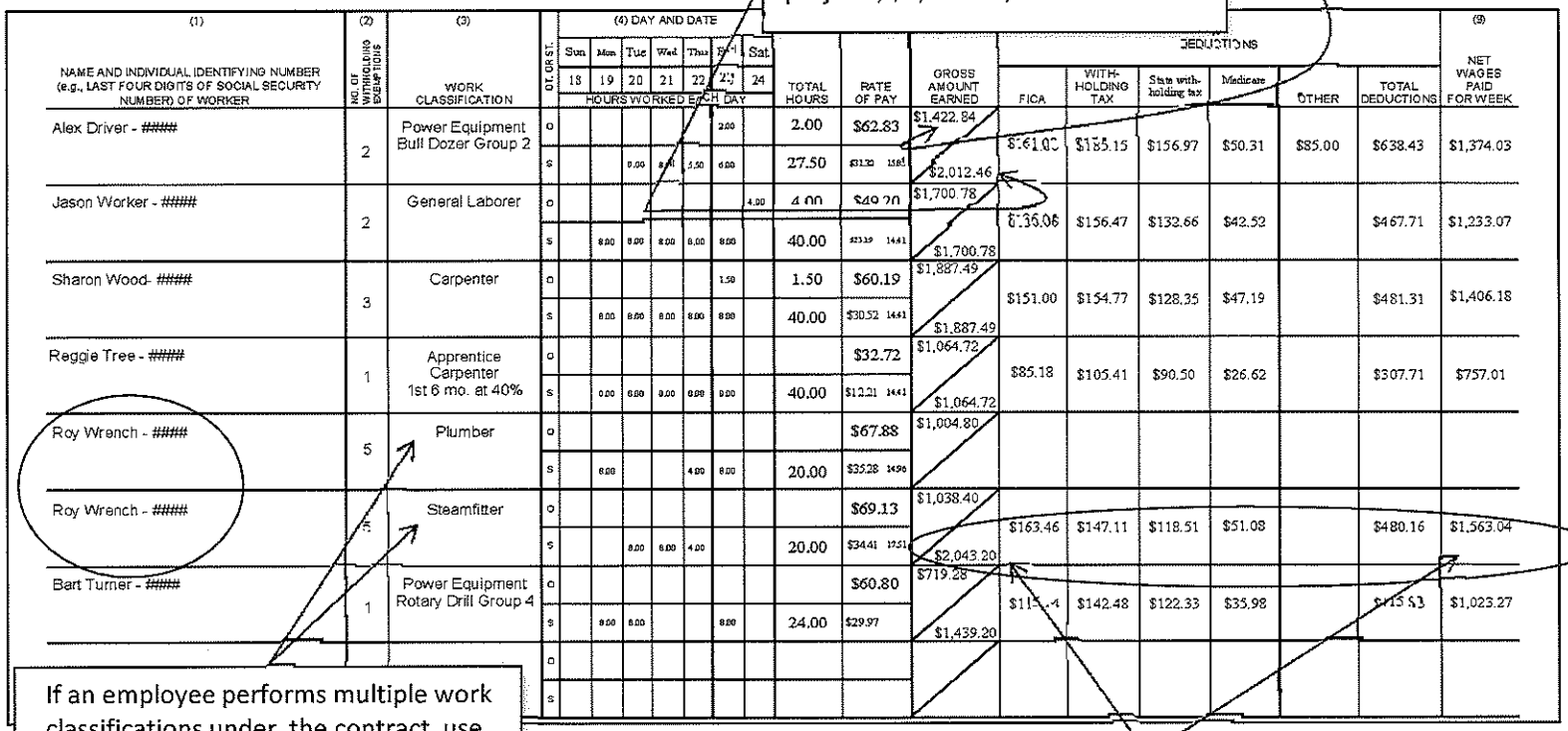
Specify the total overtime and straight time hours worked on the project.

Must accurately reflect overtime and straight time hours worked under the contract.

Specify the gross earnings for the hours worked under the contract.

If part of a worker's weekly wage was earned on projects other than the project described on this payroll, enter the gross amount earned on this contract in the top half of column 7. Enter the gross amount earned during the week for all projects in the bottom half.

Alex Driver worked 29.5 hours on this contract and 12.5 hours on another contract.
The gross wages earned on this project, $1,422.84, is entered in the top half of column 7.
The gross wages earned on all projects, $2,012.46, is entered in the



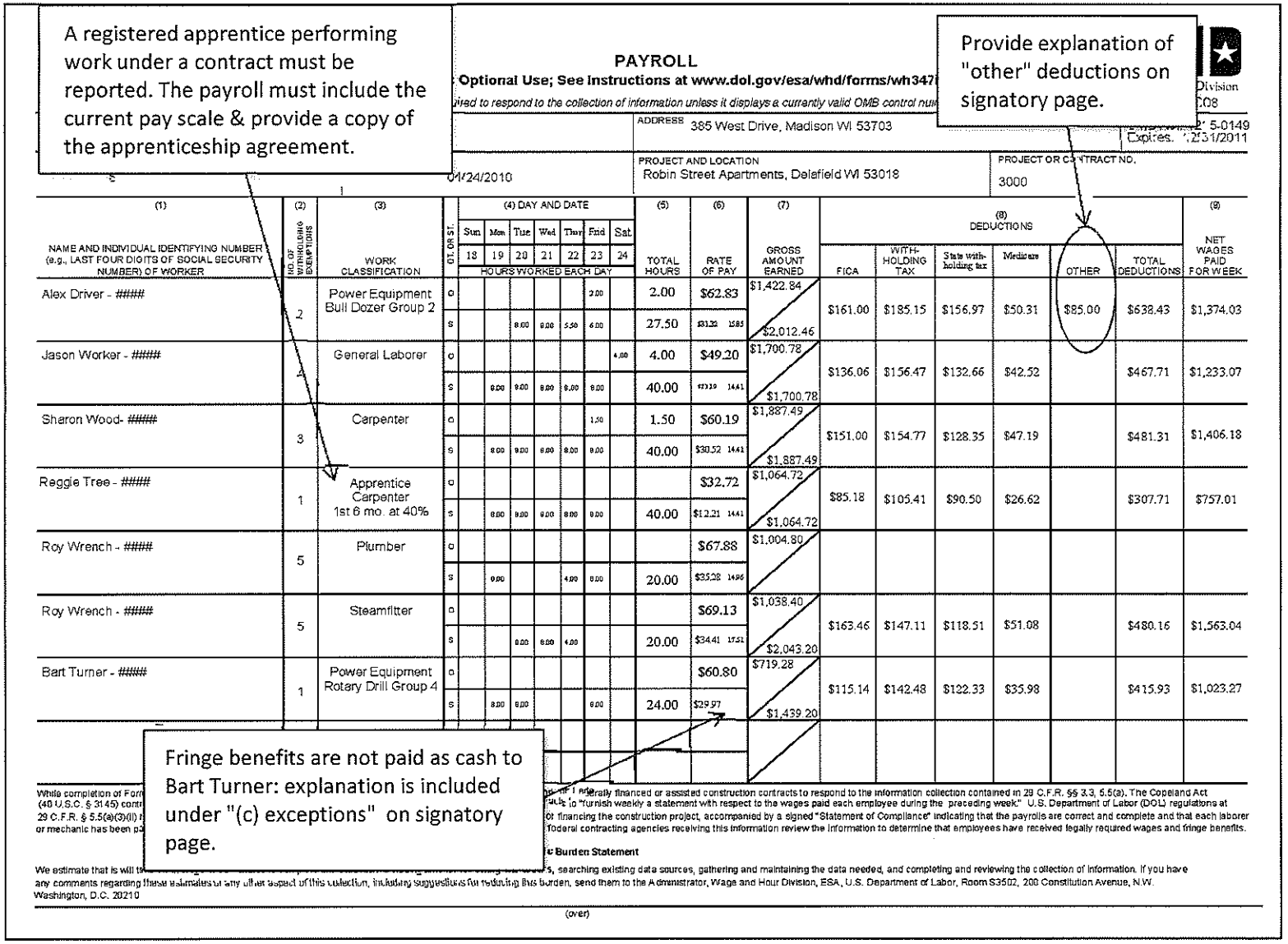
(1) NAME AND INDIVIDUAL IDENTIFYING NUMBER (e.g., LAST FOUR DIGITS OF SOCIAL SECURITY NUMBER) OF WORKER	(2) NO. OF WITHHOLDING EXEMPTIONS	(3) WORK CLASSIFICATION	OT. OR ST.	(4) DAY AND DATE: Sun 18	Mon 19	Tue 20	Wed 21	Thur 22	Fri 23	Sat 24	TOTAL HOURS	RATE OF PAY	GROSS AMOUNT EARNED	DEDUCTIONS: FICA	WITH-HOLDING TAX	State with-holding tax	Medicare	OTHER	TOTAL DEDUCTIONS	(9) NET WAGES PAID FOR WEEK
Alex Driver - #####	2	Power Equipment Bull Dozer Group 2	O						2.00		2.00	$62.83	$1,422.84							
			S			8.00	8.00	5.50	6.00		27.50	$62.83 1.5	$2,012.46	$141.00	$185.15	$156.97	$50.31	$85.00	$638.43	$1,374.03
Jason Worker - ####	2	General Laborer	O							4.00	4.00	$40.20	$1,700.78							
			S		8.00	8.00	8.00	8.00	8.00		40.00	$42.50 1.5	$1,700.78	$136.06	$156.47	$132.66	$42.52		$467.71	$1,233.07
Sharon Wood- ####	3	Carpenter	O						1.50		1.50	$60.19	$1,887.49							
			S		8.00	8.00	8.00	8.00	8.00		40.00	$30.52 1.5	$1,887.49	$151.00	$154.77	$128.35	$47.19		$481.31	$1,406.18
Reggie Tree - ####	1	Apprentice Carpenter 1st 6 mo. at 40%	O									$32.72	$1,064.72							
			S		8.00	8.00	8.00	8.00	8.00		40.00	$12.21 1.5	$1,064.72	$85.18	$105.41	$90.50	$26.62		$307.71	$757.01
Roy Wrench - ####	5	Plumber	O									$67.88	$1,004.80							
			S		8.00			4.00	8.00		20.00	$35.28 1.5	$1,038.40							
Roy Wrench - ####		Steamfitter	O									$69.13		$163.46	$147.11	$118.51	$51.08		$480.16	$1,563.04
			S			8.00	8.00	4.00			20.00	$34.41 1.5	$2,043.20							
Bart Turner - ####	1	Power Equipment Rotary Drill Group 4	O									$60.80	$719.28							
			S		8.00	8.00			8.00		24.00	$29.97	$1,439.20	$115.14	$142.48	$122.33	$35.98		$415.93	$1,023.27
			O																	
			S																	

If an employee performs multiple work classifications under the contract, use two or more lines to distinguish the different job classifications, hours worked, and hourly wage earned for each.

Combine the two classifications when recording the gross amount earned for this pay period, deductions, and net wages.

A registered apprentice performing work under a contract must be reported. The payroll must include the current pay scale & provide a copy of the apprenticeship agreement.

Provide explanation of "other" deductions on signatory page.



PAYROLL

Optional Use; See Instructions at www.dol.gov/esa/whd/forms/wh347

...ired to respond to the collection of information unless it displays a currently valid OMB control nu...

Division
...08

ADDRESS 385 West Drive, Madison WI 53703

...5-0149
Expires: ...2/31/2011

...01/24/2010

PROJECT AND LOCATION Robin Street Apartments, Delafield WI 53018

PROJECT OR CONTRACT NO. 3000

(1) NAME AND INDIVIDUAL IDENTIFYING NUMBER (e.g., LAST FOUR DIGITS OF SOCIAL SECURITY NUMBER) OF WORKER	(2) NO. OF WITHHOLDING EXEMPTIONS	(3) WORK CLASSIFICATION	OT. OR ST.	(4) DAY AND DATE: Sun 18	Mon 19	Tue 20	Wed 21	Thur 22	Fri 23	Sat 24 (HOURS WORKED EACH DAY)	(5) TOTAL HOURS	(6) RATE OF PAY	(7) GROSS AMOUNT EARNED	(8) DEDUCTIONS: FICA	WITH-HOLDING TAX	State with-holding tax	Medicare	OTHER	TOTAL DEDUCTIONS	(9) NET WAGES PAID FOR WEEK
Alex Driver - #####	2	Power Equipment Bull Dozer Group 2	O						2.00		2.00	$62.83	$1,422.84	$161.00	$185.15	$156.97	$50.31	$85.00	$638.43	$1,374.03
			S			8.00	8.00	5.50	6.00		27.50	$93.25 1585	$2,012.46							
Jason Worker - #####	4	General Laborer	O							4.00	4.00	$49.20	$1,700.78	$136.06	$156.47	$132.66	$42.52		$467.71	$1,233.07
			S		8.00	9.00	8.00	8.00	8.00		40.00	$73.19 1441	$1,700.78							
Sharon Wood- #####	3	Carpenter	O						1.50		1.50	$60.19	$1,887.49	$151.00	$154.77	$128.35	$47.19		$481.31	$1,406.18
			S		8.00	9.00	8.00	8.00	9.00		40.00	$90.52 1441	$1,887.49							
Reggie Tree - #####	1	Apprentice Carpenter 1st 6 mo. at 40%	O									$32.72	$1,064.72	$85.18	$105.41	$90.50	$26.62		$307.71	$757.01
			S		8.00	9.00	8.00	8.00	9.00		40.00	$12.21 1441	$1,064.72							
Roy Wrench - #####	5	Plumber	O									$67.88	$1,004.80							
			S		9.00			4.00	8.00		20.00	$35.28 1496								
Roy Wrench - #####	5	Steamfitter	O									$69.13	$1,038.40	$163.46	$147.11	$118.51	$51.08		$480.16	$1,563.04
			S			8.00	8.00	4.00			20.00	$34.41 1751	$2,043.20							
Bart Turner - #####	1	Power Equipment Rotary Drill Group 4	O									$60.80	$719.28	$115.14	$142.48	$122.33	$35.98		$415.93	$1,023.27
			S		8.00	8.00			8.00		24.00	$29.97	$1,439.20							

Fringe benefits are not paid as cash to Bart Turner: explanation is included under "(c) exceptions" on signatory page.

While completion of Form ... (40 U.S.C. § 3145) contr... 29 C.F.R. § 5.5(a)(3)(ii) ... or mechanic has been pa...

...erally financed or assisted construction contracts to respond to the information collection contained in 29 C.F.R. §§ 3.3, 5.5(a). The Copeland Act ...ire ... to "furnish weekly a statement with respect to the wages paid each employee during the preceding week." U.S. Department of Labor (DOL) regulations at ...or financing the construction project, accompanied by a signed "Statement of Compliance" indicating that the payrolls are correct and complete and that each laborer ...federal contracting agencies receiving this information review the information to determine that employees have received legally required wages and fringe benefits.

...c Burden Statement

We estimate that it will t... ..., searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. If you have any comments regarding these estimates or any other aspect of this collection, including suggestions for reducing this burden, send them to the Administrator, Wage and Hour Division, ESA, U.S. Department of Labor, Room S3502, 200 Constitution Avenue, N.W. Washington, D.C. 20210

(over)

Date 04/28/2010

I, Tiffany Payer (Name of Signatory Party) Payroll Supervisor (Title)

do hereby state:

(1) That I pay or supervise the payment of the persons employed by

Sample Construction Company (Contractor or Subcontractor) on the

Robin Street Apartments, Delafield WI (Building or Work); that during the payroll period commencing on the

18 day of 4, 2010, and ending the 24 day of 4, 2010,

all persons employed on said project have been paid the full weekly wages earned, that no rebates have been or will be made either directly or indirectly to or on behalf of said

Sample Construction Company (Contractor or Subcontractor) from the full

weekly wages earned by any person and that no deductions have been made either directly or indirectly from the full wages earned by any person, other than permissible deductions as defined in Regulations, Part 3 (29 C.F.R. Subtitle A), issued by the Secretary of Labor under the Copeland Act, as amended (48 Stat. 948, 63 Stat. 108, 72 Stat. 967; 76 Stat. 357; 40 U.S.C. § 3145), and described below:

Alex Driver - #### - other deductions - $85 for child support

Explanation of "other"

(2) That any payrolls otherwise under this contract required to be submitted for the above period are correct and complete; that the wage rates for laborers or mechanics contained therein are not less than the applicable wage rates contained in any wage determination incorporated into the contract; that the classifications set forth therein for each laborer or mechanic conform with the work he performed.

(3) That any apprentices employed in the above period are duly registered in a bona fide apprenticeship program registered with a State apprenticeship agency recognized by the Bureau of Apprenticeship and Training, United States Department of Labor, or if no such recognized agency exists in a State, are registered with the Bureau of Apprenticeship and Training, United States Department of Labor.

(4) That:

(a) WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS, OR PROGRAMS

☐ – in addition to the basic hourly wage rates paid to each laborer or mechanic listed in the above referenced payroll, payments of fringe benefits as listed in the contract have been or will be made to appropriate programs for the benefit of such employees, except as noted in section 4(c) below.

(b) WHERE FRINGE BENEFITS ARE PAID IN CASH

☑ – Each laborer or mechanic listed in the above referenced payroll has been paid, as indicated on the payroll, an amount not less than the sum of the applicable basic hourly wage rate plus the amount of the required fringe benefits as listed in the contract, except as noted in section 4(c) below.

(c) EXCEPTIONS

EXCEPTION (CRAFT)	EXPLANATION
Power Equipment Rotary Drill Group 4	paid directly to plan: health & dental at $12.50 per hour and Pension at $6.25 per hour

Explanation of exception to fringe benefits

REMARKS

NAME AND TITLE	SIGNATURE
Robert Sample, Owner	

THE WILLFUL FALSIFICATION OF ANY OF THE ABOVE STATEMENTS MAY SUBJECT THE CONTRACTOR OR SUBCONTRACTOR TO CIVIL OR CRIMINAL PROSECUTION. SEE SECTION 1001 OF TITLE 18 AND SECTION 231 OF TITLE 31 OF THE UNITED STATES CODE

Applicability

The Project or Program to which the construction work covered by this contract pertains is being assisted by the United States of America and the following Federal Labor Standards Provisions are included in this Contract pursuant to the provisions applicable to such Federal assistance.

A. 1. (i) Minimum Wages. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section l(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period.

Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible, place where it can be easily seen by the workers.

(ii) (a) Any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefor only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(b) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB control number 1215-0140.)

(c) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

(d) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1)(ii)(b) or (c) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part

of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

2. Withholding. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract In the event of failure to pay any laborer or mechanic, including any apprentice, trainee or helper, employed or working on the site of the work, all or part of the wages required by the contract, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the contractor, disburse such amounts withheld for and on account of the contractor or subcontractor to the respective employees to whom they are due. The Comptroller General shall make such disbursements in the case of direct Davis-Bacon Act contracts.

3. (i) Payrolls and basic records. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section l(b)(2)(B) of the Davis-bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5 (a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section l(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office of Management and Budget under OMB Control Numbers 1215-0140 and 1215-0017.)

(ii) (a) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i) except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at *http://www.dol.gov/esa/whd/forms/wh347instr.htm* or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this subparagraph for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to HUD or its designee. (Approved by the Office of Management and Budget under OMB Control Number 1215-0149.)

(b) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under 29 CFR 5.5 (a)(3)(ii), the appropriate information is being maintained under 29 CFR 5.5(a)(3)(i), and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(c) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by subparagraph A.3.(ii)(b).

(d) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under subparagraph A.3.(i) available for inspection, copying, or transcription by authorized representatives of HUD or its designee or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the contractor, sponsor, applicant or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and Trainees.

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant ',to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by

the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under 29 CFR Part 5 shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR Part 3 which are incorporated by reference in this contract

6. Subcontracts. The contractor or subcontractor will insert in any subcontracts the clauses contained in subparagraphs 1 through 11 in this paragraph A and such other clauses as HUD or its designee may by appropriate instructions require, and a copy of the applicable prevailing wage decision, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this paragraph.

7. Contract termination; debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act Requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and HUD or its designee, the U.S. Department of Labor, or the employees or their representatives.

10. (i) Certification of Eligibility. By entering into this contract the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001. Additionally, U.S. Criminal Code, Section 1 01 0, Title 18, U.S.C., "Federal Housing Administration transactions", provides in part: "Whoever, for the purpose of . . . influencing in any way the action of such Administration..... makes, utters or publishes any statement knowing the same to be false..... shall be fined not more than $5,000 or imprisoned not more than two years, or both."

11. Complaints, Proceedings, or Testimony by Employees. No laborer or mechanic to whom the wage, salary, or other labor standards provisions of this Contract are applicable shall be discharged or in any other manner discriminated against by the Contractor or any subcontractor because such employee has filed any complaint or instituted or caused to be instituted any proceeding or has testified or is about to testify in any proceeding under or relating to the labor standards applicable under this Contract to his employer.

B. Contract Work Hours and Safety Standards Act. The provisions of this paragraph B are applicable where the amount of the prime contract exceeds $100,000. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

(1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which the individual is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.

(2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in subparagraph (1) of this paragraph, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in subparagraph (1) of this paragraph, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by the clause set forth in sub paragraph (1) of this paragraph.

(3) Withholding for unpaid wages and liquidated damages. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contract, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act which is held by the same prime contractor such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in subparagraph (2) of this paragraph.

(4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraph (1) through (4) of this paragraph and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in subparagraphs (1) through (4) of this paragraph.

C. Health and Safety. The provisions of this paragraph C are applicable where the amount of the prime contract exceeds $100,000.

(1) No laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health and safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.

(2) The Contractor shall comply with all regulations issued by the Secretary of Labor pursuant to Title 29 Part 1926 and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act, (Public Law 91-54, 83 Stat 96). 40 USC 3701 et seq.

(3) The contractor shall include the provisions of this paragraph in every subcontract so that such provisions will be binding on each subcontractor. The contractor shall take such action with respect to any subcontractor as the Secretary of Housing and Urban Development or the Secretary of Labor shall direct as a means of enforcing such provisions.

U.S. Department of Labor
Wage and Hour and Public
Contracts Division

STATEMENT OF COMPLIANCE

Form Approved
Budget Bureau No. 44-R1093

Date_____

I, _____, _____, do hereby state:
(Name of signatory party) (Title)

(1) That I pay or supervise the payment of the persons employed by _____ on the
(Contractor or Subcontractor)

_____; that during the payroll commencing on the
(Building or work)

_____day of _____, _____ and ending the _____ day of _____, _____, all persons employed on said project have been paid the full weekly wages earned, that no rebates have been or will be made either directly or indirectly to or on behalf of said Contractor or Subcontractor from the full weekly wages earned by any person and that no deducions have been made either directly or indirectly from the full wages earned by any person, other than permissible deductions as defined in Regulations, Part 3 (29 CFR Subtitle A), issued by the Secretary of Labor under the Copeland Act, as amended (48 Stat., 948,63 Stat. 108, 72 Stat. 967; 76 Stat. 357; 40 U.S.C. 276c), and described below:

_____

_____

(2) That any payrolls otherwise under this contract required to be submitted for the above period are correct and complete; that the wage rates for laborers or mechanics contained therein are not less than the applicable wage rates contained in any wage determination incorporated into the contract; that the classifications set forth therein for each laborer or mechanic conform with the work he performed.

(3) That any apprentices employed in the above period are duly registered in a bona fide apprenticeship program registered with a State apprenticeship agency recognized by the Bureau of Apprenticeship and Training, United States Department of Labor, or if no such recognized agency exists in a State, are registered with the Bureau of Apprenticeship and Training, United States Department of Labor.

(4) That:

(a) WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS, OR PROGRAMS

☐ In addition to the basic hourly wage rates paid to each laborer or mechanic listed in the above referenced payroll, payments of fringe benefits as listed in the contract have been or will be made to appropriate programs for the benefit of such employees, except asnoted in Section 4(c) below.

(b) WHERE FRINGE BENEFITS ARE PAID IN CASH

☐ Each laborer or mechanic listed in the above referenced payroll has been paid as indicated on the payroll, an amount not less than the sum of the applicable basic hourly wage rate plus the amount of the required fringe benefits as listed in the contract, except as noted in Section 4(c) below.

(c) EXCEPTIONS

EXCEPTION (CRAFT)	EXPLANATION

Remarks _____

_____

_____

Name and Title	Signature

The willful falsification of any of the above statements may subject the contractor or subcontractor to civil or criminal prosecution. See Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

Form WH-348

Contractor's Certification

Concerning Labor Standards and Prevailing Wage Requirements

This is to certify that:_____

_____
(Contractor's Company Name & Address)

has executed a contract with_____
(Grantee)

for the construction of_____
(Project)

identified as Project Number _____ and acknowledges that:
(Grant #)

1. The Federal Labor Standards Provisions (HUD-4010) are attached to the contract;
2. Correction of any infractions of the Federal Labor Standards Provisions, including infractions by any subcontractor or lower tier subcontractor is this contractor's responsibility;
3. Neither this contractor, any subcontractor or any affiliates have been declared ineligible to participate in federally funded construction projects;
4. Contractor agrees to obtain and forward to the Grantee or Grantee's Representative within ten (10) days after the execution of any subcontract, a Subcontractor's Certification concerning Federal Labor Standards Provisions and Prevailing Wage requirements.

Contractor's Federal ID# (or SSN) _____

Type of Entity (Check One) ____ Single Proprietorship ____ Partnership
____ Corporation ____ Other Organization

List below the name, title and address of the owner, partner, or officers of the entity:

Name	Title	Address

Signature of Owner or Officer:_____

Date Signed:_____

Telephone Number:_____

This form is no longer required by the U.S. Department of Housing and Urban Development but is required by OCRA on federally funded construction projects.

Revised – November 2011

Subcontractor's Certification

Concerning Labor Standards and Prevailing Wage Requirements

This is to certify that:_____
(Subcontractor's Name & Address)

has executed a subcontract with_____
(Prime Contractor)

in the amount of $_____ for _____
(Nature of Work)

on Project Number _____ and acknowledges that:
(Grant #)

1. The Federal Labor Standards Provisions (HUD-4010) are attached to the contract;
2. Neither this subcontractor or any second or third tier subcontractors or any affiliates have been declared ineligible to participate in federally funded construction projects;
3. Contractor agrees to provide this completed document to the Prime Contractor within ten (10) days after the execution of any subcontract and to adhere to the Federal Labor Standards Provisions in the execution of this subcontract.

Subcontractor is a:
Type of entity: (Check one) _____ Single Proprietorship ____ Partnership

____ Corporation ____ Other Organization

List below the name, title and address of the owner, partner, or officers of the entity:

Name	Title	Address

Signature of Owner or Officer of the Subcontractor:_____

Date Signed:_____

Telephone Number:_____

This form is no longer required by the U.S. Department of Housing and Urban Development but is required by OCRA on federally funded construction projects.

Wage/Fringe Benefit Certification

Grantee: Project Number: Project:

This is to certify that (contractor) _____ plans to use the following classifications of workers on the above referenced project:

	From Applicable Wage Decision				Fringe Benefits to be Provided by Contractor		
Classification	Base Wage Due	Fringe Benefit Due	Total Package Due	Base Wage to be Paid by Contractor	Type of Benefit	Hourly Amount	Total Package to be Paid by Contractor

Certified by: _____ Title: _____ Date: _____
(contractor)

Section 3 Compliance Form

(Submit this form with your Semi-Annual Reports & at Project's Completion.)

General Information

Grantee:	**Grant Number:**
Prime Contractor:	**Prime Contractor EIN:**

Project Information

1.	**Does the project involve any contracts that exceed $200,000?**	
		Yes. Section 3 applies to the Grantee, its subrecipient (if applicable), and contractors with contracts exceeding $200,000 or subcontracts. (Complete remainder of form.)
		No. Section 3 does not apply to the Grantee and its subrecipient (if applicable). (Complete remainder of form with respect to these entities.)
2.	**Indicate the efforts made to direct the employment and other economic opportunities generated by HUD financial assistance for housing and community development programs, to the greatest extent feasible, toward low and very low income persons, particularly those who are recipients of government assistance for housing (check all that apply):**	
		Attempted to recruit low-income residents through local advertising media, signs prominently displayed at the project site, contracts with community organizations and public or private agencies operating within the metropolitan area or nonmetropolitan county in which the Section 3 covered program or project is located or similar methods.
		Advertising the training and employment positions by distributing flyers (which identify the positions to be filled, the qualifications required, and where to obtain additional information about the application process) to housing developments where low and very low income persons (as these terms are defined in Sec. 135.34) reside.
		Contacting resident councils, resident management corporations, or other resident organizations, where they exist, in the housing development or developments where low and very low income persons reside, and community organizations in HUD assisted neighborhoods, to request the assistance of these organizations in notifying residents of the training and employment positions to be filled.
		Other. Describe:

Form Continued

Grantee:	**Grant Number:**
Prime Contractor:	**Prime Contractor EIN:**

3. **The date reported to OCRA in this section must be a compilation of information throughout the grant time frame pertaining to the Grantee and each applicable contractor or subcontractor (including a subrecipient or grant administrator, if applicable).**

Name of Contractors (If prime contract is over $200,000 ALL subcontractors working for the prime must be listed below). Engineering contracts over $200,000.00 must all be reported	**Total number of hours worked by ALL employees on the project.**	**Total number of hours worked by SECTION 3 workers on the project.**	**Total number of hours worked by TARGETED SECTION 3 workers on the project.**	**Total percentage of hours worked by SECTION 3 workers on the project.**	**Total percentage of hours worked by TARGETED SECTION 3 workers on the project.**

Signature of Contractor:	
Name of Contractor:	
Date:	

Signature of Chief Elected Official:	
Name of Chief Elected Official:	
Date:	

Instructions

Number 2. Grantee and Contractor must describe all attempts made to contract with Section 3 business concerns and to hire Section 3 residents if jobs were available.

Column A: (Mandatory Field) List all Prime contractors with contracts greater than $200,000.00 as well as any Sub-Constractors working underneath those prime contractors.

Column B: (Mandatory Field) Enter the total number of hours worked by ALL employees for the contractor during the FULL duration of the project from Award to Closeout (or up to the current reporting period). Include staff hours for part-time and full-time positions.

Column C: (Mandatory Field) Enter the total number of hours worked by Section 3 employees for the contractor during the FULL duration of the project from Award to Closeout (or up to the current reporting period). Include staff hours for part-time and full-time positions.

Column D: (Mandatory Field) Enter the total number of hours worked by Targeted Section 3 employees for the contractor during the FULL duration of the project from Award to Closeout (or up to the current reporting period). Include staff hours for part-time and full-time positions.

Column E: Enter the percentage of the total staff hours worked bySection 3 employees and trainees (including new hires) connected with this award. Include staff hours for part-time and full-time positions.

Column F: Enter the percentage of the total staff hours worked by Targeted Section 3 employees and trainees (including new hires) connected with this award. Include staff hours for part-time and full-time positions.

Definitions:

Section 3 Worker - A Section 3 Worker is someone who meets one of the following criteria. If they were hired in the past 5 years, and met the criteria at their date of hire, than they are still considered a Section 3 worker:

- A Low or Very-Low Income level individual according to HUD standards.
- A Youth Build Participant
- Employed by a Section 3 Business Concern

Targeted Section 3 Worker - A Targeted Section 3 Worker is someone who meets one of the following criteria. If they were hired in the past 5 years, and met the criteria at their date of hire, than they are still considered a Targeted Section 3 worker:

- Employed by a Section 3 Business Concern
- Resident of Public Housing or Section 8 Assisted Housing
- A resident of another project managed by the Public Housing Administration
- A Youth Build Participant

Section 3 Business Concern - A business who has documented over the last 3 months that they are one of the following:

- 51% or more owned/controlled by low- or very low-income persons.
- Greater than 75% labor hours are performed over prior three-month period performed by low- or very low-income workers.
- Greater than or equal to 51% owned/controlled by current residents of public housing or Section 8-assisted housing.

ATTACHMENT B

Davis-Bacon Prevailing Wage Rate (Heavy and Highway)

General Decision No: IN20260006
Dated: 07/30/2026

"General Decision Number: IN20260006 07/30/2026

State: Indiana

Construction Types: Heavy and Highway

Counties: Indiana Counties of
Adams, Allen, Bartholomew, Benton,
Blackford, Boone, Brown, Carroll, Cass,
Clark, Clay, Clinton, Crawford, Daviess,
DeKalb, Dearborn, Decatur, Delaware,
Dubois, Elkhart, Fayette, Floyd,
Fountain, Franklin, Fulton, Gibson,
Grant, Greene, Hamilton, Hancock,
Harrison, Hendricks, Henry, Howard,
Huntington, Jackson, Jasper, Jay,
Jefferson, Jennings, Johnson, Knox,
Kosciusko, Lagrange, Lawrence, Madison,
Marion, Marshall, Martin, Miami, Monroe,
Montgomery, Morgan, Newton, Noble, Ohio,
Orange, Owen, Parke, Perry, Pike, Posey,
Pulaski, Putnam, Randolph, Ripley, Rush,
Scott, Shelby, Spencer, Starke, Steuben,
Sullivan, Switzerland, Tippecanoe,
Tipton, Union, Vanderburgh, Vermillion,
Vigo, Wabash, Warren, Warrick,
Washington, Wayne, Wells, White and
Whitley

Heavy Construction

Highway Construction

Modification Number	Publication Date
1	01/30/2026
2	05/18/2026
3	07/30/2026

ASBE0008-004 07/01/2017

	Rates	Fringes
HAZARDOUS MATERIAL HANDLER: INCLUDES PREPARATION, WETTINGS, STRIPPING, REMOVAL, SCRAPPING, VACUUMING, BAGGING & DISPOSING OF ALL INSULATION MATERIALS, WHETHER THEY CONTAIN ASBESTOS OR NOT, FROM MECHANICAL SYSTEMS (DEARBORN, FAYETTE, FRANKLIN, OHIO, RIPLEY SWITZERLAND AND UNION COUNTIES)	$ 25.00	13.70

ASBE0008-004 03/01/2025

	Rates	Fringes
ASBESTOS WORKERS/INSULATOR: INCLUDES APPLICATION OF ALL INSULATING MATERIALS, PROTECTIVE COVERINGS, COATINGS & FINISHINGS TO ALL TYPES OF MECHANICAL SYSTEMS (DEARBORN, FAYETTE, FRANKLIN, OHIO, RIPLEY SWITZERLAND AND UNION COUNTIES)	$ 35.23	22.79

ASBE0017-008 06/01/2025

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR (NEWTON COUNTY)	$ 56.02	37.24
HAZARDOUS MATERIAL HANDLER: INCLUDES PREPARATION, WETTING, STRIPPING REMOVAL SCRAPPING, VACUUMING, BAGGING AND DISPOSAL OF ALL INSULATION MATERIALS, WHETHER THEY CONTAIN ASBESTOS OR NOT, FROM MECHAINCAL SYSTEMS (NEWTON COUNTY)	$ 44.82	34.00

ASBE0018-005 06/01/2017

	Rates	Fringes
HAZARDOUS MATERIAL HANDLER: INCLUDES PREPARATION, WETTINGS, STRIPPING, REMOVAL, SCRAPPING, VACUUMING, BAGGING & DISPOSING OF ALL INSULATION MATERIALS, WHETHER THEY CONTAIN ASBESTOS OR NOT, FROM MECHANICAL SYSTEMS (BROWN, BARTHOLOMEW, BENTON, BOONE, CARROLL, CASS, CLAY, CLINTON, DECATUR, DELAWARE, ELKHART. FOUNTAIN, FULTON, GREENE, HAMILTON, HANCOCK, HENDRICKS, HENRY, HOWARD, JASPER, JOHNSON, KOSCIUSKO, LAGRANGE, MARSHALL, MADISON, MARION, MONROE, MONTGOMERY, MORGAN, OWEN, PARKE, PULASKI, P	$ 23.00	14.40

ASBE0018-005 06/01/2025

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR: INCLUDES APPLICATION OF ALL INSULATING MATERIALS, PROTECTIVE COVERINGS, COATINGS AND FINISHINGS TO ALL TYPES OF MECHANICAL SYSTEMS (BROWN, BARTHOLOMEW, BENTON, BOONE, CARROLL, CASS, CLAY, CLINTON, DECATUR, DELAWARE, ELKHART. FOUNTAIN, FULTON, GREENE, HAMILTON, HANCOCK, HENDRICKS, HENRY, HOWARD, JASPER, JOHNSON, KOSCIUSKO, LAGRANGE, MARSHALL, MADISON, MARION, MONROE, MONTGOMERY, MORGAN, OWEN, PARKE, PULASKI, PUTNAM, RUSH, SHELBY, STARKE, TIPPECANOE, TI	$ 40.20	25.68

ASBE0037-004 06/01/2023

	Rates	Fringes
HAZARDOUS MATERIAL HANDLER: INCLUDES PREPARATION, WETTING, STRIPPING, REMOVAL, SCRAPPING, VACUUMING, BAGGING AND DISPOSING OF ALL INSULATION MATERIALS, WHETHER THEY CONTAIN ASBESTOS OR NOT, FROM MECHANICAL SYSTEMS (DAVIESS, DUBOIS, GIBSON, KNOX, MARTIN, PIKE, POSEY, SPENCER, SULLIVAN, VANDERBURGH AND WARRICK COUNTIES)	$ 33.44	21.84

ASBE0037-004 04/05/2025

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR: INCLUDES APPLICATION OF ALL INSULATING MATERIALS PROTECTIVE COVERINGS, COATINGS AN FINISHES TO ALL TYPES OF MECHANICAL SYSTEMS. ALSO THE APPLICATION OF FIRESTOPPING, MATERIAL OPENINGS AND PENETRATIONS IN WALLS, FLOORS, CEILINGS, CURTAIN WALLS AND ALL LEAD ABATEMENT. (DAVIESS, DUBOIS, GIBSON, KNOX, MARTIN, PIKE, POSEY, SPENCER, SULLIVAN, VANDERBURGH AND WARRICK COUNTIES)	$ 38.19	23.59

ASBE0041-002 06/01/2024

	Rates	Fringes
HAZARDOUS MATERIAL HANDLER: INCLUDES PREPARATION, WETTINGS, STRIPPING, REMOVAL, SCRAPPING, VACCUMING, BAGGING & DISPOSING OF ALL INSULATION MATERIALS, WHETHER THEY CONTAIN ASBESTOS OR NOT, FROM MECHANICAL SYSTEMS (ADAMS, ALLEN, BLACKFORD, DE KALB, GRANT, HUNTINGTON, JAY, MIAMI, NOBLE, STEUBEN, WABASH, WELLS AND WHITLEY COUNTIES:)	$ 35.10	19.39

ASBE0041-002 03/01/2025

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR: INCLUDES APPLICATION OF ALL INSULATING MATERIALS, PROTECTIVE COVERINGS, COATINGS AND FINISHINGS TO ALL TYPES OF MECHANICAL SYSTEMS (ADAMS, ALLEN, BLACKFORD, DE KALB, GRANT, HUNTINGTON, JAY, MIAMI, NOBLE, STEUBEN, WABASH, WELLS AND WHITLEY COUNTIES:)	$ 37.25	19.85

ASBE0051-003 06/01/2017

	Rates	Fringes
HAZARDOUS MATERIAL HANDLER: INCLUDES PREPARATION, WETTINGS, STRIPPING, REMOVAL, SCRAPPING, VACCUMING, BAGGING & DISPOSING OF ALL INSULATION MATERIALS, WHETHER THEY CONTAIN ASBESTOS OR NOT, FROM MECHANICAL SYSTEMS (CLARK, CRAWFORD. FLOYD, HARRISON, JACKSON, JEFFERSON, JENNINGS, LAWRENCE, ORANGE, PERRY, SCOTT, AND WASHINGTON COUNTIES)	$ 19.80	13.30

ASBE0051-003 03/01/2025

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR: INCLUDES APPLICATION OF ALL INSULATING MATERIALS, PROTECTIVE COVERINGS, COATINGS AND FINISHINGS TO ALL TYPES OF MECHANICAL SYSTEMS (CLARK, CRAWFORD. FLOYD, HARRISON, JACKSON, JEFFERSON, JENNINGS, LAWRENCE, ORANGE, PERRY, SCOTT, AND WASHINGTON COUNTIES)	$ 30.00	20.89

ASBE0079-002 03/01/2024

	Rates	Fringes
HAZARDOUS MATERIAL HANDLER: INCLUDES PREPARATION, WETTING, STRIPPING, REMOVAL, SCRAPPING, VACUUMING, BAGGING & DISPOSING OF ALL INSULATION MATERIALS, WHETHER THEY CONTAIN ASBESTOS OR NOT, FROM MECHANICAL SYSTEMS) (RANDOLPH AND WAYNE COUNTIES)	$ 38.56	18.70

ASBE0079-002 07/01/2024

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR: INCLUDES APPLICATION OF ALL INSULATING MATERIALS, PROTECTIVE COVERINGS, COATINGS & FINISHINGS TO ALL TYPES OF MECHANICAL SYSTEMS (RANDOLPH AND WAYNE COUNTIES)	$ 38.56	18.70

BRIN0003-001 06/01/2023

	Rates	Fringes
BRICKLAYER, STONE MASON, POINTER, CAULKING (INDIANAPOLIS BOONE, HANCOCK, HENDRICKS, JOHNSON,		

MARION, MONTGOMERY, MORGAN AND SHELBY COUNTIES).....$ 36.24 17.39
TERRAZZO FINISHER (INDIANAPOLIS BOONE, HANCOCK,
HENDRICKS, JOHNSON, MARION, MONTGOMERY, MORGAN AND
SHELBY COUNTIES).....$ 23.38 13.15
TERRAZZO WORKER/SETTER (INDIANAPOLIS BOONE,
HANCOCK, HENDRICKS, JOHNSON, MARION, MONTGOMERY,
MORGAN AND SHELBY COUNTIES).....$ 36.38 17.24
TILE & MARBLE FINISHER (INDIANAPOLIS BOONE,
HANCOCK, HENDRICKS, JOHNSON, MARION, MONTGOMERY,
MORGAN AND SHELBY COUNTIES).....$ 24.33 13.16
TILE, MARBLE SETTER (INDIANAPOLIS BOONE, HANCOCK,
HENDRICKS, JOHNSON, MARION, MONTGOMERY, MORGAN AND
SHELBY COUNTIES).....$ 35.63 17.23

BRIN0004-004 06/01/2024

	Rates	Fringes
BRICKLAYER: STONE MASON, MARBLE MASONS, POINTER, CLEANER, AND CAULKER (FORT WAYNE ADAMS, ALLEN, DEKALB, HUNTINGTON, NOBLE, STEUBEN, WELLS AND WHITLEY COUNTIES:)	$ 35.00	21.60
TERRAZZO GRINDER FINISHER (FORT WAYNE ADAMS, ALLEN, DEKALB, HUNTINGTON, NOBLE, STEUBEN, WELLS AND WHITLEY COUNTIES:)	$ 31.00	17.89
TERRAZZO WORKER MECHANIC (FORT WAYNE ADAMS, ALLEN, DEKALB, HUNTINGTON, NOBLE, STEUBEN, WELLS AND WHITLEY COUNTIES:)	$ 36.30	22.04
TILE SETTER & MARBLE MASON MECHANIC (FORT WAYNE ADAMS, ALLEN, DEKALB, HUNTINGTON, NOBLE, STEUBEN, WELLS AND WHITLEY COUNTIES:)	$ 31.55	19.08
TILE, MARBLE & TERRAZZO FINISHER (FORT WAYNE ADAMS, ALLEN, DEKALB, HUNTINGTON, NOBLE, STEUBEN, WELLS AND WHITLEY COUNTIES:)	$ 31.55	19.08

BRIN0004-005 06/01/2024

	Rates	Fringes
BRICKLAYER (CRAWFORD, DUBOIS, PERRY, POSEY, SPENCER, VANDERBURGH, AND WARRICK COUNTIES)	$ 35.34	21.72
TILE FINISHER (CRAWFORD, DUBOIS, PERRY, POSEY, SPENCER, VANDERBURGH, AND WARRICK COUNTIES)	$ 29.08	17.32
TILE SETTER (CRAWFORD, DUBOIS, PERRY, POSEY, SPENCER, VANDERBURGH, AND WARRICK COUNTIES)	$ 29.08	17.32

BRIN0004-009 06/01/2024

	Rates	Fringes
BRICKLAYER, STONEMASON (BARTHOLOMEW, BROWN, DEARBORN, DECATUR, JENNINGS, MONROE, OHIO, OWENS, RIPLEY AND SWITZERLAND COUNTIES)	$ 35.21	18.19
TERRAZZO FINISHER (BARTHOLOMEW, BROWN, DEARBORN, DECATUR, JENNINGS, MONROE, OHIO, OWENS, RIPLEY AND SWITZERLAND COUNTIES)	$ 25.33	14.19
TERRAZZO WORKER/SETTER (BARTHOLOMEW, BROWN, DEARBORN, DECATUR, JENNINGS, MONROE, OHIO, OWENS, RIPLEY AND SWITZERLAND COUNTIES)	$ 37.97	18.06
TILE & MARBLE FINISHER (BARTHOLOMEW, BROWN, DEARBORN, DECATUR, JENNINGS, MONROE, OHIO, OWENS, RIPLEY AND SWITZERLAND COUNTIES)	$ 25.33	14.19
TILE, MARBLE SETTER (BARTHOLOMEW, BROWN, DEARBORN, DECATUR, JENNINGS, MONROE, OHIO, OWENS, RIPLEY AND SWITZERLAND COUNTIES)	$ 37.22	18.05

BRIN0004-010 06/01/2024

	Rates	Fringes
BRICKLAYER: BRICKLAYERS, STONEMASONS AND CEMENT MASONS (CLARK, FLOYD, AND HARRISON COUNTIES)	$ 33.70	16.57

BRIN0004-015 06/01/2024

	Rates	Fringes
BRICKLAYER: BRICKLAYERS, STONE MASONS AND POINTER/ CLEANER/CAULKER (TERRE HAUTE CLAY, DAVIESS, GIBSON, GREENE, KNOX, MARTIN, PARKE, PIKE, PUTNAM, SULLIVAN, VERMILLION AND VIGO COUNTIES)	$ 38.16	18.22
BRICKLAYER: CEMENT MASON (REMAINING COUNTIES) (TERRE HAUTE CLAY, DAVIESS, GIBSON, GREENE, KNOX, MARTIN, PARKE, PIKE, PUTNAM, SULLIVAN, VERMILLION AND VIGO COUNTIES)	$ 37.16	18.22
BRICKLAYER: TERRAZO FINISHER (TERRE HAUTE CLAY, DAVIESS, GIBSON, GREENE, KNOX, MARTIN, PARKE, PIKE, PUTNAM, SULLIVAN, VERMILLION AND VIGO COUNTIES)	$ 25.33	14.19
BRICKLAYER: TERRAZZO WORKER (TERRE HAUTE CLAY, DAVIESS, GIBSON, GREENE, KNOX, MARTIN, PARKE, PIKE, PUTNAM, SULLIVAN, VERMILLION AND VIGO COUNTIES)	$ 37.97	18.06
BRICKLAYER: TILE LAYER, MARBLE MASON, MOSAIC WORKER (TERRE HAUTE CLAY, DAVIESS, GIBSON, GREENE, KNOX, MARTIN, PARKE, PIKE, PUTNAM, SULLIVAN, VERMILLION AND VIGO COUNTIES)	$ 38.16	18.22

BRIN0004-016 06/01/2024

	Rates	Fringes
BRICKLAYER, STONEMASON, POINTER, CAULKER & CLEANER (MUNCIE BLACKFORD, DELAWARE, FAYETTE, FRANKLIN, HAMILTON, HENRY, JAY, MADISON, RANDOLPH, RUSH, TIPTON, UNION AND WAYNE COUNTIES)	$ 35.83	20.89
TERRAZZO FINISHER (MUNCIE BLACKFORD, DELAWARE, FAYETTE, FRANKLIN, HAMILTON, HENRY, JAY, MADISON, RANDOLPH, RUSH, TIPTON, UNION AND WAYNE COUNTIES)	$ 25.33	14.19
TERRAZZO WORKER/SETTER (MUNCIE BLACKFORD, DELAWARE, FAYETTE, FRANKLIN, HAMILTON, HENRY, JAY, MADISON, RANDOLPH, RUSH, TIPTON, UNION AND WAYNE COUNTIES)	$ 37.97	18.06
TILE & MARBLE FINISHER (MUNCIE BLACKFORD, DELAWARE, FAYETTE, FRANKLIN, HAMILTON, HENRY, JAY, MADISON, RANDOLPH, RUSH, TIPTON, UNION AND WAYNE COUNTIES)	$ 25.33	14.19
TILE & MARBLE SETTER; MOSAIC WORKER (MUNCIE BLACKFORD, DELAWARE, FAYETTE, FRANKLIN, HAMILTON, HENRY, JAY, MADISON, RANDOLPH, RUSH, TIPTON, UNION AND WAYNE COUNTIES)	$ 35.83	20.89

BRIN0006-001 06/01/2023

	Rates	Fringes
BRICKLAYER: INCLUDING STONEMASON, AND POINTER, CAULKER & CLEANER (JASPER, NEWTON & STARKE COUNTIES)	$ 42.05	28.22
TILE, MARBLE & TERRAZZO WORKER (JASPER, NEWTON & STARKE COUNTIES)	$ 42.05	28.22

BRIN0011-001 06/01/2023

	Rates	Fringes
BRICKLAYER, STONEMASON, POINTER, CAULKER & CLEANER (LAFAYETTE BENTON, CARROLL, CLINTON, FOUNTAIN, TIPPECANOE, WARREN AND WHITE COUNTIES)	$ 33.75	20.12
TERRAZZO FINISHER (LAFAYETTE BENTON, CARROLL,		

CLINTON, FOUNTAIN, TIPPECANOE, WARREN AND WHITE
COUNTIES).....$ 23.38 13.15
TERRAZZO WORKER/SETTER (LAFAYETTE BENTON, CARROLL,
CLINTON, FOUNTAIN, TIPPECANOE, WARREN AND WHITE
COUNTIES).....$ 36.38 17.24
TILE & MARBLE FINISHER (LAFAYETTE BENTON,
CARROLL, CLINTON, FOUNTAIN, TIPPECANOE, WARREN AND
WHITE COUNTIES).....$ 24.33 13.16
TILE & MARBLE SETTER; MOSAIC WORKER (LAFAYETTE
BENTON, CARROLL, CLINTON, FOUNTAIN, TIPPECANOE,
WARREN AND WHITE COUNTIES).....$ 35.63 17.23

BRIN0018-002 06/01/2023

Rates Fringes
BRICKLAYER, CAULKER, CLEANER, POINTER (CASS,
ELKHART, FULTON, GRANT, HOWARD, KOSCUISKO,
LAGRANGE, MARSHALL, MIAMI, PULASKI, WABASH).....$ 34.00 19.71

CARP0002-023 04/01/2025

Rates Fringes
CARPENTER (DEARBORN, JACKSON, JENNINGS, OHIO,
RIPLEY AND SWITZERLAND COUNTIES).....$ 31.09 28.53

CARP0133-001 04/01/2025

Rates Fringes
CARPENTER (BOONE, CLAY, FOUNTAIN, MONROE,
MONTGOMERY, MORGAN, OWEN, PARKE, PUTNAM, VERMILLION
AND VIGO COUNTIES).....$ 34.69 25.59

CARP0133-003 04/01/2025

Rates Fringes
CARPENTER (HAMILTON, HANCOCK, HENDRICKS, JOHNSON
(TOWNSHIPS OF CLARK, CAMP ATTERBURY NORTH OF
HOSPITAL ROAD, PLEASANT, WHITE RIVER), AND MARION
COUNTIES).....$ 35.80 25.59

CARP0175-004 04/01/2025

Rates Fringes
CARPENTER (CLARK, FLOYD, HARRISON, JEFFERSON,SCOTT
AND WASHINGTON COUNTIES).....$ 30.52 29.11

CARP0215-002 04/01/2025

Rates Fringes
CARPENTER (BENTON, CARROLL, CLINTON, PULASKI,
TIPPECANOE, WARREN AND WHITE COUNTIES).....$ 35.14 25.10

CARP0224-011 04/01/2025

Rates Fringes
CARPENTER (CRAWFORD, DUBOIS, PERRY, PIKE, POSEY,
SPENCER, VANDERBURGH AND WARRICK COUNTIES:).....$ 30.59 29.03

CARP0224-012 04/01/2025

Rates Fringes
CARPENTER (DAVIESS, GIBSON, GREENE, KNOX,
LAWRENCE, MARTIN, ORANGE AND SULLIVAN COUNTIES:)...$ 30.94 29.08

CARP0232-003 04/01/2025

	Rates	Fringes
CARPENTER (ALLEN, DEKALB, LAGRANGE, NOBLE, STEUBEN AND WHITLEY COUNTIES)	$ 33.74	25.84

CARP0301-001 04/01/2025

	Rates	Fringes
CARPENTER (BARTHOLOMEW, BROWN,(CAMP ATTERBURY SOUTH OF HOSPITAL ROAD), DECATUR, FRANKLIN, JOHNSON (TOWNSHIPS OF BLUE RIVER, FRANKLIN, HENSLEY, NEEDHAM, NINEVEH, UNION) , RUSH AND SHELBY COUNTIES)	$ 34.25	25.59

CARP0413-003 04/01/2025

	Rates	Fringes
CARPENTER (ADAMS, CASS, ELKHART, FULTON, GRANT, HOWARD, HUNTINGTON, KOSCIUSKO, MARSHALL, MIAMI, TIPTON, WABASH AND WELLS COUNTIES:)	$ 34.06	25.67

CARP0999-001 06/01/2025

	Rates	Fringes
CARPENTER (JASPER, NEWTON, AND STARKE COUNTIES)	$ 45.91	35.90

CARP1016-001 04/01/2025

	Rates	Fringes
CARPENTER (BLACKFORD, DELAWARE, FAYETTE, HENRY, JAY, MADISON, RANDOLPH, UNION AND WAYNE COUNTIES)	$ 34.55	25.59

CARP1076-004 04/01/2016

	Rates	Fringes
MILLWRIGHT (HAMILTON AND MARION COUNTIES, AND THE FOLLOWING TOWNSHIPS IN JOHNSON COUNTY: CAMP ATTERBURY (NORTH OF HOSPITAL RD.), CLARK, PLEASANT, AND WHITE RIVER)	$ 26.81	19.28

CARP1076-005 06/01/2025

	Rates	Fringes
MILLWRIGHT (JASPER, NEWTON, PULASKI, AND STARKE COUNTIES)	$ 47.92	37.23

CARP1076-006 06/01/2025

	Rates	Fringes
MILLWRIGHT (BARTHOLOMEW, BLACKFORD, BOONE, BROWN, CLAY, DECATUR, DELAWARE, FAYETTE, FOUNTAIN, FRANKLIN, HAMILTON, HANCOCK, HENDRICKS, HENRY, JAY, JOHNSON, MADISON, MARION, MONROE, MONTGOMERY, MORGAN, OWEN, PARKE, PUTNAM, RANDOLPH, RUSH, SHELBY, UNION, VERMILLION, VIGO, AND WAYNE COUNTIES)	$ 39.10	26.94

CARP1080-001 04/01/2025

	Rates	Fringes
MILLWRIGHT: ZONE 1: POSEY, VANDERBURGH AND WARRICK COUNTIES	$ 36.30	28.37
MILLWRIGHT: ZONE 2: GIBSON, GREENE AND SULLIVAN COUNTIES	$ 35.00	29.33

ELEC0016-003 04/01/2023

	Rates	Fringes
ELECTRICIAN (CRAWFORD, DAVIESS, DUBOIS, GIBSON, LAWRENCE, MARTIN, ORANGE, PERRY, PIKE, POSEY, SPENCER, VANDERBURGH, WARRICK)	$ 41.04	18.94

ELEC0016-006 08/31/2024

	Rates	Fringes
ELECTRICIAN (COMMUNICATION TECHNICIAN ONLY) (CRAWFORD, DAVIESS, DUBOIS, GIBSON, LAWRENCE, MARTIN, ORANGE, PERRY, PIKE, POSEY, SPENCER, VANDERBURGH, WARRICK)	$ 33.98	18.04

ELEC0071-006 01/02/2024

	Rates	Fringes
LINE CONSTRUCTION: EQUIPMENT OPERATOR (DEARBORN, OHIO, AND SWTIZERLAND COUNTIES)	$ 39.11	17.13
LINE CONSTRUCTION: GROUNDMAN (DEARBORN, OHIO, AND SWTIZERLAND COUNTIES)	$ 25.90	13.97
LINE CONSTRUCTION:: LINEMAN & CABLE SPLICERS (DEARBORN, OHIO, AND SWTIZERLAND COUNTIES)	$ 44.52	18.43

ELEC0153-003 06/03/2019

	Rates	Fringes
COMMUNICATION TECHNICIAN (ELKHART, KOSCIUSKO AND MARSHALL COUNTIES)	$ 26.50	18.33

ELEC0153-003 06/01/2025

	Rates	Fringes
ELECTRICIAN (ELKHART, KOSCIUSKO AND MARSHALL COUNTIES)	$ 46.00	29.23

ELEC0212-002 11/30/2023

	Rates	Fringes
ELECTRICIAN (COMMUNICATION TECHNICIAN ONLY) (DEARBORN, OHIO, AND SWITZERLAND COUNTIES)	$ 27.20	14.54

ELEC0212-009 06/07/2025

	Rates	Fringes
ELECTRICIAN (DEARBORN, OHIO, AND SWITZERLAND COUNTIES)	$ 38.05	22.32

ELEC0305-003 12/01/2024

	Rates	Fringes
ELECTRICIAN (ADAMS, ALLEN, DE KALB, HUNTINGTON, LAGRANGE, NOBLE, STEUBEN, WELLS, AND WHITLEY COUNTIES)	$ 40.18	23.18

ELEC0305-004 08/31/2024

	Rates	Fringes
ELECTRICIAN (COMMUNICATION TECHNICIAN ONLY) (ADAMS, ALLEN, DE KALB, HUNTINGTON, LAGRANGE, NOBLE, STEUBEN, WELLS, AND WHITLEY COUNTIES)	$ 36.00	21.51

ELEC0369-005 05/29/2025

	Rates	Fringes
ELECTRICIAN (CLARK, FLOYD, HARRISON, JACKSON, JEFFERSON, SCOTT, AND WASHINGTON COUNTIES)	$ 40.96	22.44

ELEC0481-003 03/31/2025

	Rates	Fringes
ELECTRICIAN (BARTHOLOMEW, BOONE, DECATUR, HAMILTON, HANCOCK, HENDRICKS, JENNINGS, JOHNSON, MADISON, MARION, MONTGOMERY, MORGAN, PUTNAM, RIPLEY, RUSH AND SHELBY COUNTIES)	$ 45.45	28.19

ELEC0481-004 01/01/2023

	Rates	Fringes
ELECTRICIAN (COMMUNICATION TECHNICIAN ONLY) (BARTHOLOMEW, BOONE, DECATUR, HAMILTON, HANCOCK, HENDRICKS, JENNINGS, JOHNSON, MADISON, MARION, MONTGOMERY, MORGAN, PUTNAM, RIPLEY, RUSH AND SHELBY COUNTIES)	$ 35.76	18.96

ELEC0531-002 05/31/2025

	Rates	Fringes
ELECTRICIAN (JASPER, PULASKI, AND STARKE COUNTIES)	$ 49.00	32.89

ELEC0531-003 05/28/2018

	Rates	Fringes
ELECTRICIAN (COMMUNICATION TECHNICIAN ONLY) (JASPER, PULASKI, AND STARKE COUNTIES)	$ 27.64	13.23

ELEC0538-005 06/01/2025

	Rates	Fringes
ELECTRICIAN (FOUNTAIN, VERMILLION, AND WARREN COUNTIES)	$ 41.00	27.36

ELEC0538-009 09/01/2025

	Rates	Fringes
ELECTRICIAN (COMMUNICATION TECHNICIAN ONLY) (FOUNTAIN, VERMILLION, AND WARREN COUNTIES)	$ 40.64	20.46

ELEC0668-001 06/01/2023

	Rates	Fringes
ELECTRICIAN (COMMUNICATION TECHNICIAN ONLY) (BENTON, CARROLL, CASS, FULTON, TIPPECANOE AND WHITE COUNTIES)	$ 33.02	16.10

ELEC0668-002 06/01/2025

	Rates	Fringes
ELECTRICIAN (BENTON, CARROLL, CASS, FULTON, TIPPECANOE AND WHITE COUNTIES) FOOTNOTE: A. PAID HOLIDAYS: NEW YEARS DAY, MEMORIAL DAY, JULY 4TH, LABOR DAY, VETERANS DAY THANKSGIVING DAY AND CHRISTMAS DAY	$ 42.00	24.15

ELEC0697-003 08/31/2025

	Rates	Fringes
ELECTRICIAN (COMMUNICATION TECHNICIAN ONLY) (NEWTON COUNTY)	$ 41.50	31.23

ELEC0697-006 06/01/2024

	Rates	Fringes
ELECTRICIAN (NEWTON COUNTY)	$ 48.10	31.28

ELEC0702-003 01/02/2025

	Rates	Fringes
LINE CONSTRUCTION: GROUNDMAN, CLASS A (DUBOIS, GIBSON, PERRY, PIKE, POSEY, SPENCER AND VANDERBURGH COUNTIES)	$ 33.96	19.04
LINE CONSTRUCTION: GROUNDMAN-EQUIPMENT OPERATOR (ALL OTHER EQUIPMENT) (DUBOIS, GIBSON, PERRY, PIKE, POSEY, SPENCER AND VANDERBURGH COUNTIES)	$ 43.19	21.81
LINE CONSTRUCTION: HEAVY-EQUIPMENT OPERATOR: ALL CRAWLER TYPE EQUIPMENT D-4 AND LARGER) (DUBOIS, GIBSON, PERRY, PIKE, POSEY, SPENCER AND VANDERBURGH COUNTIES)	$ 49.30	23.64
LINE CONSTRUCTION: LINEMAN (DUBOIS, GIBSON, PERRY, PIKE, POSEY, SPENCER AND VANDERBURGH COUNTIES)	$ 60.15	26.90

ELEC0725-007 06/01/2022

	Rates	Fringes
COMMUNICATION TECHNICIAN (BROWN, CLAY, GREENE, KNOX, MONROE, OWEN, PARKE, SULLIVAN AND VIGO COUNTIES)	$ 30.00	18.07

ELEC0725-014 10/01/2024

	Rates	Fringes
ELECTRICIAN (BROWN, CLAY, GREENE, KNOX, MONROW, OWEN, PARKE, SULLIVAN AND VIGO COUNTIES)	$ 43.30	25.32

ELEC0855-002 06/01/2025

	Rates	Fringes
ELECTRICIAN (COMMUNICATION TECHNICIAN ONLY) (BLACKFORD, DELAWARE, FAYETTE, FRANKLIN, HENRY, JAY, RANDOLPH, UNION AND WAYNE COUNTIES)	$ 39.20	17.95

ELEC0855-004 06/01/2025

	Rates	Fringes
ELECTRICIAN (BLACKFORD, DELAWARE, FAYETTE, FRANKLIN, HENRY, JAY, RANDOLPH, UNION AND WAYNE COUNTIES)	$ 40.18	22.15

ELEC0873-001 06/01/2021

	Rates	Fringes
ELECTRICIAN (COMMUNICATION TECHNICIAN ONLY) (CLINTON, GRANT, HOWARD, MIAMI, TIPTON, AND WABASH COUNTIES)	$ 30.08	17.23

ELEC0873-002 03/01/2025

	Rates	Fringes
ELECTRICIAN (CLINTON, GRANT, HOWARD, MIAMI, TIPTON AND WABASH COUNTIES:)	$ 42.02	23.07

ELEC1393-001 12/02/2025

	Rates	Fringes

LINE CONSTRUCTION: GROUNDMAN TRUCK DRIVER
(REMAINING COUNTIES).....$ 31.49 16.93
LINE CONSTRUCTION:: LINEMAN (REMAINING COUNTIES)....$ 50.28 22.38

ENGI0103-003 04/01/2025

	Rates	Fringes
POWER EQUIPMENT OPERATORS: GROUP 1- AIR COMPRESSORS IN MANIFOLD WITH THROTTLE VALVE; ASPHALT PLANT ENGINEER; AUTO GRADE OR SIMILAR TYPE MACHINE; AUTO PATROL; BACKHOE OR FARM-TYPE TRACTOR, 45 HP AND OVER; BALLAST REGULATOR (RR); BITUMINOUS MIXER; BITUMINOUS PAVER; BITUMINOUS PLANT ENGINEER; BULLDOZER; CAISSON DRILLING MACHINE; CHERRY PICKER, 15 TON OR OVER; CHIP SPREADER; CONCRETE MIXER 21 CU. FT. OR OVER; CORE DRILLING MACHINE; CRANE OR DERRICK WITH ANY ATTACHMENT (INCLUDING CLAMSHELL, DRAGLINE, SHOVEL, BACKHOE, ETC.); DREDGE ENGINEER; DREDGE OPERATOR; DRILLING MACHINE ON WHICH THE DRILL IS AN INTEGRAL PART; EARTH MOVER, RUBBER-TIRED (PADDLE WHEEL, 616, 631, TS-24 OR SIMILAR TYPE); EARTH MOVER, RUBBER-TIRED, TANDEM ($0.50 PER HOUR ADDITIONAL FOR EACH BOWL); ELEVATING GRADER; FORK LIFT, 10 TON OR OVER; P.C.C. FORMLESS PAVER POST DRIVER; HIGHLIFT SHOVEL, 1 1/2 CU. YD. OR OVER; HOIST, 2 DRUMS AND OVER; HELICOPTER, CREW; HYDRAULIC BOOM TRUCK; KEYSTONE, SKIMMER SCOOP; LOADER, SELF-PROPELLED (BELT, CHAIN, WHEEL); LOCOMOTIVE OPERATOR; MECHANIC; MUCKING MACHINE; PANEL BOARD CONCRETE PLANT, CENTRAL MIX TYPE; PAVER, HETHERINGTON; PILE DRIVER, SKID OR CRAWLER; ROAD PAVING MIXER; ROCK BREAKING PLANT; ROCK CRUSHING PLANT, PORTABLE; ROLLER (ASPHALT, WATERBOUND MACADAM, BITUMINOUS MACADAM, BRICK SURFACE); ROLLER WITH DOZER BLADE; ROOT RAKE, TRACTOR-MOUNTED; SELF-PROPELLED WIDENER; STUMP REMOVER, TRACTOR-MOUNTED; SURFACE HEATER AND PLANER; TANDEM PUSH TRACTOR ($0.50 PER HOUR ADDITIONAL); TRACTOR, BOOM; WINCH OR HOE HEAD; TRACTOR, PUSH; TRACTOR WITH SCOOP; TRACTOR-MOUNTED SPREADER; TREE MOVER; TRENCH MACHINE, OVER 24""; TUG BOAT OPERATOR; WELL DRILLING MACHINE; WINCH TRUCK WITH A-FRAME (ADAMS, ALLEN, BENTON, BLACKFORD, CARROLL, CASS, CLINTON, DEKALB, DELAWARE, FAYETTE, GRANT, HAMILTON, HANCOCK, HENRY, HOWARD, HUNTINGTON, JAY, JOHNSON, MADISON, MARION, MIAMI, RANDOLPH, RUSH, SHELBY, STEUBEN, TIPPECANOE, TIPTON, UNION, WABASH, WAYNE, WELLS, WHITE AND WHITLEY COUNTIES)	$ 44.60	23.35
POWER EQUIPMENT OPERATORS: GROUP 2- AIR COMPRESSOR WITH THROTTLE VALVE OR CLEVER BROOKS-TYPE COMBINATION; BACKFILLER; BACKHOE ON FARM-TYPE TRACTOR, UNDER 45 HP; BULL FLOAT; CHERRY PICKER UNDER 15 TON; CHIP SPREADER, SELF-PROPELLED; CONCRETE PUMP; CONCRETE MESH DEPRESSOR, INDEPENDENTLY OPERATED; CONCRETE SPREADER, POWER-DRIVEN; END LOADER UNDER 1 1/2 CU. YD.; EXCAVATING LOADER, PORTABLE; FINISHING MACHINE AND BULL FLOAT; GUNITE MACHINE; HEAD GREASER; MESH OR STEEL PLACER; MULTIPLE TAMPING MACHINE (RR); P.C.C. CONCRETE BELT PLACER; PULL GRADER, POWER CONTROL; REFRIGERATING MACHINE, FREEZING OPERATION; ROSS CARRIER; SHEEPFOOT ROLLER (SELF-PROPELLED); TAMPER (MULTIPLE VIBRATING, ASPHALT, WATERBOUND MACADAM, BITUMINOUS MACADAM, BRICK SURFACE); TRENCH MACHINE,		

24"" AND UNDER; TUBE FLOAT; WELDER (ADAMS, ALLEN, BENTON, BLACKFORD, CARROLL, CASS, CLINTON, DEKALB, DELAWARE, FAYETTE, GRANT, HAMILTON, HANCOCK, HENRY, HOWARD, HUNTINGTON, JAY, JOHNSON, MADISON, MARION, MIAMI, RANDOLPH, RUSH, SHELBY, STEUBEN, TIPPECANOE, TIPTON, UNION, WABASH, WAYNE, WELLS, WHITE AND WHITLEY COUNTIES).....$ 42.88 23.35

POWER EQUIPMENT OPERATORS: GROUP 3- ASSISTANT PLANT ENGINEER; BASE PAVER (JERSEY OR SIMILAR TYPE MACHINE); CONCRETE FINISHING MACHINE; CONCRETE MIXER, LESS THAN 21 CU. FT.; CURB MACHINE; FARM TRACTOR, INCLUDING FARM TRACTOR WITH ALL ATTACHMENTS EXCEPT BACKHOE AND INCLUDING HIGH LIFT END LOADERS OF 1 CU. YD. CAPACITY OR LESS; FIRE TENDER ON BOILER; HOIST, 1 DRUM; OPERATOR, 5 PIECES OF MINOR EQUIPMENT; PAVING BREAKER; POWER BROOM, SELF-PROPELLED; ROLLER, EARTH AND SUB-BASE MATERIAL; SLURRY SEAL MACHINE; SPIKE MACHINE (RR); TAMPER (MULTIPLE VIBRATING, EARTH AND SUB-BASE MATERIAL); THROTTLE VALVE AND FIRE TENDER COMBINATION ON HORIZONTAL OR UPRIGHT BOILER; TRACTAIRE WITH DRILL; TRACTOR, 50 H.P. OR OVER; WELL POINT SYSTEM; WIDENER, APSCO OR SIMILAR TYPE (ADAMS, ALLEN, BENTON, BLACKFORD, CARROLL, CASS, CLINTON, DEKALB, DELAWARE, FAYETTE, GRANT, HAMILTON, HANCOCK, HENRY, HOWARD, HUNTINGTON, JAY, JOHNSON, MADISON, MARION, MIAMI, RANDOLPH, RUSH, SHELBY, STEUBEN, TIPPECANOE, TIPTON, UNION, WABASH, WAYNE, WELLS, WHITE AND WHITLEY COUNTIES).....$ 41.96 23.35

POWER EQUIPMENT OPERATORS: GROUP 4- AIR COMPRESSOR; ASSISTANT TO ENGINEER, OILER; AUTOMATIC DRY BATCH PLANT; BITUMINOUS DISTRIBUTOR; BITUMINOUS PATCHING TAMPER; BELT SPREADER; BROOM AND BELT MACHINE; CHAIR CART, SELF-PROPELLED; COLEMAN-TYPE SCREEN; CONVEYOR, PORTABLE; DIGGER POST HOLE, POWER-DRIVEN; FORK LIFT, UNDER 10 TON; FORM GRADER; FORM TAMPER, MOTOR-DRIVEN; GENERATOR; HETHERINGTON DRIVER; HYDRA SEEDER; OPERATOR, 1 THROUGH 4 PIECES OF MINOR EQUIPMENT; OUTBOARD OR INBOARD MOTOR BOAT; POWER CURING SPRAYING MACHINE; POWER SAW, CONCRETE, POWER-DRIVEN; PUG MILL; PULL BROOM, POWER-TYPE; SEAMAN TILLER; STRAW BLOWER OR BRUSH MULCHER; STRIPING MACHINE PAINT, MOTOR-DRIVEN; SUB GRADER; TRACTAIRE, TRACTOR, BELOW 50 H.P.; TRUCK CRANE OILER, DRIVER; SPREADER; WATER PUMP; WELDING MACHINE, 2 OF 300 AMPS OR OVER (ADAMS, ALLEN, BENTON, BLACKFORD, CARROLL, CASS, CLINTON, DEKALB, DELAWARE, FAYETTE, GRANT, HAMILTON, HANCOCK, HENRY, HOWARD, HUNTINGTON, JAY, JOHNSON, MADISON, MARION, MIAMI, RANDOLPH, RUSH, SHELBY, STEUBEN, TIPPECANOE, TIPTON, UNION, WABASH, WAYNE, WELLS, WHITE AND WHITLEY COUNTIES).....$ 40.46 23.35

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	Rates	Fringes

POWER EQUIPMENT OPERATOR, HEAVY, HIGHWAY AND RAILROAD CONSTRUCTION: GROUP 4 AIR COMPRESSOR; ASSISTANT TO ENGINEER, OILER; BITUMINOUS PATCHING TAMPER; BELT SPREADER; BROOM AND BELT MACHINE; CHAIR CART, SELF-PROPELLED; COLEMAN-TYPE SCREEN; CONVEYOR, PORTABLE; DECK-HAND DIGGER POST HOLE, POWER-DRIVEN; FORKLIFT, UNDER 10 TON; FORM GRADER; FORM TAMPER, MOTOR-DRIVEN; GENERATOR; HETHERINGTON DRIVER; HYDRA SEEDER; MECHANIC HEATER; OPERATOR, 2

PIECES OF MINOR EQUIPMENT; OUTBOARD OR INBOARD MOTOR BOAT; POWER CURING SPRAYING MACHINE; PUG MILL; PULL BROOM, POWER TYPE; SEAMAN TILLER; SKID STEER LOADER OVER 3/4 CU. YD.; STRAW BLOWER OR BRUSH MULCHER; STRIPING MACHINE PAINT, MOTOR-DRIVEN; SUB-GRADER; TRACTAIRE; TRACTOR, BELOW 50 H.P.; TRUCK CRANE OILER; SPREADER; WATER PUMP (ELKHART, FULTON, JASPER, KOSCIUSKO, LAGRANGE, MARSHALL, NEWTON, NOBLE, PULASKI, AND STARKE COUNTIES).....$ 34.55 36.65

POWER EQUIPMENT OPERATOR, HEAVY, HIGHWAY AND RAILROAD CONSTRUCTION: GROUP 5 SKID STEER LOADER UNDER 3/4 CU. YDS (ELKHART, FULTON, JASPER, KOSCIUSKO, LAGRANGE, MARSHALL, NEWTON, NOBLE, PULASKI, AND STARKE COUNTIES).....$ 24.30 30.85

POWER EQUIPMENT OPERATOR, HEAVY, HIGHWAY AND RAILROAD CONSTRUCTION:GROUP 3 PLANT ENGINEER; BASE PAVER (JERSEY OR SIMILAR TYPE MACHINE); CONCRETE FINISHING MACHINE; CONCRETE MIXER, LESS THAN 21 CU. FT.; CURB MACHINE; FARM TRACTOR, INCLUDING FARM TRACTOR WITH ALL ATTACHMENTS EXCEPT BACKHOE AND INCLUDING HIGH LIFT END LOADERS OF 1 CU. YD. CAPACITY OR LESS; FIREMAN, ON BOILER; HOIST, 1 DRUM; OPERATOR, 3-5 PIECES OF MINOR EQUIPMENT; PAVING BREAKER; POWER BROOM, SELF-PROPELLED; ROLLER, EARTH AND SUB-BASE MATERIAL; POWER SAW-CONCRETE (POWER DRIVEN); SLURRY SEAL MACHINE; SPIKE MACHINE (RR); SUB-SURFACE MATERIAL DISTRIBUTOR; TAMPER (MULTIPLE VIBRATING, EARTH AND SUB-BASE MATERIAL); THROTTLE VALVE; THROTTLE VALVE AND FIREMAN COMBINATION ON HORIZONTAL OR UPRIGHT BOILER; TRACTAIRE WITH DRILL; WELL POINT (ELKHART, FULTON, JASPER, KOSCIUSKO, LAGRANGE, MARSHALL, NEWTON, NOBLE, PULASKI, AND STARKE COUNTIES).....$ 35.95 36.65

POWER EQUIPMENT OPERATOR: HEAVY, HIGHWAY AND RAILROAD CONSTRUCTION: GROUP 1 AIR COMPRESSORS IN MANIFOLD WITH THROTTLE VALVE; ASPHALT PLANT ENGINEER; AUTO GRADE OR SIMILAR TYPE MACHINE; AUTO PATROL; AUTOMATIC SUB-GRADE; BACKHOE OR FARM TYPE TRACTOR, 45 HP AND OVER; BALLAST REGULATOR (RR); BARRIER WALL MACHINE; BATCH PLANTS (CONCRETE & ASPHALT); B ITUMINOUS MIXER; BITUMINOUS PAVER; BITUMINOUS PLANT ENGINEER; BORING MACHINE; BULLDOZER; CAISSON DRILLING MACHINE; CHERRY PICKER, 15 TON OR OVER; CHIP SPREADER; CONCRETE MIXER, 21 CU. FT. OR OVER; CONCRETE BELT PLACER; CONCRETE PAVER; CONCRETE PUMP (TRUCK MOUNTED); CONCRETE SAW (TRACK MOUNTED); CONCRETE SPREADER (POWER DRIVEN); CORE DRILLING MACHINE; CRANE OR DERRICK WITH ANY ATTACHMENT (INCLUDING CLAMSHELL, DRAGLINE, SHOVEL, BACKHOE, ETC.); CURB MACHINE; GUTTER MACHINE; DREDGE ENGINEER; DREDGE OPERATOR; DRILLING MACHINE ON WHICH THE DRILL IS AN INTEGRAL PART; EARTHMOVER, RUBBER-TIRED (PADDLE WHEEL, 616, 631, TS-24 OR SIMILAR TYPE); EARTHMOVER, RUBBER-TIRED, TANDEM (.50 PER HR. ADDITIONAL FOR EACH BOWL); ELEVATING GRADER; FORKLIFT (10 TON OR OVER); P.C.C. FORMLESS PAVER; GRADALL; GRAVEL PROCESSING PLANT (PORTABLE); OPERATOR OF GUARD RAIL POST DRIVER; HIGHLIFT SHOVEL 1-1/2 CU.YD. OR OVER) FRAME; HOIST (2 DRUM & OVER); HELICOPTER CREW; HYDRAULIC BOOM TRUCK; HYDRAULIC EXCAVATOR; LOADED-SELF PROPELLED (BELT CHAIN WHEEL); LASER SCREED; LOCOMOTIVE OPERATOR; MECHANIC; MUCKING MACHINE; P.C.C. CONCRETE BELT

PLACER; PANEL BOARD CONCRETE PLANT (CENTRAL MIX
TYPE); PAVER (HETHERINGTON); PAVEMENT BREAKER; PILE
DRIVER, SKID OR CRAWLER; ROAD PAVING MIXER; ROCK
BREAKING PLANT; ROCK CRUSHING PLANT (PORTABLE);
ROLLER (ASPHALT, WATERBOUND MACADAM, BITUMINOUS
MACADAM, BRICK SURFACE); ROLLER WITH DOZER BLADE;
ROAD WIDENER; ROOT RAKE (TRACTOR-MOUNTED); ROTO
MILL GRINDER; SELF-PROPELLED WIDENER; STUMP
REMOVER; SURFACE HEATER AND PLANER; TANDEM PUSH
TRACTOR ($0.50 PER HOUR ADDITIONAL); TRACTOR, BOOM;
WINCH OR HOE HEAD; TRACTOR (PUSH); TRACTOR WITH
SCOOP; TRACTOR-MOUNTED SPREADER; TREE MOVER; TRENCH
MACHINE, OVER 24""; TUG BOAT OPERATOR; WELL DRILLING
MACHINE; WIDENER (APSCO OR SIMILAR TYPE); WINCH
TRUCK WITH A-FRAME (ELKHART, FULTON, JASPER,
KOSCIUSKO, LAGRANGE, MARSHALL, NEWTON, NOBLE,
PULASKI, AND STARKE COUNTIES).....$ 38.85 36.65
POWER EQUIPMENT OPERATOR: HEAVY, HIGHWAY AND
RAILROAD CONSTRUCTION: GROUP 2 AIR COMPRESSOR WITH
THROTTLE VALVE OR CLEVER BROOKS TYPE COMBINATION;
BACKFILLER; FARM TYPE TRACTOR (UNDER 45 H.P.);
CHERRY PICKER UNDER 15 TON; CHIP SPREADER
(SELF-PROPELLED); CONCRETE PUMP (TRAILER TYPE);
CONCRETE MESH DEPRESSOR, INDEPENDENTLY OPERATED;
END LOADER UNDER 1 1/2 CU. YD.; EXCAVATING LOADER
(PORTABLE); FINISHING MACHINE AND BULL FLOAT;
GUNITE MACHINE; HYDRAULIC POWER UNIT; HEAD GREASER;
MESH OR STEEL PLACER; MULTIPLE TAMPING BACKHOE ON
MACHINE (RR); BULL FLOAT (BIDWELL MACHINE);
REFRIGERATING MACHINE-OPERATION; ROSS CARRIER;
SHEEPFOOT ROLLER (SELF-PROPELLED); TAMPER-MULTIPLE
VIBRATING (ASPHALT, WATERBOUND, MACADAM, BITUMINOUS
MACADAM, BRICK SURFACE); TRENCH MACHINE (24"" AND
UNDER); TUBE FLOAT; WATER PULL/WAGON; WELDER
(ELKHART, FULTON, JASPER, KOSCIUSKO, LAGRANGE,
MARSHALL, NEWTON, NOBLE, PULASKI, AND STARKE
COUNTIES).....$ 37.25 36.65

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Rates Fringes

POWER EQUIPMENT OPERATOR, UNDERGROUND & UTILITY
CONSTRUCTION: GROUP 3 BACK FILLER, BITUMINOUS
DISTRIBUTOR, BROOM AND BELT MACHINE, BULL FLOAT,
COMPRESSOR (COMMON RECEIVER 2), CONCRETE CUTTER
WHEEL TYPE (ROCKWELL), CONCRETE FINISHING MACHINE,
CONCRETE SPREADER (POWER DRIVEN), DIGGER, POST HOLE
(POWER DRIVEN), FINISHING MACHINE AND BULL FLOAT,
FORKLIFT, FORM GRADER, FORM TAMPER (MOTOR DRIVEN),
HYDRAULIC (BOOM TRUCK) WHEN USED FOR HAULING
MATERIALS, LASER SCREED, MUTIPLE TAMPING MACHINE,
PAVING BREAKER, ROLLER (EARTH AND SUBBASE
MATERIAL), ROLLER SHEEPFOOT (SELF-PROPELLED),
SUB-GRADER, TAMPER, MUTIPILE VIBRATING (EARTH AND
SUBBASE MATERIAL), TRACTAIRE WITH DRILL, TRACTOR
(WITH ALL DRAWN ATTACHEMENTS EXCEPT BACKHOE AND
INCLUDING HIGHLIFT, ENDLOADER OF 1 CU. YD. CAPACITY
AND LESS. (JASPER, NEWTON, PULASKI AND STARKE
COUNTIES).....$ 43.60 45.93
POWER EQUIPMENT OPERATOR, UNDERGROUND & UTILITY
CONSTRUCTION: GROUP 1 ASPHALT PLANTS
(CONSTRUCTION), ASPHALT PLANT (PERMANENT), AUTO
PATROL (MAINTAINER), AUTOMATIC DRY BATCH PLANT,
AUTOMATED CONCRETE PLACER, AUTOMATED SUB-GRADER,
AUTOMATED SLIP FORM PAVER, AUTOMATED FINISH

MACHINE, COMBINATION BACKHOE FRONT, END LOADER MACHINE (1/2 CU. YD.), BACKHOE BUCKET OR OVER OR WITH ATTACHMENTS), COMBINATION BACKHOE 1 CU YD, BACKHOE BUCKET OR OVER OR WITH ATTACHMENTS, BALLAST REGULATOR (RR), BELT LOADER (STATIONARY), BORING MACHINE (ROAD), BULLDOZER, CONCRETE MIXER(27 CU. FT. OR OVER), CONCRETE PUMP (TRUCK MOUNTED), CONCRETE BREAKER (TRUCK MOUNTED AND SELF-PROPELLED), CORE DRILLING MACHINE, CRANES AND BACKHOES (ALL ATTACHMENTS), CRANES, HAMMERHEAD, CRETER CRANE, CRUSHERS (CONCRETE, ROCK, RECYCLING, ETC.), DERRICKS , DERRICKS (TRAVELING), DREDGE OPERATOR, FORMLESS CURB AND GUTTER MACHINE (36 INCHES AND OVER), FORMLESS CURB AND GUTTER MACHINE UNDER 36 INCHES, GRADALL AND MACHINES (OF A LIKE NATURE), GUARDRAIL POST DRIVER (TRUCK MOUNTED), LEAD GREASER, HELICOPTER, HIGHLIFT SHOVEL (3 YD. AND OVER), HOIST (1 DRUM), HOIST (2, AND 3 DRUMS), HYDRAULIC POWER UNITS (GROUTING, PILEDRIVING AND EXTRACTING) HYDRO OR WATER BLASTER (SELF-PROPELLED), LOCOMOTIVE OPERATORS, MECHANIC, WELDER, MUCKING MACHINE, PANELBOARD CONCRETE PLANT (CENTRAL MIX TYPE), PAVER (HETHERINGTON), PILE DRIVER (SKID OR CRAWLER), ROAD PAVING MIXER, ROCK DRILL CRAWLER OR SKID RIG, ROCK DRILL (TRUCK MOUNTED), ROSS CARRIER, ROTO MILL GRINDER (36"" AND OVER), ROTO MILL GRINDER (LESS THAN 36""), THROTTLE VALVE AND COMPRESSOR OR CLEVER BROOKS TYPE COMBINATION, THROTTLE VALVE AND FIREMAN COMBINATION OR HORIZONTAL OR UPRIGHT BOILER, TOURNAPULL OR SIMILAR TYPE EQUIPMENT, TRACTOR (BOOM), TRACTOR DRAWN BELT LOADER WITH ATTACHED PUSHER (REQUIRES TWO ENGINEERS), TRENCH MACHINE, TUG BOAT OPERATOR, WHEEL EXCAVATOR, WINCH TRACTOR WITH ""A"" FRAME, SCOOPS, TURNAPULL OR SIMILAR TYPES MACHINE USED IN TANDEM (ADD $1.00 TO CLASS L HOURLY RATE FOR EACH MACHINE ATTACHED THERE TO). (JASPER, NEWTON, PULASKI AND STARKE   COUNTIES).....$ 48.70 45.93

POWER EQUIPMENT OPERATOR, UNDERGROUND & UTILITY CONSTRUCTION: GROUP 2 COMBINATION BACKHOE FRONT END LOADER MACHINE WITH LESS THAN 1/2 CU. YD., BACKHOE BUCKET OR WITH ATTACHMENTS, BITUMINOUS MIXER, BITUMINOUS PAVER, BRIDGE DECK FINISHER, CONCRETE MIXER (LESS THAN 27 CU. FT.), COMPRESSOR AND THROTTLE VALVE, COMPRESSOR (COMMON RECEIVER 3), GREASER, HIGHLIFT SHOVELS (UNDER 3 CU. YDS.), JERSEY SPREADER OR BASE PAVER, PAVEMENT BUMP GRINDER (SELF-PROPELLED), ROLLER (ASPHALT, WATERBOUND, MACADAM, BITUMINOUS MACADAM, BRICK SURFACE, SHEEPFOOT ROLLER (SELF- PROPELLED WITH BLADE), SURFACE HEATER AND PLANER, TAMPER (MUTIPLE VIBRATING, ASPHALT WATERBOUND MACADAM, BITUMINOUUS MACADAM, BRICK SURFACE), TRACTOR (PUSH), TRACTOR WITH SCOOP, WIDENER, APSCO OR SIMILAR TYPE. (JASPER, NEWTON, PULASKI AND STARKE   COUNTIES).....$ 47.90 45.93

POWER EQUIPMENT OPERATOR, UNDERGROUND & UTILITY CONSTRUCTION: GROUP 4 AIR COMPRESSORS, CONVEYOR (ALL), FIREMAN ON BOILER, GENERATOR, GROUT MACHINE, POWER CURING SPRAYING MACHINE (SELF-PROPELLED), BROOM (SELF-PROPELLED), SEAMAN TILLER, SKID STEER LOADERS, SPIKE MACHINE (RR), STRIPPING MACHINE (PAINT, SELF-PROPELLED), THROTTLE VALVE, WELDING MACHINE, WELL POINTS SYSTEM. (JASPER, NEWTON, PULASKI AND STARKE COUNTIES).....$ 41.40 45.93

POWER EQUIPMENT OPERATOR, UNDERGROUND & UTILITY

CONSTRUCTION: GROUP 5 DECK HAND, HETHERINGTON DRIVER, MECHANICAL HEATER (1 TO 5), OUTBOARD OR INBOARD MOTOR BOAT, OILER, POWER SAW (CONCRETE POWER DRIVEN), WATER PUMP, GRASSCUTTER. (JASPER, NEWTON, PULASKI AND STARKE COUNTIES).....$ 35.95 45.93

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	Rates	Fringes
POWER EQUIPMENT OPERATORS: HEAVY AND HIGHWAY CONSTRUCTION: GROUP C- AIR COMPRESSOR, OILER; AUTOMATIC DRY BATCH PLANT; BITUMINOUS DISTRIBUTOR; BITUMINOUS PATCHING TAMPER; BELT SPREADER; BROOM AND BELT MACHINE; BRUSH BURNER; CHAIR CART, SELF-PROPELLED; COLEMAN-TYPE SCREEN; COLD GRINDER OILER; CONCRETE MIXER, LESS THAN 21 CU. FT.; CONVEYOR, PORTABLE; CURB MACHINE; DECKHAND; DIGGER (POST HOLE, POWER-DRIVEN); FARM TRACTOR, INCLUDING FARM TRACTOR WITH ALL ATTACHMENTS (EXCEPT BACKHOE, HI-LIFT ENDLOADERS); FORM GRADER; FORM TAMPER, MOTOR-DRIVEN; GENERATOR; GUNITE MACHINE; HETHERINGTON DRIVER; HYDRA SEEDER; MECHANICAL HEATER; MINOR EQUIPMENT OPERATOR, 1 THROUGH 4 PIECES; CURING SPRAYING MACHINE; POWER SAW, CONCRETE (POWER-DRIVEN); PUG MILL PULL BROOM, POWER TYPE; SEAMAN TILLER; SLURRY SEAL MACHINE; SPIKE MACHINE; STRAW BLOWER OR BRUSH MULCHER; STRIPPING MACHINE (PAINT, MOTOR-DRIVEN); SUB GRADER; THROTTLE VALVE; TRACTAIRE WITH DRILL; TRUCK CRANE AND MULTI-DRILL OILER, DRIVER; SPREADER; WATER PUMP. (BARTHOLOMEW, BROWN, CLARK, CRAWFORD, DEARBORN, DECATUR, DUBOIS, FLOYD, FRANKLIN, GIBSON, HARRISON, JACKSON, JEFFERSON, JENNINGS, LAWRENCE, MARTIN, OHIO, ORANGE, PERRY, PIKE, POSEY, RIPLEY, SCOTT, SPENCER, SWITZERLAND, VANDERBURGH, WARRICK, AND WASHINGTON COUNTIES).....	$ 42.02	19.60
POWER EQUIPMENT OPERATORS:: GROUP A (BARTHOLOMEW, BROWN, CLARK, CRAWFORD, DEARBORN, DECATUR, DUBOIS, FLOYD, FRANKLIN, GIBSON, HARRISON, JACKSON, JEFFERSON, JENNINGS, LAWRENCE, MARTIN, OHIO, ORANGE, PERRY, PIKE, POSEY, RIPLEY, SCOTT, SPENCER, SWITZERLAND, VANDERBURGH, WARRICK, AND WASHINGTON COUNTIES) (HEAVY AND HIGHWAY CONSTRUCTION:).....	$ 46.80	19.60
POWER EQUIPMENT OPERATORS:: GROUP B (BARTHOLOMEW, BROWN, CLARK, CRAWFORD, DEARBORN, DECATUR, DUBOIS, FLOYD, FRANKLIN, GIBSON, HARRISON, JACKSON, JEFFERSON, JENNINGS, LAWRENCE, MARTIN, OHIO, ORANGE, PERRY, PIKE, POSEY, RIPLEY, SCOTT, SPENCER, SWITZERLAND, VANDERBURGH, WARRICK, AND WASHINGTON COUNTIES) (HEAVY AND HIGHWAY CONSTRUCTION:).....	$ 44.15	19.60

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	Rates	Fringes
POWER EQUIPMENT OPERATORS:: GROUP A (BARTHOLOMEW, BROWN, CLARK, CRAWFORD, DEARBORN, DECATUR, DUBOIS, FLOYD, FRANKLIN, GIBSON, HARRISON, JACKSON, JEFFERSON, JENNINGS, LAWRENCE, MARTIN, OHIO, ORANGE, PERRY, PIKE, POSEY, RIPLEY, SCOTT, SPENCER, SWITZERLAND, VANDERBURGH, WARRICK, AND WASHINGTON COUNTIES) (SEWER WATERLINE & UTILITY CONSTRUCTION:).	$ 43.43	19.60
POWER EQUIPMENT OPERATORS:: GROUP B (BARTHOLOMEW, BROWN, CLARK, CRAWFORD, DEARBORN, DECATUR, DUBOIS, FLOYD, FRANKLIN, GIBSON, HARRISON, JACKSON, JEFFERSON, JENNINGS, LAWRENCE, MARTIN, OHIO,		

ORANGE, PERRY, PIKE, POSEY, RIPLEY, SCOTT, SPENCER,
SWITZERLAND, VANDERBURGH, WARRICK, AND WASHINGTON
COUNTIES) (SEWER WATERLINE & UTILITY CONSTRUCTION:).$ 35.30 19.60

ENGI0841-011 04/01/2024

	Rates	Fringes
POWER EQUIPMENT OPERATORS: HEAVY, HIGHWAY AND UTILITY CONSTRUCTION: GROUP 1 (AIR COMPRESSOR OVER 600 CU FT, AIR COMPRESSORS (2), COMPRESSORS HOOKED IN MANIFOLD, ASPHALT PLANT ENGINEER, AUTO GRADE AND/OR C.M.I. OR SIMILAR TYPE MACHINE, AUTO PATROL, MOTOR PATROL, POWER BLADE, ASPCO PAVER, ASPHALT PLANER, ASPHALT ROLLERS, ASPHALT PAVER OPERATOR, CONCRETE OR ASPHALT MILLING MACHINE, SELF PROPELLED WIDENER, BACKHOE AND/OR PAVEMENT BREAKER ATTACHMENT, SELF PROPELLED PAVEMENT BREAKER, BALLAST REGULATOR (R.R), BITUMINOUS MIXER, BITUMINOUS PAVER, BITUMINOUS PLANT ENGINEER, BULK CEMENT PLANT ENGINEER, BULLDOZER, ONE DRUM HOIST WITH TOWER OR BOOM, CABLEWAYS, TOWER MACHINES, BACK FILLER, BOOM TRACTOR, BOOM OR WINCH TRUCK, WINCH OR HYDRAULIC BOOM TRUCK, BORING MACHINE, BOLIER OPERATOR, BRUSH MULCHER, BULL FLOAT, FINISHING MACHINE, POWER CRANES, OVERHEAD CRANES, TRUCK CRANES, PILEDRIVER, SKID OR CRAWLER, GUARD RAIL POST DRIVER, TOWER CRANES, HYDRO CRANE, CHERRY PICKER, DRAGLINES, DERRICKS, SHOVELS, CLAM, GRADALLS, TWO DRUM MACHINE, CONCRETE OR ASPHALT CURB MACHINE, SELF PROPELLED, CONCRETE MIXERS WITH SKID, TOURNAMIXER, CONCRETE PUMP (TRUCK OR SKID MOUNTED), CONCRETE PLANT ENGINEER, SOIL CEMENT MACHINE, FORMLESS PAVER, CONCRETE SPREADER, SPAN SAW (AND SIMILAR TYPES), CHIP SPREADER, MESH PLACER, DREDGING EQUIPMENT OR DREDGE ENGINEER OR DREDGE OPERATOR, TUG BOAT OPERATOR, MARINE SCOOPS, DITCHING MACHINE WITH DUAL ATTACHMENT, STANDARD OR DINKEY LOCOMOTIVES, DRILLING MACHINE, INCLUDING WELL TESTING, CAISSONS, SHAFT OR ANY SIMILAR TYPE DRILLING MACHINE (WELL POINT SYSTEMS), 4 POINT LIFE SYSTEM (POWER LIFT OR SIMILAR TYPE), MUD CAT, MUCKING MACHINE, SULL-AIR, MECHANICS, WELDER, HEAD EQUIPMENT GREASER, TOURNAPULL, TRACTOR OPERATING SCOOPS, PUSH TRACTORS, LARGE ROLLERS ON EARTH, LOADERS (TRACK OR RUBBER MOUNTED), OR SIMILAR TYPE MACHINE, LULL, TOURNADOZER, SCOOPMOBILES, ELEVATING MACHINES, POWER BROOM (SELF PROPELLED), POWER SUB GRADER, HYDRA AX, FARM TRACTOR WITH ATTACHMENTS, SOIL STABILIZER (SEAMAN TILLER, BO MAG, RAGO GATOR AND SIMILAR TYPES OF EQUIPMENT), TREE MOVER, STUMP REMOVER, ROOT RAKE, HYDRA SEEDER, STRAW BLOWER, REFRIGERATING MACHINE, FREEZING OPERATOR, CHAIR CART-SELF PROPELLED, HELICOPTER CREW (3), ROSS CARRIER OR STRADDLE BUGGY OR SIMILAR MACHINE, ROCK CRUSHER PLANT, GRAVEL PROCESSING MACHINE, PIPE CLEANING MACHINE, PIPE WRAPPING MACHINE, PIPE BENDING MACHINE, PUG MILL, CONCRETE BUMP GRINDER MACHINE, POWER CURING SPRAY MACHINE, FORKLIFT (EXCEPT WHEN USED FOR LANDSCAPING), SNOOPER TRUCK OPERATOR. (BOONE, CLAY, DAVIESS, FOUNTAIN, GREENE, HENDRICKS, KNOX, MONROE, MONTGOMERY, MORGAN OWEN, PARKE, PUTNAM, SULLIVAN, VERMILLIAN, VIGO, AND WARREN COUNTIES) FOOTNOTES: A. EMPLOYEES OPERATING BOOMS FROM 149FT. TO 199 FT. INCLUDING JIB, SHALL RECECEIVE AN ADDITIONAL SEVENTY-FIVE		

CENTS (.75) PER HOUR ABOVE THE RATE. EMPLOYEES OPERATING BOOMS OVER 199 FT. INCLUDING JIB, SHALL RECEIVE AN ADDITIONAL ONE DOLLAR AND TWENTY- FIVE CENTS ($1.25) PER HOUR ABOVE THE REGULAR RATE. B. EMPLOYEES OPERATING SCOOPS, PULLS, OR TRACTORS HOOKED IN TANDEM SHALL RECEIVE AN ADDITIONAL ONE DOLLAR ($1.00) PER HOUR ABOVE THE REGULAR RATE. C. EMPLOYEES OPERATING SCOOPS, PULLS, OR TRACTORS PULLING ANY OTHER HAULING UNIT IN TANDEM SHALL RECEIVE AN ADDITIONAL ONE DOLLAR ($1.00) PER HOUR ABOVE THE REGULAR RATE. D. UNDERGROUND WORK - EMPLOYEES WORKING IN TUNNELS, SHAFTS, ETC. SHALL BE PAID A THIRTY PERCENT (30%) PREMIUM ABOVE THE WAGE RATE.....$ 38.80 27.15

POWER EQUIPMENT OPERATORS: HEAVY, HIGHWAY AND UTILITY CONSTRUCTION: GROUP 2 AIR COMPRESSOR 600 CU. FT. AND UNDER, AIR TUGGER, AIR VALVES, ASSISTANT CONCRETE PLANT ENGINEER, ASSISTANT ASPHALT PLANT ENGINEER, ASPHALT PLANT FIREMAN, BULK CEMENT PLANT EQUIPMENT GREASER, CONCRETE MIXERS WITHOUT SKIPS, CURBING MACHINE, CONCRETE SAW (SELF PROPELLED), CONVEYORS,CEMENT BLIMPS, DITCHING MACHINE UNDER 6"", DISTRIBUTOR OPERATOR ON TRUCKS, DECK HANDS, ELEVATORS WHEN USED FOR HOISTING MATERIAL, ENGINE TENDERS, FORK LIFT (WHEN USED FOR LANDSCAPING), FARM TRACTOR, FIREMAN, FIREMAN ON PAINT OR DOPE POTS, FORM TAMPER, FORM GRADER, FLEX PLANE, GENERATORS (TWO TO FOUR), OR WELDING MACHINES OR WATER PUMPS, WITHIN 400 FEET, GUNITE MACHINE, MACHINE MOUNTED POST HOLE DIGGER, MUDE JACK, ONE DRUM MACHINES WITHOUT TOWER OR BOOM, ONE WATER PUMP, ONE WELDING MACHINE, OUTBOARD OR INBOARD MOTOR BOAT, PULL BROOM (POWER TYPE, SIPHONS AND PULSOMETER, SWITCHMAN, STRIPING AND OR PAINTING MACHINE (MOTOR DRIVEN), SLURRY SEAL MACHINE, TRACK JACK, TEMPORARY HEAT, THROTTLE VALVE, TUBE FLOAT, TRACTAIRE, WAGON DRILL, MULTIPLE TAMPING MACHINE (R.R.), SPIKE MACHINE (R.R.), MECHANICAL HEATERS, BRUSH BURNER, VACUUM TRUCK (SUPER SUCKER AND SIMILAR TYPES). (BOONE, CLAY, DAVIESS, FOUNTAIN, GREENE, HENDRICKS, KNOX, MONROE, MONTGOMERY, MORGAN OWEN, PARKE, PUTNAM, SULLIVAN, VERMILLIAN, VIGO, AND WARREN COUNTIES) FOOTNOTES: A. EMPLOYEES OPERATING BOOMS FROM 149FT. TO 199 FT. INCLUDING JIB, SHALL RECECEIVE AN ADDITIONAL SEVENTY-FIVE CENTS (.75) PER HOUR ABOVE THE RATE. EMPLOYEES OPERATING BOOMS OVER 199 FT. INCLUDING JIB, SHALL RECEIVE AN ADDITIONAL ONE DOLLAR AND TWENTY- FIVE CENTS ($1.25) PER HOUR ABOVE THE REGULAR RATE. B. EMPLOYEES OPERATING SCOOPS, PULLS, OR TRACTORS HOOKED IN TANDEM SHALL RECEIVE AN ADDITIONAL ONE DOLLAR ($1.00) PER HOUR ABOVE THE REGULAR RATE. C. EMPLOYEES OPERATING SCOOPS, PULLS, OR TRACTORS PULLING ANY OTHER HAULING UNIT IN TANDEM SHALL RECEIVE AN ADDITIONAL ONE DOLLAR ($1.00) PER HOUR ABOVE THE REGULAR RATE. D. UNDERGROUND WORK - EMPLOYEES WORKING IN TUNNELS, SHAFTS, ETC. SHALL BE PAID A THIRTY PERCENT (30%) PREMIUM ABOVE THE WAGE RATE.....$ 32.55 27.15

IRON0022-001 06/01/2025

	Rates	Fringes
IRONWORKER (BARTHOLOMEW, BENTON, BOONE, BROWN, CARROLL, CASS, CLAY, CLINTON, DAVIESS (REMAINDER OF		

COUNTY), DECATUR (W 3/4), DELAWARE (REMAINDER OF COUNTY), FAYETTE (W 1/3), FOUNTAIN,FRANKLIN (NW TIP), FULTON (REMAINDER OF COUNTY), GRANT (REMAINDER OF COUNTY), GREENE, HAMILTON, HANCOCK, HENDRICKS, HENRY, HOWARD, JACKSON, JASPER (SOUTHEASTERN 1/2), JENNINGS (NORTHWEST 2/3), JOHNSON, KNOX (REMAINDER OF COUNTY), LAWRENCE, MADISON, MARION, MARTIN (NW 2/3), MIAMI (REMAINDER OF COUNTY), MONROE, MONTG.....$ 38.00 26.39

IRON0044-010 06/01/2025

	Rates	Fringes
IRONWORKERS: FENCE ERECTORS (DEARBORN, DECATUR (REMAINDER OF COUNTY), FAYETTE (REMAINDER OF COUNTY), FRANKLIN (REMAINDER OF COUNTY), JEFFERSON (REMAINDER OF COUNTY), JENNINGS (REMAINDER OF COUNTY), OHIO, RIPLEY, RUSH (SOUTHEASTERN TIP), SWITZERLAND, AND UNION (SOUTHERN 1/3))	$ 35.88	23.90
IRONWORKERS: ORNAMENTAL (DEARBORN, DECATUR (REMAINDER OF COUNTY), FAYETTE (REMAINDER OF COUNTY), FRANKLIN (REMAINDER OF COUNTY), JEFFERSON (REMAINDER OF COUNTY), JENNINGS (REMAINDER OF COUNTY), OHIO, RIPLEY, RUSH (SOUTHEASTERN TIP), SWITZERLAND, AND UNION (SOUTHERN 1/3))	$ 37.77	23.90
IRONWORKERS: STRUCTURAL, MACHINERY MOVERS, RIGGERS (DEARBORN, DECATUR (REMAINDER OF COUNTY), FAYETTE (REMAINDER OF COUNTY), FRANKLIN (REMAINDER OF COUNTY), JEFFERSON (REMAINDER OF COUNTY), JENNINGS (REMAINDER OF COUNTY), OHIO, RIPLEY, RUSH (SOUTHEASTERN TIP), SWITZERLAND, AND UNION (SOUTHERN 1/3))	$ 37.77	23.90

IRON0070-002 06/01/2025

	Rates	Fringes
IRONWORKER (CLARK, CRAWFORD, FLOYD, HARRISON, JACKSON (SOUTHERN 3/4); JEFFERSON (EXCLUDING NORTHEASTERN TIP); JENNINGS (SOUTHERN 3/4), LAWRENCE (SOUTHERN 2/3), MARTIN (SOUTHEASTERN 2/3), ORANGE, PERRY (EASTERN 3/4); SCOTT AND WASHINGTON COUNTIES:)	$ 36.17	25.80

IRON0070-016 06/01/2025

	Rates	Fringes
IRONWORKER: REINFORCING (DEARBORN, DECATUR (REMAINDER OF COUNTY), FAYETTE (SE CORNER), FRANKLIN (S 3/4), OHIO, RIPLEY (REM. OF COUNTY), SWITZERLAND (REMAINDER OF COUNTY) AND JENNINGS (NE TIP) COUNTIES)	$ 36.17	25.80

IRON0103-001 04/01/2024

	Rates	Fringes
IRONWORKER (DAVIESS (S 1/2), DUBOIS, GIBSON, KNOX (S 1/2), MARTIN (SW 1/3), PERRY (W 1/4), PIKE, POSEY, SPENCER, VANDERBURGH, AND WARRICK)	$ 35.34	25.75

IRON0147-004 06/01/2025

	Rates	Fringes
IRONWORKER (ADAMS, ALLEN, BLACKFORD, DEKALB, DELAWARE (NORTHEAST THIRD OF COUNTY), FULTON (EASTERN PART), GRANT (EXCLUDING SOUTHWEST		

PORTION), HUNTINGTON, JAY, MIAMI (NORTHEAST HALF), NOBLE (EXCLUDING NORTHEAST TIP), STEUBEN, WABASH, WELLS, AND WHITLEY COUNTIES).....$ 35.40 26.92

IRON0290-004 06/01/2024

	Rates	Fringes
IRONWORKERS: (FAYETTE (NE 1/4), RANDOLPH (S. PART OF COUNTY EXCLUDING WINCHESTER BUT INCLUDING UNION CITY) UNION (NORTHERN 2/3) AND WAYNE (REMAINDER OF COUNTY) COUNTIES).....	$ 35.39	24.35

IRON0292-005 06/01/2025

	Rates	Fringes
IRONWORKER (ELKHART, FULTON (NORTH 2/3), KOSCIUSKO (REMAINDER OF COUNTY), LAGRANGE (WEST 1/3), MARSHALL, MIAMI (NORTHWESTERN TIP), NOBLE (NORTHWESTERN TIP), PULASKI (NORTHEAST HALF), AND STARKE COUNTIES).....	$ 39.76	25.00

IRON0395-002 06/01/2025

	Rates	Fringes
IRONWORKER (JASPER (NORTHERN 1/2), NEWTON (NORTHERN 1/2), PULASKI (NORTHWESTERN TIP) COUNTIES).....	$ 47.75	41.28
IRONWORKER: SHEETER (JASPER (NORTHERN 1/2), NEWTON (NORTHERN 1/2), PULASKI (NORTHWESTERN TIP) COUNTIES).....	$ 48.00	41.28

LABO0041-003 04/01/2025

	Rates	Fringes
LABORERS: HEAVY & HIGHWAY CONSTRUCTION: GROUP 1 CONSTRUCTION LABORER, CARPENTER TENDER, FENCE ERECTOR, GRADE CHECKER, GUARD RAIL ERECTOR, CONTINUOUS STEEL ROD OR MAT INSTALLER, WIRE MESH LAYER, JOINT MAN (MORTAR, MASTIC, AND ALL OTHER TYPES), LIGHTING INSTALLER (PERMANENT OR TEMPORARY), LINEMAN FOR AUTOMATIC GRADE MAKER ON PAVING MACHINES, MORTAR MAN, MULTI-PLANT ERECTOR, RIP-RAP INSTALLER (ALL PRODUCTS AND MATERIALS), ROAD MARKING AND DELINEATION LABORER, SETTING AND PLACING OF ALL PRECAST CONCRETE PRODUCTS, SING INSTALLATION INCLUDING SUPPORTING STRUCTURE, SPRAYING OF ALL EPOXY, CURING COMPOUND, OR LIKE MATERIAL, FLAGPERSON, AIR TOOL, POWER TOOL OPERATOR, ASPHALT RAKER MAN, BATCH TRUCK DUMPER, BRIDGE HAND RAIL ERECTOR, HANDLER (BULK OR BAG CEMENT), CHAIN SAW MAN, CONCRETE PUDDLER, CONCRETE RUBBER, CONCRETE SAW OPERATOR, CORE DRILL OPERATOR, EYE LEVEL, HAND BLADE OPERATOR HYDRO SEEDER MAN, MOTOR DRIVEN GEORGIA BUGGY OPERATOR, POWER DRIVEN COMPACTOR OR TAPER OPERATOR, POWER SAW OPERATOR, PUMP CRETE ASSEMBLY MAN, SREED MAN OR SCREW MAN ON ASPHALT PAVER, REGAR INSTALLER, SANDBLASTER MAN, SEALER APPLICATOR FOR ASPHALT (TOXIC), SETTING AND PLACING PRE-STRESSED ON PRE-CAST CONCRETE STRUCTURAL MEMBERS, SIDE RAIL SETTERS (FOR SIDEWALK, SIDE DITCHES, RADII, AND PAVEMENT), SPREADER BOX TENDER (MANUA OR POWER DRIVEN), STRAW BLOWER MAN, SUBSUREFACE DRAIN AND CULVERT PIPE LAYER, CONCRETE CONVEYOR, HORIZONAL BORING AND JACKMAN AND SHEETMAN, PIPE GREADE MAN, WINCH AND WINDLESS OPERATOR CONDUIT INSTALLER, SOD LAYER		

(NEWTON COUNTY).....$ 33.45 27.50
LABORERS: HEAVY & HIGHWAY CONSTRUCTION: GROUP 2
CUTTING TORCH BURNER, LASER BEAM ALIGNER, MANHOLE
ERECTOR, SEWER PIPE LAYER, WATER LINE INSTALLER,
TEMPORARY OR PERMANENT WELDERS (ELECTRIC OR OXY
ACETYLENE) (NEWTON COUNTY).....$ 33.75 27.50
LABORERS: HEAVY & HIGHWAY CONSTRUCTION: GROUP 3 AIR
TRACK AND WAGON DRILLMAN, DYNAMITE AND POWDER MAN,
CONCRETE BARRIER RAIL FORM SETTER, CONCRETE SAW
JOINT CONTROL CUTTING (NEWTON COUNTY).....$ 34.45 27.50

LABO0041-005 04/01/2025

Rates Fringes
LABORERS: UTILITY CONSTRUCTION: GROUP 1 (JASPER &
NEWTON COUNTIES) CONSTRUCTION LABORER; FENCE
ERECTOR; FLAGGER; GRADE CHECKER; GUARD RAIL
ERECTOR; WIRE MESH LAYER; JOINT MAN (MORTAR, MASTIC
AND ALL OTHER TYPES); LIGHTING INSTALLER (PERMANENT
OR TEMPORARY); LINEMAN FOR AUTOMATIC GRADE MAKER ON
PAVING MACHINES; MORTAR MAN; MULTI-PLATE ERECTOR;
RIP-RAP INSTALLER (ALL PRODUCTS AND MATERIALS);
ROAD MARKING AND DELINEATION LABORER; SETTING AND
PLACING OF ALL PRECAST CONCRETE PRODUCTS; SIGN
INSTALLATION INCLUDING SUPPORTING STRUCTURE;
SPRAYING OF ALL EPOXY, CURING COMPOUND, OR LIKE
MATERIAL; SOD LAYER; AIR TOOL, POWER TOOL, AND
POWER EQUIPMENT OPERATOR; ASPHALT LUTE MAN; ASPHALT
RAKER MAN; BATCH TRUCK DUMPER; BRIDGE HANDRAIL
ERECTOR; HANDLER (BULK OR BAG CEMENT); CHAIN SAW
MAN; CONCRETE PUDDLER; CONCRETE RUBBER; CONCRETE
SAW OPERATOR; CORE DRILL OPERATOR, EYE LEVEL; HAND
BLADE OPERATOR; HYDRO SEEDER MAN; MOTOR-DRIVEN
GEORGIA BUGGY OPERATOR; POWER-DRIVEN COMPACTOR OR
TAMPER OPERATOR; POWER SAW OPERATOR; PUMPCRETE
ASSEMBLY MAN; SCREED MAN OR SCREW MAN ON ASPHALT
PAVER; REBAR INSTALLER; SANDBLASTER MAN; SEALER
APPLICATOR FOR ASPHALT (TOXIC); SETTING AND PLACING
PRESTRESSED OR PRECAST CONCRETE STRUCTURAL
MEMEBERS; SIDE RAIL SETTER (FOR SIDEWALKS, SIDE
DITCHES, RADII, AND PAVEMENTS); SPREADER BOX TENDER
(MANUAL OR POWER-DRIVEN); STRAW BLOWER MAN;
SUBSURFACE DRAIN AND CULVERT PIPE LAYER; TRANSVERSE
AND LONGITUDINAL HAND BULL FLOAT MAN; CONCRETE
CONVEYOR ASSEMBLY MAN; HORIZONTAL BORING AND
JACKING MAN; JACKMAN AND SHEETMAN; PIPE GRADE MAN;
WINCH AND WINDLASS OPERATOR.....$ 33.45 27.50
LABORERS: UTILITY CONSTRUCTION: GROUP 2 CUTTING
TORCH BURNER; LASER BEAM ALIGNER; MANHOLE ERECTOR;
SEWER PIPE LAYER; WATER LINE INSTALLER, TEMPORARY
OR PERMANENT; WELDER (ELECTRIC OR EXY-ACETYLENE) IN
CONNECTION WITH WATERLINE AND SEWER WORK, HOD
CARRIER (TENDING BRICKLAYERS); TVING AND ASSOCIATED
GROUTING OF UTILITY LINES (JASPER & NEWTON
COUNTIES).....$ 33.75 27.50
LABORERS: UTILITY CONSTRUCTION: GROUP 3 AIR TRACK
AND WAGON DRILLMAN; CONCRETE BARRIER RAIL FORM
SETTER; DYNAMITE AND POWDER MAN; GENERAL LEADMAN;
CONCRETE SAW JOINT CONTROL CUTTING (JASPER &
NEWTON COUNTIES).....$ 34.45 27.50

LABO0041-006 04/01/2025

Rates Fringes
LABORERS: HEAVY & HIGHWAY CONSTRUCTION: GROUP 1

CONSTRUCTION LABORER, CARPENTER TENDER, FENCE ERECTOR, GRADE CHECKER, GUARD RAIL ERECTOR, CONTINUOUS STEEL ROD OR MAT INSTALLER, WIRE MESH LAYER, JOINT MAN (MORTAR, MASTIC, AND ALL OTHER TYPES), LIGHTING INSTALLER (PERMANENT OR TEMPORARY), LINEMAN FOR AUTOMATIC GRADE MAKER ON PAVING MACHINES, MORTAR MAN, MULTI-PLANT ERECTOR, RIP-RAP INSTALLER (ALL PRODUCTS AND MATERIALS), ROAD MARKING AND DELINEATION LABORER, SETTING AND PLACING OF ALL PRECAST CONCRETE PRODUCTS, SING INSTALLATION INCLUDING SUPPORTING STRUCTURE, SPRAYING OF ALL EPOXY, CURING COMPOUND, OR LIKE MATERIAL, FLAGPERSON, AIR TOOL, POWER TOOL OPERATOR, ASPHALT RAKER MAN, BATCH TRUCK DUMPER, BRIDGE HAND RAIL ERECTOR, HANDLER (BULK OR BAG CEMENT), CHAIN SAW MAN, CONCRETE PUDDLER, CONCRETE RUBBER, CONCRETE SAW OPERATOR, CORE DRILL OPERATOR, EYE LEVEL, HAND BLADE OPERATOR HYDRO SEEDER MAN, MOTOR DRIVEN GEORGIA BUGGY OPERATOR, POWER DRIVEN COMPACTOR OR TAPER OPERATOR, POWER SAW OPERATOR, PUMP CRETE ASSEMBLY MAN, SREED MAN OR SCREW MAN ON ASPHALT PAVER, REGAR INSTALLER, SANDBLASTER MAN, SEALER APPLICATOR FOR ASPHALT (TOXIC), SETTING AND PLACING PRE-STRESSED ON PRE-CAST CONCRETE STRUCTURAL MEMBERS, SIDE RAIL SETTERS (FOR SIDEWALK, SIDE DITCHES, RADII, AND PAVEMENT), SPREADER BOX TENDER (MANUA OR POWER DRIVEN), STRAW BLOWER MAN, SUBSUREFACE DRAIN AND CULVERT PIPE LAYER, CONCRETE CONVEYOR, HORIZONAL BORING AND JACKMAN AND SHEETMAN, PIPE GREADE MAN, WINCH AND WINDLESS OPERATOR CONDUIT INSTALLER, SOD LAYER (JASPER & STARKE COUNTIES).....$ 30.68 27.50

LABORERS: HEAVY & HIGHWAY CONSTRUCTION: GROUP 2 CUTTING TORCH BURNER, LASER BEAM ALIGNER, MANHOLE ERECTOR, SEWER PIPE LAYER, WATER LINE INSTALLER, TEMPORARY OR PERMANENT WELDERS (ELECTRIC OR OXY ACETYLENE) (JASPER & STARKE COUNTIES).....$ 30.98 27.50

LABORERS: HEAVY & HIGHWAY CONSTRUCTION: GROUP 3 AIR TRACK AND WAGON DRILLMAN, DYNAMITE AND POWDER MAN, CONCRETE BARRIER RAIL FORM SETTER, CONCRETE SAW JOINT CONTROL CUTTING (JASPER & STARKE COUNTIES)...$ 31.68 27.50

LABO0081-003 04/01/2025

	Rates	Fringes

LABORERS: UTILITY CONSTRUCTION: GROUP 1 CONSTRUCTION LABORER; FENCE ERECTOR; FLAGGER; GRADE CHECKER; GUARD RAIL ERECTOR; WIRE MESH LAYER; JOINT MAN (MORTAR, MASTIC AND ALL OTHER TYPES); LIGHTING INSTALLER (PERMANENT OR TEMPORARY); LINEMAN FOR AUTOMATIC GRADE MAKER ON PAVING MACHINES; MORTAR MAN; MULTI-PLATE ERECTOR; RIP-RAP INSTALLER (ALL PRODUCTS AND MATERIALS); ROAD MARKING AND DELINEATION LABORER; SETTING AND PLACING OF ALL PRECAST CONCRETE PRODUCTS; SIGN INSTALLATION INCLUDING SUPPORTING STRUCTURE; SPRAYING OF ALL EPOXY, CURING COMPOUND, OR LIKE MATERIAL; SOD LAYER; AIR TOOL, POWER TOOL, AND POWER EQUIPMENT OPERATOR; ASPHALT LUTE MAN; ASPHALT RAKER MAN; BATCH TRUCK DUMPER; BRIDGE HANDRAIL ERECTOR; HANDLER (BULK OR BAG CEMENT); CHAIN SAW MAN; CONCRETE PUDDLER; CONCRETE RUBBER; CONCRETE SAW OPERATOR; CORE DRILL OPERATOR, EYE LEVEL; HAND BLADE OPERATOR; HYDRO SEEDER MAN; MOTOR-DRIVEN GEORGIA BUGGY OPERATOR; POWER-DRIVEN COMPACTOR OR

TAMPER OPERATOR; POWER SAW OPERATOR; PUMPCRETE
ASSEMBLY MAN; SCREED MAN OR SCREW MAN ON ASPHALT
PAVER; REBAR INSTALLER; SANDBLASTER MAN; SEALER
APPLICATOR FOR ASPHALT (TOXIC); SETTING AND PLACING
PRESTRESSED OR PRECAST CONCRETE STRUCTURAL
MEMEBERS; SIDE RAIL SETTER (FOR SIDEWALKS, SIDE
DITCHES, RADII, AND PAVEMENTS); SPREADER BOX TENDER
(MANUAL OR POWER-DRIVEN); STRAW BLOWER MAN;
SUBSURFACE DRAIN AND CULVERT PIPE LAYER; TRANSVERSE
AND LONGITUDINAL HAND BULL FLOAT MAN; CONCRETE
CONVEYOR ASSEMBLY MAN; HORIZONTAL BORING AND
JACKING MAN; JACKMAN AND SHEETMAN; PIPE GRADE MAN;
WINCH AND WINDLASS OPERATOR (STARKE COUNTY).....$ 30.68 27.50
LABORERS: UTILITY CONSTRUCTION: GROUP 2 CUTTING
TORCH BURNER; LASER BEAM ALIGNER; MANHOLE ERECTOR;
SEWER PIPE LAYER; WATER LINE INSTALLER, TEMPORARY
OR PERMANENT; WELDER (ELECTRIC OR EXY-ACETYLENE) IN
CONNECTION WITH WATERLINE AND SEWER WORK, HOD
CARRIER (TENDING BRICKLAYERS); TVING AND ASSOCIATED
GROUTING OF UTILITY LINES   (STARKE COUNTY).....$ 30.98 27.50
LABORERS: UTILITY CONSTRUCTION: GROUP 3 AIR TRACK
AND WAGON DRILLMAN; CONCRETE BARRIER RAIL FORM
SETTER; DYNAMITE AND POWDER MAN; GENERAL LEADMAN;
CONCRETE SAW JOINT CONTROL CUTTING   (STARKE
COUNTY).....$ 31.68 27.50

LABO0120-003 04/01/2025

	Rates	Fringes
LABORERS: UTILITY CONSTRUCTION: GROUP 1 CONSTRUCTION LABORER; FENCE ERECTOR; FLAGGER; GRADE CHECKER; GUARD RAIL ERECTOR; WIRE MESH LAYER; JOINT MAN (MORTAR, MASTIC AND ALL OTHER TYPES); LIGHTING INSTALLER (PERMANENT OR TEMPORARY); LINEMAN FOR AUTOMATIC GRADE MAKER ON PAVING MACHINES; MORTAR MAN; MULTI-PLATE ERECTOR; RIP-RAP INSTALLER (ALL PRODUCTS AND MATERIALS); ROAD MARKING AND DELINEATION LABORER; SETTING AND PLACING OF ALL PRECAST CONCRETE PRODUCTS; SIGN INSTALLATION INCLUDING SUPPORTING STRUCTURE; SPRAYING OF ALL EPOXY, CURING COMPOUND, OR LIKE MATERIAL; SOD LAYER; AIR TOOL, POWER TOOL, AND POWER EQUIPMENT OPERATOR; ASPHALT LUTE MAN; ASPHALT RAKER MAN; BATCH TRUCK DUMPER; BRIDGE HANDRAIL ERECTOR; HANDLER (BULK OR BAG CEMENT); CHAIN SAW MAN; CONCRETE PUDDLER; CONCRETE RUBBER; CONCRETE SAW OPERATOR; CORE DRILL OPERATOR, EYE LEVEL; HAND BLADE OPERATOR; HYDRO SEEDER MAN; MOTOR-DRIVEN GEORGIA BUGGY OPERATOR; POWER-DRIVEN COMPACTOR OR TAMPER OPERATOR; POWER SAW OPERATOR; PUMPCRETE ASSEMBLY MAN; SCREED MAN OR SCREW MAN ON ASPHALT PAVER; REBAR INSTALLER; SANDBLASTER MAN; SEALER APPLICATOR FOR ASPHALT (TOXIC); SETTING AND PLACING PRESTRESSED OR PRECAST CONCRETE STRUCTURAL MEMEBERS; SIDE RAIL SETTER (FOR SIDEWALKS, SIDE DITCHES, RADII, AND PAVEMENTS); SPREADER BOX TENDER (MANUAL OR POWER-DRIVEN); STRAW BLOWER MAN; SUBSURFACE DRAIN AND CULVERT PIPE LAYER; TRANSVERSE AND LONGITUDINAL HAND BULL FLOAT MAN; CONCRETE CONVEYOR ASSEMBLY MAN; HORIZONTAL BORING AND JACKING MAN; JACKMAN AND SHEETMAN; PIPE GRADE MAN; WINCH AND WINDLASS OPERATOR (MARION & SHELBY COUNTIES)	$ 30.65	18.00
LABORERS: UTILITY CONSTRUCTION: GROUP 2 CUTTING TORCH BURNER; LASER BEAM ALIGNER; MANHOLE ERECTOR;		

SEWER PIPE LAYER; WATER LINE INSTALLER, TEMPORARY
OR PERMANENT; WELDER (ELECTRIC OR EXY-ACETYLENE) IN
CONNECTION WITH WATERLINE AND SEWER WORK, TVING AND
ASSOCIATED GROUTING OF UTILITY LINES (MARION &
SHELBY COUNTIES).....$ 31.15 18.00
LABORERS: UTILITY CONSTRUCTION: GROUP 3 AIR TRACK
AND WAGON DRILLMAN; CONCRETE BARRIER RAIL FORM
SETTER; DYNAMITE AND POWDER MAN; GENERAL LEADMAN;
CONCRETE SAW JOINT CONTROL CUTTING; HOD CARRIER
(TENDING BRICKLAYERS) (MARION & SHELBY COUNTIES)...$ 31.65 18.00

LABO0204-003 04/01/2025

Rates Fringes

LABORERS: UTILITY CONSTRUCTION: GROUP 1
CONSTRUCTION LABORER; FENCE ERECTOR; FLAGGER; GRADE
CHECKER; GUARD RAIL ERECTOR; WIRE MESH LAYER; JOINT
MAN (MORTAR, MASTIC AND ALL OTHER TYPES); LIGHTING
INSTALLER (PERMANENT OR TEMPORARY); LINEMAN FOR
AUTOMATIC GRADE MAKER ON PAVING MACHINES; MORTAR
MAN; MULTI-PLATE ERECTOR; RIP-RAP INSTALLER (ALL
PRODUCTS AND MATERIALS); ROAD MARKING AND
DELINEATION LABORER; SETTING AND PLACING OF ALL
PRECAST CONCRETE PRODUCTS; SIGN INSTALLATION
INCLUDING SUPPORTING STRUCTURE; SPRAYING OF ALL
EPOXY, CURING COMPOUND, OR LIKE MATERIAL; SOD
LAYER; AIR TOOL, POWER TOOL, AND POWER EQUIPMENT
OPERATOR; ASPHALT LUTE MAN; ASPHALT RAKER MAN;
BATCH TRUCK DUMPER; BRIDGE HANDRAIL ERECTOR;
HANDLER (BULK OR BAG CEMENT); CHAIN SAW MAN;
CONCRETE PUDDLER; CONCRETE RUBBER; CONCRETE SAW
OPERATOR; CORE DRILL OPERATOR, EYE LEVEL; HAND
BLADE OPERATOR; HYDRO SEEDER MAN; MOTOR-DRIVEN
GEORGIA BUGGY OPERATOR; POWER-DRIVEN COMPACTOR OR
TAMPER OPERATOR; POWER SAW OPERATOR; PUMPCRETE
ASSEMBLY MAN; SCREED MAN OR SCREW MAN ON ASPHALT
PAVER; REBAR INSTALLER; SANDBLASTER MAN; SEALER
APPLICATOR FOR ASPHALT (TOXIC); SETTING AND PLACING
PRESTRESSED OR PRECAST CONCRETE STRUCTURAL
MEMEBERS; SIDE RAIL SETTER (FOR SIDEWALKS, SIDE
DITCHES, RADII, AND PAVEMENTS); SPREADER BOX TENDER
(MANUAL OR POWER-DRIVEN); STRAW BLOWER MAN;
SUBSURFACE DRAIN AND CULVERT PIPE LAYER; TRANSVERSE
AND LONGITUDINAL HAND BULL FLOAT MAN; CONCRETE
CONVEYOR ASSEMBLY MAN; HORIZONTAL BORING AND
JACKING MAN; JACKMAN AND SHEETMAN; PIPE GRADE MAN;
WINCH AND WINDLASS OPERATOR (CLAY, FOUNTAIN,
GREENE, HENDRICKS, OWEN, PARKE, PUTNAM, SULLIVAN,
VERMILLION, VIGO, & WARREN COUNTIES).....$ 30.65 18.00
LABORERS: UTILITY CONSTRUCTION: GROUP 2 CUTTING
TORCH BURNER; LASER BEAM ALIGNER; MANHOLE ERECTOR;
SEWER PIPE LAYER; WATER LINE INSTALLER, TEMPORARY
OR PERMANENT; WELDER (ELECTRIC OR EXY-ACETYLENE) IN
CONNECTION WITH WATERLINE AND SEWER WORK, TVING AND
ASSOCIATED GROUTING OF UTILITY LINES (CLAY,
FOUNTAIN, GREENE, HENDRICKS, OWEN, PARKE, PUTNAM,
SULLIVAN, VERMILLION, VIGO, & WARREN COUNTIES).....$ 31.15 18.00
LABORERS: UTILITY CONSTRUCTION: GROUP 3 AIR TRACK
AND WAGON DRILLMAN; CONCRETE BARRIER RAIL FORM
SETTER; DYNAMITE AND POWDER MAN; GENERAL LEADMAN;
HOD CARRIER (TENDING BRICKLAYERS); CONCRETE SAW
JOINT CONTROL CUTTING (CLAY, FOUNTAIN, GREENE,
HENDRICKS, OWEN, PARKE, PUTNAM, SULLIVAN,
VERMILLION, VIGO, & WARREN COUNTIES).....$ 31.65 18.00

LABO0213-003 04/01/2025

	Rates	Fringes
LABORERS: UTILITY CONSTRUCTION: GROUP 1 CONSTRUCTION LABORER; FENCE ERECTOR; FLAGGER; GRADE CHECKER; GUARD RAIL ERECTOR; WIRE MESH LAYER; JOINT MAN (MORTAR, MASTIC AND ALL OTHER TYPES); LIGHTING INSTALLER (PERMANENT OR TEMPORARY); LINEMAN FOR AUTOMATIC GRADE MAKER ON PAVING MACHINES; MORTAR MAN; MULTI-PLATE ERECTOR; RIP-RAP INSTALLER (ALL PRODUCTS AND MATERIALS); ROAD MARKING AND DELINEATION LABORER; SETTING AND PLACING OF ALL PRECAST CONCRETE PRODUCTS; SIGN INSTALLATION INCLUDING SUPPORTING STRUCTURE; SPRAYING OF ALL EPOXY, CURING COMPOUND, OR LIKE MATERIAL; SOD LAYER; AIR TOOL, POWER TOOL, AND POWER EQUIPMENT OPERATOR; ASPHALT LUTE MAN; ASPHALT RAKER MAN; BATCH TRUCK DUMPER; BRIDGE HANDRAIL ERECTOR; HANDLER (BULK OR BAG CEMENT); CHAIN SAW MAN; CONCRETE PUDDLER; CONCRETE RUBBER; CONCRETE SAW OPERATOR; CORE DRILL OPERATOR, EYE LEVEL; HAND BLADE OPERATOR; HYDRO SEEDER MAN; MOTOR-DRIVEN GEORGIA BUGGY OPERATOR; POWER-DRIVEN COMPACTOR OR TAMPER OPERATOR; POWER SAW OPERATOR; PUMPCRETE ASSEMBLY MAN; SCREED MAN OR SCREW MAN ON ASPHALT PAVER; REBAR INSTALLER; SANDBLASTER MAN; SEALER APPLICATOR FOR ASPHALT (TOXIC); SETTING AND PLACING PRESTRESSED OR PRECAST CONCRETE STRUCTURAL MEMEBERS; SIDE RAIL SETTER (FOR SIDEWALKS, SIDE DITCHES, RADII, AND PAVEMENTS); SPREADER BOX TENDER (MANUAL OR POWER-DRIVEN); STRAW BLOWER MAN; SUBSURFACE DRAIN AND CULVERT PIPE LAYER; TRANSVERSE AND LONGITUDINAL HAND BULL FLOAT MAN; CONCRETE CONVEYOR ASSEMBLY MAN; HORIZONTAL BORING AND JACKING MAN; JACKMAN AND SHEETMAN; PIPE GRADE MAN; WINCH AND WINDLASS OPERATOR (ADAMS, ALLEN, DEKALB, HUNTINGTON, NOBLE, STEUBEN, WABASH, WELLS, & WHITLEY COUNTIES)	$ 30.65	18.00
LABORERS: UTILITY CONSTRUCTION: GROUP 2 CUTTING TORCH BURNER; LASER BEAM ALIGNER; MANHOLE ERECTOR; SEWER PIPE LAYER; WATER LINE INSTALLER, TEMPORARY OR PERMANENT; WELDER (ELECTRIC OR EXY-ACETYLENE) IN CONNECTION WITH WATERLINE AND SEWER WORK, TVING AND ASSOCIATED GROUTING OF UTILITY LINES (ADAMS, ALLEN, DEKALB, HUNTINGTON, NOBLE, STEUBEN, WABASH, WELLS, & WHITLEY COUNTIES)	$ 31.15	18.00
LABORERS: UTILITY CONSTRUCTION: GROUP 3 AIR TRACK AND WAGON DRILLMAN; CONCRETE BARRIER RAIL FORM SETTER; DYNAMITE AND POWDER MAN; GENERAL LEADMAN; HOD CARRIER (TENDING BRICKLAYERS); CONCRETE SAW JOINT CONTROL CUTTING (ADAMS, ALLEN, DEKALB, HUNTINGTON, NOBLE, STEUBEN, WABASH, WELLS, & WHITLEY COUNTIES)	$ 31.65	18.00

LABO0274-005 04/01/2025

	Rates	Fringes
LABORERS: UTILITY CONSTRUCTION: GROUP 1 CONSTRUCTION LABORER; FENCE ERECTOR; FLAGGER; GRADE CHECKER; GUARD RAIL ERECTOR; WIRE MESH LAYER; JOINT MAN (MORTAR, MASTIC AND ALL OTHER TYPES); LIGHTING INSTALLER (PERMANENT OR TEMPORARY); LINEMAN FOR AUTOMATIC GRADE MAKER ON PAVING MACHINES; MORTAR MAN; MULTI-PLATE ERECTOR; RIP-RAP INSTALLER (ALL PRODUCTS AND MATERIALS); ROAD MARKING AND		

DELINEATION LABORER; SETTING AND PLACING OF ALL PRECAST CONCRETE PRODUCTS; SIGN INSTALLATION INCLUDING SUPPORTING STRUCTURE; SPRAYING OF ALL EPOXY, CURING COMPOUND, OR LIKE MATERIAL; SOD LAYER; AIR TOOL, POWER TOOL, AND POWER EQUIPMENT OPERATOR; ASPHALT LUTE MAN; ASPHALT RAKER MAN; BATCH TRUCK DUMPER; BRIDGE HANDRAIL ERECTOR; HANDLER (BULK OR BAG CEMENT); CHAIN SAW MAN; CONCRETE PUDDLER; CONCRETE RUBBER; CONCRETE SAW OPERATOR; CORE DRILL OPERATOR, EYE LEVEL; HAND BLADE OPERATOR; HYDRO SEEDER MAN; MOTOR-DRIVEN GEORGIA BUGGY OPERATOR; POWER-DRIVEN COMPACTOR OR TAMPER OPERATOR; POWER SAW OPERATOR; PUMPCRETE ASSEMBLY MAN; SCREED MAN OR SCREW MAN ON ASPHALT PAVER; REBAR INSTALLER; SANDBLASTER MAN; SEALER APPLICATOR FOR ASPHALT (TOXIC); SETTING AND PLACING PRESTRESSED OR PRECAST CONCRETE STRUCTURAL MEMEBERS; SIDE RAIL SETTER (FOR SIDEWALKS, SIDE DITCHES, RADII, AND PAVEMENTS); SPREADER BOX TENDER (MANUAL OR POWER-DRIVEN); STRAW BLOWER MAN; SUBSURFACE DRAIN AND CULVERT PIPE LAYER; TRANSVERSE AND LONGITUDINAL HAND BULL FLOAT MAN; CONCRETE CONVEYOR ASSEMBLY MAN; HORIZONTAL BORING AND JACKING MAN; JACKMAN AND SHEETMAN; PIPE GRADE MAN; WINCH AND WINDLASS OPERATOR (BENTON, BOONE, CARROLL, CASS, CLINTON, FULTON, HOWARD, MIAMI, MONTGOMERY, PULASKI, TIPPECANOE, TIPTON, AND WHITE COUNTIES).....$ 30.65 18.00

LABORERS: UTILITY CONSTRUCTION: GROUP 2 CUTTING TORCH BURNER; LASER BEAM ALIGNER; MANHOLE ERECTOR; SEWER PIPE LAYER; WATER LINE INSTALLER, TEMPORARY OR PERMANENT; WELDER (ELECTRIC OR EXY-ACETYLENE) IN CONNECTION WITH WATERLINE AND SEWER WORK, TVING AND ASSOCIATED GROUTING OF UTILITY LINES (BENTON, BOONE, CARROLL, CASS, CLINTON, FULTON, HOWARD, MIAMI, MONTGOMERY, PULASKI, TIPPECANOE, TIPTON, AND WHITE COUNTIES).....$ 31.15 18.00

LABORERS: UTILITY CONSTRUCTION: GROUP 3 AIR TRACK AND WAGON DRILLMAN; CONCRETE BARRIER RAIL FORM SETTER; DYNAMITE AND POWDER MAN; GENERAL LEADMAN; HOD CARRIER (TENDING BRICKLAYERS); CONCRETE SAW JOINT CONTROL CUTTING (BENTON, BOONE, CARROLL, CASS, CLINTON, FULTON, HOWARD, MIAMI, MONTGOMERY, PULASKI, TIPPECANOE, TIPTON, AND WHITE COUNTIES)....$ 31.65 18.00

LABO0561-015 04/01/2025

	Rates	Fringes

LABORERS: UTILITY CONSTRUCTION: GROUP 1 CONSTRUCTION LABORER; FENCE ERECTOR; FLAGGER; GRADE CHECKER; GUARD RAIL ERECTOR; WIRE MESH LAYER; JOINT MAN (MORTAR, MASTIC AND ALL OTHER TYPES); LIGHTING INSTALLER (PERMANENT OR TEMPORARY); LINEMAN FOR AUTOMATIC GRADE MAKER ON PAVING MACHINES; MORTAR MAN; MULTI-PLATE ERECTOR; RIP-RAP INSTALLER (ALL PRODUCTS AND MATERIALS); ROAD MARKING AND DELINEATION LABORER; SETTING AND PLACING OF ALL PRECAST CONCRETE PRODUCTS; SIGN INSTALLATION INCLUDING SUPPORTING STRUCTURE; SPRAYING OF ALL EPOXY, CURING COMPOUND, OR LIKE MATERIAL; SOD LAYER; AIR TOOL, POWER TOOL, AND POWER EQUIPMENT OPERATOR; ASPHALT LUTE MAN; ASPHALT RAKER MAN; BATCH TRUCK DUMPER; BRIDGE HANDRAIL ERECTOR; HANDLER (BULK OR BAG CEMENT); CHAIN SAW MAN; CONCRETE PUDDLER; CONCRETE RUBBER; CONCRETE SAW

OPERATOR; CORE DRILL OPERATOR, EYE LEVEL; HAND
BLADE OPERATOR; HYDRO SEEDER MAN; MOTOR-DRIVEN
GEORGIA BUGGY OPERATOR; POWER-DRIVEN COMPACTOR OR
TAMPER OPERATOR; POWER SAW OPERATOR; PUMPCRETE
ASSEMBLY MAN; SCREED MAN OR SCREW MAN ON ASPHALT
PAVER; REBAR INSTALLER; SANDBLASTER MAN; SEALER
APPLICATOR FOR ASPHALT (TOXIC); SETTING AND PLACING
PRESTRESSED OR PRECAST CONCRETE STRUCTURAL
MEMEBERS; SIDE RAIL SETTER (FOR SIDEWALKS, SIDE
DITCHES, RADII, AND PAVEMENTS); SPREADER BOX TENDER
(MANUAL OR POWER-DRIVEN); STRAW BLOWER MAN;
SUBSURFACE DRAIN AND CULVERT PIPE LAYER; TRANSVERSE
AND LONGITUDINAL HAND BULL FLOAT MAN; CONCRETE
CONVEYOR ASSEMBLY MAN; HORIZONTAL BORING AND
JACKING MAN; JACKMAN AND SHEETMAN; PIPE GRADE MAN;
WINCH AND WINDLASS OPERATOR (DAVIESS, DUBOIS,
GIBSON, KNOX, PIKE, POSEY, SPENCER, VANDERBURGH, &
WARRICK COUNTIES).....$ 30.65 18.00
LABORERS: UTILITY CONSTRUCTION: GROUP 2 CUTTING
TORCH BURNER; LASER BEAM ALIGNER; MANHOLE ERECTOR;
SEWER PIPE LAYER; WATER LINE INSTALLER, TEMPORARY
OR PERMANENT; WELDER (ELECTRIC OR EXY-ACETYLENE) IN
CONNECTION WITH WATERLINE AND SEWER WORK, HOD
CARRIER (TENDING BRICKLAYERS); TVING AND ASSOCIATED
GROUTING OF UTILITY LINES (DAVIESS, DUBOIS,
GIBSON, KNOX, PIKE, POSEY, SPENCER, VANDERBURGH, &
WARRICK COUNTIES).....$ 31.15 18.00
LABORERS: UTILITY CONSTRUCTION: GROUP 3 AIR TRACK
AND WAGON DRILLMAN; CONCRETE BARRIER RAIL FORM
SETTER; DYNAMITE AND POWDER MAN; GENERAL LEADMAN;
CONCRETE SAW JOINT CONTROL CUTTING (DAVIESS,
DUBOIS, GIBSON, KNOX, PIKE, POSEY, SPENCER,
VANDERBURGH, & WARRICK COUNTIES).....$ 31.65 18.00

LABO0645-005 04/01/2025

Rates Fringes

LABORERS: UTILITY CONSTRUCTION: GROUP 1
CONSTRUCTION LABORER; FENCE ERECTOR; FLAGGER; GRADE
CHECKER; GUARD RAIL ERECTOR; WIRE MESH LAYER; JOINT
MAN (MORTAR, MASTIC AND ALL OTHER TYPES); LIGHTING
INSTALLER (PERMANENT OR TEMPORARY); LINEMAN FOR
AUTOMATIC GRADE MAKER ON PAVING MACHINES; MORTAR
MAN; MULTI-PLATE ERECTOR; RIP-RAP INSTALLER (ALL
PRODUCTS AND MATERIALS); ROAD MARKING AND
DELINEATION LABORER; SETTING AND PLACING OF ALL
PRECAST CONCRETE PRODUCTS; SIGN INSTALLATION
INCLUDING SUPPORTING STRUCTURE; SPRAYING OF ALL
EPOXY, CURING COMPOUND, OR LIKE MATERIAL; SOD
LAYER; AIR TOOL, POWER TOOL, AND POWER EQUIPMENT
OPERATOR; ASPHALT LUTE MAN; ASPHALT RAKER MAN;
BATCH TRUCK DUMPER; BRIDGE HANDRAIL ERECTOR;
HANDLER (BULK OR BAG CEMENT); CHAIN SAW MAN;
CONCRETE PUDDLER; CONCRETE RUBBER; CONCRETE SAW
OPERATOR; CORE DRILL OPERATOR, EYE LEVEL; HAND
BLADE OPERATOR; HYDRO SEEDER MAN; MOTOR-DRIVEN
GEORGIA BUGGY OPERATOR; POWER-DRIVEN COMPACTOR OR
TAMPER OPERATOR; POWER SAW OPERATOR; PUMPCRETE
ASSEMBLY MAN; SCREED MAN OR SCREW MAN ON ASPHALT
PAVER; REBAR INSTALLER; SANDBLASTER MAN; SEALER
APPLICATOR FOR ASPHALT (TOXIC); SETTING AND PLACING
PRESTRESSED OR PRECAST CONCRETE STRUCTURAL
MEMEBERS; SIDE RAIL SETTER (FOR SIDEWALKS, SIDE
DITCHES, RADII, AND PAVEMENTS); SPREADER BOX TENDER
(MANUAL OR POWER-DRIVEN); STRAW BLOWER MAN;

SUBSURFACE DRAIN AND CULVERT PIPE LAYER; TRANSVERSE
AND LONGITUDINAL HAND BULL FLOAT MAN; CONCRETE
CONVEYOR ASSEMBLY MAN; HORIZONTAL BORING AND
JACKING MAN; JACKMAN AND SHEETMAN; PIPE GRADE MAN;
WINCH AND WINDLASS OPERATOR (ELKHART COUNTY).....$ 30.65 18.00
LABORERS: UTILITY CONSTRUCTION: GROUP 2 CUTTING
TORCH BURNER; LASER BEAM ALIGNER; MANHOLE ERECTOR;
SEWER PIPE LAYER; WATER LINE INSTALLER, TEMPORARY
OR PERMANENT; WELDER (ELECTRIC OR EXY-ACETYLENE) IN
CONNECTION WITH WATERLINE AND SEWER WORK, HOD
CARRIER (TENDING BRICKLAYERS); TVING AND ASSOCIATED
GROUTING OF UTILITY LINES   (ELKHART COUNTY).....$ 31.15 18.00
LABORERS: UTILITY CONSTRUCTION: GROUP 3 AIR TRACK
AND WAGON DRILLMAN; CONCRETE BARRIER RAIL FORM
SETTER; DYNAMITE AND POWDER MAN; GENERAL LEADMAN;
CONCRETE SAW JOINT CONTROL CUTTING   (ELKHART
COUNTY).....$ 31.65 18.00

 LABO0645-006 04/01/2025

Rates Fringes

LABORERS: UTILITY CONSTRUCTION: GROUP 1
CONSTRUCTION LABORER; FENCE ERECTOR; FLAGGER; GRADE
CHECKER; GUARD RAIL ERECTOR; WIRE MESH LAYER; JOINT
MAN (MORTAR, MASTIC AND ALL OTHER TYPES); LIGHTING
INSTALLER (PERMANENT OR TEMPORARY); LINEMAN FOR
AUTOMATIC GRADE MAKER ON PAVING MACHINES; MORTAR
MAN; MULTI-PLATE ERECTOR; RIP-RAP INSTALLER (ALL
PRODUCTS AND MATERIALS); ROAD MARKING AND
DELINEATION LABORER; SETTING AND PLACING OF ALL
PRECAST CONCRETE PRODUCTS; SIGN INSTALLATION
INCLUDING SUPPORTING STRUCTURE; SPRAYING OF ALL
EPOXY, CURING COMPOUND, OR LIKE MATERIAL; SOD
LAYER; AIR TOOL, POWER TOOL, AND POWER EQUIPMENT
OPERATOR; ASPHALT LUTE MAN; ASPHALT RAKER MAN;
BATCH TRUCK DUMPER; BRIDGE HANDRAIL ERECTOR;
HANDLER (BULK OR BAG CEMENT); CHAIN SAW MAN;
CONCRETE PUDDLER; CONCRETE RUBBER; CONCRETE SAW
OPERATOR; CORE DRILL OPERATOR, EYE LEVEL; HAND
BLADE OPERATOR; HYDRO SEEDER MAN; MOTOR-DRIVEN
GEORGIA BUGGY OPERATOR; POWER-DRIVEN COMPACTOR OR
TAMPER OPERATOR; POWER SAW OPERATOR; PUMPCRETE
ASSEMBLY MAN; SCREED MAN OR SCREW MAN ON ASPHALT
PAVER; REBAR INSTALLER; SANDBLASTER MAN; SEALER
APPLICATOR FOR ASPHALT (TOXIC); SETTING AND PLACING
PRESTRESSED OR PRECAST CONCRETE STRUCTURAL
MEMEBERS; SIDE RAIL SETTER (FOR SIDEWALKS, SIDE
DITCHES, RADII, AND PAVEMENTS); SPREADER BOX TENDER
(MANUAL OR POWER-DRIVEN); STRAW BLOWER MAN;
SUBSURFACE DRAIN AND CULVERT PIPE LAYER; TRANSVERSE
AND LONGITUDINAL HAND BULL FLOAT MAN; CONCRETE
CONVEYOR ASSEMBLY MAN; HORIZONTAL BORING AND
JACKING MAN; JACKMAN AND SHEETMAN; PIPE GRADE MAN;
WINCH AND WINDLASS OPERATOR (KOSCIUSKO, LAGRANGE,
& MARSHALL COUNTIES).....$ 30.65 18.00
LABORERS: UTILITY CONSTRUCTION: GROUP 2 CUTTING
TORCH BURNER; LASER BEAM ALIGNER; MANHOLE ERECTOR;
SEWER PIPE LAYER; WATER LINE INSTALLER, TEMPORARY
OR PERMANENT; WELDER (ELECTRIC OR EXY-ACETYLENE) IN
CONNECTION WITH WATERLINE AND SEWER WORK, HOD
CARRIER (TENDING BRICKLAYERS); TVING AND ASSOCIATED
GROUTING OF UTILITY LINES   (KOSCIUSKO, LAGRANGE, &
MARSHALL COUNTIES).....$ 31.15 18.22
LABORERS: UTILITY CONSTRUCTION: GROUP 3 AIR TRACK
AND WAGON DRILLMAN; CONCRETE BARRIER RAIL FORM

SETTER; DYNAMITE AND POWDER MAN; GENERAL LEADMAN;
CONCRETE SAW JOINT CONTROL CUTTING (KOSCIUSKO,
LAGRANGE, & MARSHALL COUNTIES).....$ 31.65 18.00

LABO0741-007 04/01/2025

Rates Fringes

LABORERS: UTILITY CONSTRUCTION: GROUP 1
CONSTRUCTION LABORER; FENCE ERECTOR; FLAGGER; GRADE
CHECKER; GUARD RAIL ERECTOR; WIRE MESH LAYER; JOINT
MAN (MORTAR, MASTIC AND ALL OTHER TYPES); LIGHTING
INSTALLER (PERMANENT OR TEMPORARY); LINEMAN FOR
AUTOMATIC GRADE MAKER ON PAVING MACHINES; MORTAR
MAN; MULTI-PLATE ERECTOR; RIP-RAP INSTALLER (ALL
PRODUCTS AND MATERIALS); ROAD MARKING AND
DELINEATION LABORER; SETTING AND PLACING OF ALL
PRECAST CONCRETE PRODUCTS; SIGN INSTALLATION
INCLUDING SUPPORTING STRUCTURE; SPRAYING OF ALL
EPOXY, CURING COMPOUND, OR LIKE MATERIAL; SOD
LAYER; AIR TOOL, POWER TOOL, AND POWER EQUIPMENT
OPERATOR; ASPHALT LUTE MAN; ASPHALT RAKER MAN;
BATCH TRUCK DUMPER; BRIDGE HANDRAIL ERECTOR;
HANDLER (BULK OR BAG CEMENT); CHAIN SAW MAN;
CONCRETE PUDDLER; CONCRETE RUBBER; CONCRETE SAW
OPERATOR; CORE DRILL OPERATOR, EYE LEVEL; HAND
BLADE OPERATOR; HYDRO SEEDER MAN; MOTOR-DRIVEN
GEORGIA BUGGY OPERATOR; POWER-DRIVEN COMPACTOR OR
TAMPER OPERATOR; POWER SAW OPERATOR; PUMPCRETE
ASSEMBLY MAN; SCREED MAN OR SCREW MAN ON ASPHALT
PAVER; REBAR INSTALLER; SANDBLASTER MAN; SEALER
APPLICATOR FOR ASPHALT (TOXIC); SETTING AND PLACING
PRESTRESSED OR PRECAST CONCRETE STRUCTURAL
MEMEBERS; SIDE RAIL SETTER (FOR SIDEWALKS, SIDE
DITCHES, RADII, AND PAVEMENTS); SPREADER BOX TENDER
(MANUAL OR POWER-DRIVEN); STRAW BLOWER MAN;
SUBSURFACE DRAIN AND CULVERT PIPE LAYER; TRANSVERSE
AND LONGITUDINAL HAND BULL FLOAT MAN; CONCRETE
CONVEYOR ASSEMBLY MAN; HORIZONTAL BORING AND
JACKING MAN; JACKMAN AND SHEETMAN; PIPE GRADE MAN;
WINCH AND WINDLASS OPERATOR (BARTHOLOMEW, BROWN,
DEARBORN, DECATUR, FRANKLIN, JACKSON, JENNINGS,
JOHNSON, LAWRENCE, MARTIN, MONROE, MORGAN, OHIO,
ORANGE & RIPLEY COUNTIES).....$ 30.65 18.00
LABORERS: UTILITY CONSTRUCTION: GROUP 2 CUTTING
TORCH BURNER; LASER BEAM ALIGNER; MANHOLE ERECTOR;
SEWER PIPE LAYER; WATER LINE INSTALLER, TEMPORARY
OR PERMANENT; WELDER (ELECTRIC OR EXY-ACETYLENE) IN
CONNECTION WITH WATERLINE AND SEWER WORK, TVING AND
ASSOCIATED GROUTING OF UTILITY LINES
(BARTHOLOMEW, BROWN, DEARBORN, DECATUR, FRANKLIN,
JACKSON, JENNINGS, JOHNSON, LAWRENCE, MARTIN,
MONROE, MORGAN, OHIO, ORANGE & RIPLEY COUNTIES).....$ 31.15 18.00
LABORERS: UTILITY CONSTRUCTION: GROUP 3 AIR TRACK
AND WAGON DRILLMAN; CONCRETE BARRIER RAIL FORM
SETTER; DYNAMITE AND POWDER MAN; GENERAL LEADMAN;
HOD CARRIER (TENDING BRICKLAYERS); CONCRETE SAW
JOINT CONTROL CUTTING (BARTHOLOMEW, BROWN,
DEARBORN, DECATUR, FRANKLIN, JACKSON, JENNINGS,
JOHNSON, LAWRENCE, MARTIN, MONROE, MORGAN, OHIO,
ORANGE & RIPLEY COUNTIES).....$ 31.65 18.00

LABO0795-004 04/01/2025

Rates Fringes

LABORERS: UTILITY CONSTRUCTION: GROUP 1

CONSTRUCTION LABORER; FENCE ERECTOR; FLAGGER; GRADE CHECKER; GUARD RAIL ERECTOR; WIRE MESH LAYER; JOINT MAN (MORTAR, MASTIC AND ALL OTHER TYPES); LIGHTING INSTALLER (PERMANENT OR TEMPORARY); LINEMAN FOR AUTOMATIC GRADE MAKER ON PAVING MACHINES; MORTAR MAN; MULTI-PLATE ERECTOR; RIP-RAP INSTALLER (ALL PRODUCTS AND MATERIALS); ROAD MARKING AND DELINEATION LABORER; SETTING AND PLACING OF ALL PRECAST CONCRETE PRODUCTS; SIGN INSTALLATION INCLUDING SUPPORTING STRUCTURE; SPRAYING OF ALL EPOXY, CURING COMPOUND, OR LIKE MATERIAL; SOD LAYER; AIR TOOL, POWER TOOL, AND POWER EQUIPMENT OPERATOR; ASPHALT LUTE MAN; ASPHALT RAKER MAN; BATCH TRUCK DUMPER; BRIDGE HANDRAIL ERECTOR; HANDLER (BULK OR BAG CEMENT); CHAIN SAW MAN; CONCRETE PUDDLER; CONCRETE RUBBER; CONCRETE SAW OPERATOR; CORE DRILL OPERATOR, EYE LEVEL; HAND BLADE OPERATOR; HYDRO SEEDER MAN; MOTOR-DRIVEN GEORGIA BUGGY OPERATOR; POWER-DRIVEN COMPACTOR OR TAMPER OPERATOR; POWER SAW OPERATOR; PUMPCRETE ASSEMBLY MAN; SCREED MAN OR SCREW MAN ON ASPHALT PAVER; REBAR INSTALLER; SANDBLASTER MAN; SEALER APPLICATOR FOR ASPHALT (TOXIC); SETTING AND PLACING PRESTRESSED OR PRECAST CONCRETE STRUCTURAL MEMEBERS; SIDE RAIL SETTER (FOR SIDEWALKS, SIDE DITCHES, RADII, AND PAVEMENTS); SPREADER BOX TENDER (MANUAL OR POWER-DRIVEN); STRAW BLOWER MAN; SUBSURFACE DRAIN AND CULVERT PIPE LAYER; TRANSVERSE AND LONGITUDINAL HAND BULL FLOAT MAN; CONCRETE CONVEYOR ASSEMBLY MAN; HORIZONTAL BORING AND JACKING MAN; JACKMAN AND SHEETMAN; PIPE GRADE MAN; WINCH AND WINDLASS OPERATOR (CLARK, CRAWFORD, FLOYD, HARRISON, JEFFERSON, PERRY, SCOTT, SWITZERLAND, & WASHINGTON COUNTIES).....$ 30.65 18.00

LABORERS: UTILITY CONSTRUCTION: GROUP 2 CUTTING TORCH BURNER; LASER BEAM ALIGNER; MANHOLE ERECTOR; SEWER PIPE LAYER; WATER LINE INSTALLER, TEMPORARY OR PERMANENT; WELDER (ELECTRIC OR EXY-ACETYLENE) IN CONNECTION WITH WATERLINE AND SEWER WORK, HOD CARRIER (TENDING BRICKLAYERS); TVING AND ASSOCIATED GROUTING OF UTILITY LINES (CLARK, CRAWFORD, FLOYD, HARRISON, JEFFERSON, PERRY, SCOTT, SWITZERLAND, & WASHINGTON COUNTIES).....$ 31.15 18.00

LABORERS: UTILITY CONSTRUCTION: GROUP 3 AIR TRACK AND WAGON DRILLMAN; CONCRETE BARRIER RAIL FORM SETTER; DYNAMITE AND POWDER MAN; GENERAL LEADMAN; CONCRETE SAW JOINT CONTROL CUTTING (CLARK, CRAWFORD, FLOYD, HARRISON, JEFFERSON, PERRY, SCOTT, SWITZERLAND, & WASHINGTON COUNTIES).....$ 31.65 18.00

LABO0999-001 04/01/2023

	Rates	Fringes

LABORERS: HEAVY AND HIGHWAY CONSTRUCTION: GROUP 1 CONSTRUCTION LABORER; FENCE ERECTOR; FLAGGER; GRADE CHECKER; GUARD RAIL ERECTOR; WIRE MESH LAYER; JOINT MAN (MORTAR, MASTIC AND ALL OTHER TYPES); LIGHTING INSTALLER (PERMANENT OR TEMPORARY); LINEMAN FOR AUTOMATIC GRADE MAKER ON PAVING MACHINES; MORTAR MAN; MULTI-PLATE ERECTOR; RIP-RAP INSTALLER (ALL PRODUCTS AND MATERIALS); ROAD MARKING AND DELINEATION LABORER; SETTING AND PLACING OF ALL PRECAST CONCRETE PRODUCTS; SIGN INSTALLATION INCLUDING SUPPORTING STRUCTURE; SPRAYING OF ALL EPOXY, CURING COMPOUND, OR LIKE MATERIAL; SOD

LAYER; AIR TOOL, POWER TOOL, AND POWER EQUIPMENT
OPERATOR; ASPHALT LUTE MAN; ASPHALT RAKER MAN;
BATCH TRUCK DUMPER; BRIDGE HANDRAIL ERECTOR;
HANDLER (BULK OR BAG CEMENT); CHAIN SAW MAN;
CONCRETE PUDDLER; CONCRETE RUBBER; CONCRETE SAW
OPERATOR; CORE DRILL OPERATOR, EYE LEVEL; HAND
BLADE OPERATOR; HYDRO SEEDER MAN; MOTOR-DRIVEN
GEORGIA BUGGY OPERATOR; POWER-DRIVEN COMPACTOR OR
TAMPER OPERATOR; POWER SAW OPERATOR; PUMPCRETE
ASSEMBLY MAN; SCREED MAN OR SCREW MAN ON ASPHALT
PAVER; REBAR INSTALLER; SANDBLASTER MAN; SEALER
APPLICATOR FOR ASPHALT (TOXIC); SETTING AND PLACING
PRESTRESSED OR PRECAST CONCRETE STRUCTURAL
MEMEBERS; SIDE RAIL SETTER (FOR SIDEWALKS, SIDE
DITCHES, RADII, AND PAVEMENTS); SPREADER BOX TENDER
(MANUAL OR POWER-DRIVEN); STRAW BLOWER MAN;
SUBSURFACE DRAIN AND CULVERT PIPE LAYER; TRANSVERSE
AND LONGITUDINAL HAND BULL FLOAT MAN; CONCRETE
CONVEYOR ASSEMBLY MAN; HORIZONTAL BORING AND
JACKING MAN; JACKMAN AND SHEETMAN; PIPE GRADE MAN;
WINCH AND WINDLASS OPERATOR (ALL COUNTIES EXCEPT:
JASPER, NEWTON, & STARKE).....$ 28.50 17.72
LABORERS: HEAVY AND HIGHWAY CONSTRUCTION: GROUP 2
CUTTING TORCH BURNER; LASER BEAM ALIGNER; MANHOLE
ERECTOR; SEWER PIPE LAYER; WATER LINE INSTALLER,
TEMPORARY OR PERMANENT; WELDER (ELECTRIC OR
EXY-ACETYLENE) IN CONNECTION WITH WATERLINE AND
SEWER WORK, TVING AND ASSOCIATED GROUTING OF
UTILITY LINES (ALL COUNTIES EXCEPT: JASPER,
NEWTON, & STARKE).....$ 29.00 17.72
LABORERS: HEAVY AND HIGHWAY CONSTRUCTION: GROUP 3
AIR TRACK AND WAGON DRILLMAN; CONCRETE BARRIER RAIL
FORM SETTER; DYNAMITE AND POWDER MAN; GENERAL
LEADMAN; HOD CARRIER (TENDING BRICKLAYERS);
CONCRETE SAW JOINT CONTROL CUTTING   (ALL COUNTIES
EXCEPT: JASPER, NEWTON, & STARKE).....$ 29.50 17.72

LABO1112-003 04/01/2025

Rates Fringes

LABORERS: UTILITY CONSTRUCTION: GROUP 2 CUTTING
TORCH BURNER; LASER BEAM ALIGNER; MANHOLE ERECTOR;
SEWER PIPE LAYER; WATER LINE INSTALLER, TEMPORARY
OR PERMANENT; WELDER (ELECTRIC OR EXY-ACETYLENE) IN
CONNECTION WITH WATERLINE AND SEWER WORK, TVING AND
ASSOCIATED GROUTING OF UTILITY LINES (BLACKFORD,
DELAWARE, FAYETTE, GRANT, HAMILTON, HANCOCK, HENRY,
JAY, MADISON, RANDOLPH, RUSH, UNION & WAYNE
COUNTIES).....$ 31.15 18.00
LABORERS: UTILITY CONSTRCTION: GROUP 1 CONSTRUCTION
LABORER; FENCE ERECTOR; FLAGGER; GRADE CHECKER;
GUARD RAIL ERECTOR; WIRE MESH LAYER; JOINT MAN
(MORTAR, MASTIC AND ALL OTHER TYPES); LIGHTING
INSTALLER (PERMANENT OR TEMPORARY); LINEMAN FOR
AUTOMATIC GRADE MAKER ON PAVING MACHINES; MORTAR
MAN; MULTI-PLATE ERECTOR; RIP-RAP INSTALLER (ALL
PRODUCTS AND MATERIALS); ROAD MARKING AND
DELINEATION LABORER; SETTING AND PLACING OF ALL
PRECAST CONCRETE PRODUCTS; SIGN INSTALLATION
INCLUDING SUPPORTING STRUCTURE; SPRAYING OF ALL
EPOXY, CURING COMPOUND, OR LIKE MATERIAL; SOD
LAYER; AIR TOOL, POWER TOOL, AND POWER EQUIPMENT
OPERATOR; ASPHALT LUTE MAN; ASPHALT RAKER MAN;
BATCH TRUCK DUMPER; BRIDGE HANDRAIL ERECTOR;
HANDLER (BULK OR BAG CEMENT); CHAIN SAW MAN;

CONCRETE PUDDLER; CONCRETE RUBBER; CONCRETE SAW
OPERATOR; CORE DRILL OPERATOR, EYE LEVEL; HAND
BLADE OPERATOR; HYDRO SEEDER MAN; MOTOR-DRIVEN
GEORGIA BUGGY OPERATOR; POWER-DRIVEN COMPACTOR OR
TAMPER OPERATOR; POWER SAW OPERATOR; PUMPCRETE
ASSEMBLY MAN; SCREED MAN OR SCREW MAN ON ASPHALT
PAVER; REBAR INSTALLER; SANDBLASTER MAN; SEALER
APPLICATOR FOR ASPHALT (TOXIC); SETTING AND PLACING
PRESTRESSED OR PRECAST CONCRETE STRUCTURAL
MEMEBERS; SIDE RAIL SETTER (FOR SIDEWALKS, SIDE
DITCHES, RADII, AND PAVEMENTS); SPREADER BOX TENDER
(MANUAL OR POWER-DRIVEN); STRAW BLOWER MAN;
SUBSURFACE DRAIN AND CULVERT PIPE LAYER; TRANSVERSE
AND LONGITUDINAL HAND BULL FLOAT MAN; CONCRETE
CONVEYOR ASSEMBLY MAN; HORIZONTAL BORING AND
JACKING MAN; JACKMAN AND SHEETMAN; PIPE GRADE MAN;
WINCH AND WINDLASS OPERATOR (BLACKFORD, DELAWARE,
FAYETTE, GRANT, HAMILTON, HANCOCK, HENRY, JAY,
MADISON, RANDOLPH, RUSH, UNION & WAYNE COUNTIES)....$ 30.65 18.22
LABORERS: UTILITY CONSTRUCTION: GROUP 3 AIR TRACK
AND WAGON DRILLMAN; CONCRETE BARRIER RAIL FORM
SETTER; DYNAMITE AND POWDER MAN; HOD CARRIER
(TENDING BRICKLAYERS); GENERAL LEADMAN; CONCRETE
SAW JOINT CONTROL CUTTING   (BLACKFORD, DELAWARE,
FAYETTE, GRANT, HAMILTON, HANCOCK, HENRY, JAY,
MADISON, RANDOLPH, RUSH, UNION & WAYNE COUNTIES)....$ 31.65 18.00

PAIN0012-006 05/01/2024

	Rates	Fringes
PAINTER: BRIDGES, LEAD ABATEMENT (COMMERCIAL AND INDUSTRIAL) (DEARBORN, OHIO, RIPLEY AND SWITZERLAND COUNTIES)	$ 31.68	14.46
PAINTER: BRUSH & ROLLER, PAPERHANGER, DRYWALL TAPING (COMMERCIAL AND INDUSTRIAL) (DEARBORN, OHIO, RIPLEY AND SWITZERLAND COUNTIES)	$ 30.34	14.46
PAINTER: SANDBLASTING, WATERBLASTING (COMMERCIAL AND INDUSTRIAL) (DEARBORN, OHIO, RIPLEY AND SWITZERLAND COUNTIES)	$ 31.68	14.46
PAINTER: SPRAY (COMMERCIAL AND INDUSTRIAL) (DEARBORN, OHIO, RIPLEY AND SWITZERLAND COUNTIES)	$ 28.79	14.46

PAIN0027-005 06/01/2025

	Rates	Fringes
GLAZIER (NEWTON COUNTY, WEST OF HIGHWAY #41)	$ 53.55	44.88

PAIN0047-005 06/01/2024

	Rates	Fringes
PAINTER BRUSH, ROLLER (NON-BRIDGE WORK)	$ 31.02	16.89
PAINTER SPRAY AND SAND-BLASTING (NON-BRIDGE WORK)	$ 30.52	15.89

PAIN0080-001 06/01/2025

	Rates	Fringes
PAINTER: BRUSH AND ROLLER (BENTON, CARROLL, CASS, CLINTON, FOUNTAIN, MONTGOMERY TIPPECANOE AND WARREN COUNTIES)	$ 31.15	18.76
PAINTER: SPRAY AND SANDBLASTING (BENTON, CARROLL, CASS, CLINTON, FOUNTAIN, MONTGOMERY TIPPECANOE AND WARREN COUNTIES)	$ 32.10	18.76

PAIN0091-007 06/01/2025

	Rates	Fringes
PAINTER: BRUSH & ROLLER, DRYWALL TAPING & FINISHING, VINYL/PAPER HANGING (ELKHART, FULTON, KOSCIUSKO AND MARSHALL COUNTIES)	$ 32.50	19.86
PAINTER: SPRAY (ELKHART, FULTON, KOSCIUSKO AND MARSHALL COUNTIES)	$ 33.00	19.86

PAIN0118-005 06/01/2025

	Rates	Fringes
PAINTERS: BRUSH, ROLLER & PAPERHANGER (HIGHWAY CONSTRUCTION & RAILROAD BRIDGES) (CLARK, CRAWFORD, FLOYD, HARRISON JEFFERSON, SCOTT AND WASHINGTON COUNTIES)	$ 37.42	15.99
PAINTERS: SPRAY, SANDBLAST & WATERBLAST (HIGHWAY CONSTRUCTION & RAILROAD BRIDGES) (CLARK, CRAWFORD, FLOYD, HARRISON JEFFERSON, SCOTT AND WASHINGTON COUNTIES)	$ 37.42	15.99

PAIN0156-001 04/01/2025

	Rates	Fringes
PAINTERS: BRUSH & ROLLER (DAVIESS, DUBOIS, GIBZSON, KNOX, PERRY, PIKE, POSSEY, SPENCER, VANDERBURGH, AND WARRICK COUNTIES) FOOTNOTE A: ALL STRUCTURES OVER 40FT? $0.75/ HOUR ABOVE BASE WAGE ALL STRUCTURES OVER 75FT? $1.50/ HOUR ABOVE BASE WAGE ALL STRUCTURES OVER 100FT? $2.50/ HOUR ABOVE BASE WAGE	$ 31.12	21.20
PAINTERS: BRUSH & ROLLER OF MASTICS, CREOSOTES, KEWINCH KOATE, & COAL TAR EPOXY (DAVIESS, DUBOIS, GIBZSON, KNOX, PERRY, PIKE, POSSEY, SPENCER, VANDERBURGH, AND WARRICK COUNTIES) FOOTNOTE A: ALL STRUCTURES OVER 40FT? $0.75/ HOUR ABOVE BASE WAGE ALL STRUCTURES OVER 75FT? $1.50/ HOUR ABOVE BASE WAGE ALL STRUCTURES OVER 100FT? $2.50/ HOUR ABOVE BASE WAGE	$ 31.12	21.20
PAINTERS: DRYWALL FINISHERS (DAVIESS, DUBOIS, GIBZSON, KNOX, PERRY, PIKE, POSSEY, SPENCER, VANDERBURGH, AND WARRICK COUNTIES) FOOTNOTE A: ALL STRUCTURES OVER 40FT? $0.75/ HOUR ABOVE BASE WAGE ALL STRUCTURES OVER 75FT? $1.50/ HOUR ABOVE BASE WAGE ALL STRUCTURES OVER 100FT? $2.50/ HOUR ABOVE BASE WAGE	$ 31.87	21.20
PAINTERS:: SPRAY OF MASTICS CREOSOTES, KWINCH KOATE, COAL TAR EPOXY (DAVIESS, DUBOIS, GIBZSON, KNOX, PERRY, PIKE, POSSEY, SPENCER, VANDERBURGH, AND WARRICK COUNTIES) FOOTNOTE A: ALL STRUCTURES OVER 40FT? $0.75/ HOUR ABOVE BASE WAGE ALL STRUCTURES OVER 75FT? $1.50/ HOUR ABOVE BASE WAGE ALL STRUCTURES OVER 100FT? $2.50/ HOUR ABOVE BASE WAGE	$ 32.12	21.20
PAINTERS:: SPRAY, SANDBLAST, POWER TOOLS, WATERBLAST & STEAM CLEANING (DAVIESS, DUBOIS, GIBZSON, KNOX, PERRY, PIKE, POSSEY, SPENCER, VANDERBURGH, AND WARRICK COUNTIES) FOOTNOTE A: ALL STRUCTURES OVER 40FT? $0.75/ HOUR ABOVE BASE WAGE ALL STRUCTURES OVER 75FT? $1.50/ HOUR ABOVE BASE WAGE ALL STRUCTURES OVER 100FT? $2.50/ HOUR ABOVE BASE WAGE	$ 32.12	21.20

PAIN0197-001 06/01/2025

	Rates	Fringes
PAINTERS: BRUSH & ROLLER (CLAY, GREENE, OWEN,		

PARKE, PUTNAM, SULLIVAN, VERMILLION AND VIGO COUNTIES) FOOTNOTE A: $1.00 PREMIUM FOR WORK ON STRUCTURES OVER 40 FT. ABOVE FLOOR/GROUND LEVEL $2.00 PREMIUM FOR WORK ON STRUCTURES OVER 100 FT ABOVE FLOOR/GROUND LEVEL.....$ 31.20 15.55

PAINTERS: SANDBLASTING (CLAY, GREENE, OWEN, PARKE, PUTNAM, SULLIVAN, VERMILLION AND VIGO COUNTIES) FOOTNOTE A: $1.00 PREMIUM FOR WORK ON STRUCTURES OVER 40 FT. ABOVE FLOOR/GROUND LEVEL $2.00 PREMIUM FOR WORK ON STRUCTURES OVER 100 FT ABOVE FLOOR/GROUND LEVEL.....$ 34.20 15.55

PAINTERS: SPRAY & POT MAN (CLAY, GREENE, OWEN, PARKE, PUTNAM, SULLIVAN, VERMILLION AND VIGO COUNTIES) FOOTNOTE A: $1.00 PREMIUM FOR WORK ON STRUCTURES OVER 40 FT. ABOVE FLOOR/GROUND LEVEL $2.00 PREMIUM FOR WORK ON STRUCTURES OVER 100 FT ABOVE FLOOR/GROUND LEVEL.....$ 32.20 15.55

PAIN0387-004 11/01/2023

	Rates	Fringes
GLAZIER (DEARBORN, FRANKLIN, OHIO, RIPLEY, AND SWITZERLAND COUNTIES)	$ 31.95	17.75

PAIN0460-004 06/01/2025

	Rates	Fringes
PAINTERS: BRUSH & ROLLER (BUILDING) (JASPER, NEWTON, PULASKI, STARKE AND WHITE COUNTIES)	$ 41.00	31.26
PAINTERS: BRUSH AND ROLLER (HEAVY AND HIGHWAY) (JASPER, NEWTON, PULASKI, STARKE AND WHITE COUNTIES)	$ 41.00	31.26
PAINTERS: DRYWALL TAPING & FINISHING (JASPER, NEWTON, PULASKI, STARKE AND WHITE COUNTIES)	$ 41.80	31.26

PAIN0469-002 06/01/2025

	Rates	Fringes
PAINTERS: BRUSH, ROLLER, PAPERHANGER, & DRYWALL FINISHING (ADAMS, ALLEN, DEKALB, GRANT, HUNTINGTON, LAGRANGE, NOBLE, STEUBEN, WABASH, WELLS, AND WHITLEY COUNTIES)	$ 27.04	16.27
PAINTERS: LEAD ABATEMENT (ADAMS, ALLEN, DEKALB, GRANT, HUNTINGTON, LAGRANGE, NOBLE, STEUBEN, WABASH, WELLS, AND WHITLEY COUNTIES)	$ 32.24	16.27
PAINTERS: SPRAY & SANDBLAST POT TENDERS AND GROUND PERSONNEL (ADAMS, ALLEN, DEKALB, GRANT, HUNTINGTON, LAGRANGE, NOBLE, STEUBEN, WABASH, WELLS, AND WHITLEY COUNTIES)	$ 27.04	16.27
PAINTERS: SPRAY, SANDBLAST, POWER TOOLS, WATERBLAST, & STEAM CLEANING (ADAMS, ALLEN, DEKALB, GRANT, HUNTINGTON, LAGRANGE, NOBLE, STEUBEN, WABASH, WELLS, AND WHITLEY COUNTIES)	$ 27.04	16.27

PAIN0669-001 05/01/2024

	Rates	Fringes
PAINTERS: BRUSH; ROLLER; PAPERHANGING; DRYWALL FINISHERS (BLACKFORD, DELAWARE, FAYETTE, FRANKLIN, HENRY, HOWARD, JAY, MADISON, MIAMI, RANDOLPH, RUSH, TIPTON, UNION AND WAYNE COUNTIES)	$ 25.10	16.39
PAINTERS: SPRAY/WATERBLASTING; SANDBLASTING (BLACKFORD, DELAWARE, FAYETTE, FRANKLIN, HENRY, HOWARD, JAY, MADISON, MIAMI, RANDOLPH, RUSH, TIPTON, UNION AND WAYNE COUNTIES)	$ 26.10	16.39

PAIN1165-014 07/01/2025

	Rates	Fringes
GLAZIER (CLARK, CRAWFORD, DAVIESS, DUBOIS, FLOYD, GIBSON, HARRISION, JEFFERSON, KNOX, MARTIN, ORANGE, PERRY, PIKE, POSEY, SCOTT, SPENCER, VANDERBURGH, WARRICK AND WASHINGTON)	$ 35.13	19.57

PAIN1165-017 07/01/2025

	Rates	Fringes
GLAZIER (ADAMS, ALLEN, BLACKFORD, DE KALB, GRANT, HUNTINGTON, JAY, NOBLE, STEUBEN, WABASH, WELLS AND WHITLEY COUNTIES)	$ 29.50	19.02

PAIN1165-018 07/01/2025

	Rates	Fringes
GLAZIER (JASPER AND NEWTON (EAST OF HIGHWAY #41) COUNTIES)	$ 44.09	30.73

PAIN1165-019 07/01/2025

	Rates	Fringes
GLAZIER (ELKHART, FULTON, KOSCIUSKO, LAGRANGE, MARSHALL, PULASKI, AND STARKE COUNTY)	$ 34.22	24.67

PAIN1165-022 01/01/2025

	Rates	Fringes
GLAZIER (BARTHOLOMEW, BENTON, BOONE, BROWN, CARROLL, CASS, CLAY, CLINTON, DECATUR, DELEWARE, FAYETTE, FOUNTAIN, GREENE,HAMILTON, HANCOCK, HENDRICKS, HENRY, HOWARD, JACKSON, JENNINGS, JOHNSON, LAWRENCE, MADISON, MARION, MIAMI, MONROE, MONTGOMERY, MORGAN, OWEN, PARKE, PUTNAM, RANDOLPH, RUSH, SHELBY, SULLIVAN, TIPPECANOE, TIPTON, UNION, VIGO, VERMILLION, WARREN, WAYNE, AND WHITE COUNTIES)	$ 36.03	20.55

PLAS0075-001 06/01/2017

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER (CLAY, OWEN, PARKE, PUTNAM, VERMILLION AND VIGO COUNTIES:)	$ 25.75	13.50

PLAS0075-002 06/01/2017

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER (GREENE AND SULLIVAN COUNTIES)	$ 28.50	13.50

PLAS0101-001 06/01/2018

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER (ELKHART, FULTON AND MARSHALL COUNTIES; PULASKI COUNTY (SOUTHERN 1/2))	$ 31.50	14.30

PLAS0101-008 06/01/2014

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER (ADAMS, ALLEN, DEKALB, HUNTINGTON, KOSCIUSKO, LAGRANGE, NOBLE, STEUBEN, WELLS AND WHITLEY COUNTIES)	$ 23.38	11.94

PLASTERER (ADAMS, ALLEN, DEKALB, HUNTINGTON,
KOSCIUSKO, LAGRANGE, NOBLE, STEUBEN, WELLS AND
WHITLEY COUNTIES).....$ 25.69 11.75

PLAS0438-003 06/01/2018

Rates Fringes

CEMENT MASON/CONCRETE FINISHER (PULASKI (NOTHERN
2/3), JASPER (N. EASTERN PORTION OF WEST TO BUT NOT
INCLUDING WHEATFIELD), ALL OF STARKE COUNTY).....$ 36.01 25.40

PLAS0692-002 06/01/2025

Rates Fringes

PLASTERER: AREA #46 (BARTHOLOMEW, BOONE, BROWN,
CLARK, CLAY, CRAWFORD, DAVIESS, DUBOIS, GIBSON,
HENDRICKS, JACKSON, JEFFERSON, JENNINGS, JOHNSON,
KNOX, LAWRENCE, MARION, MARTIN, MONROE, MORGAN,
ORANGE, OWEN, PARKE, PERRY, PIKE, POSEY, PUTNAM,
SCOTT, SHELBY, SPENCER, VANDERBURGH, VERMILLION,
VIGO AND WARRICK COUNTIES).....$ 31.50 18.32

PLAS0692-008 05/01/2025

Rates Fringes

CEMENT MASON/CONCRETE FINISHER: AREA #821
(BARTHOLOMEW, BROWN, CLARK, DEARBORN, FLOYD,
JACKSON, JEFFERSON, JENNINGS, LAWRENCE, OHIO,
ORANGE, RIPLEY, SCOTT, SHELBY, SWITZERLAND, AND
WASHINGTON COUNTIES).....$ 30.02 18.20

PLAS0692-009 04/01/2025

Rates Fringes

CEMENT MASON/CONCRETE FINISHER: AREA #83
(BLACKFORD, DELAWARE, GRANT, HAMILTON (NORTHERN
PART), HANCOCK (NORTHERN PART), JAY, MADISON,
TIPTON, AND WABASH COUNTIES).....$ 32.55 22.04

PLAS0692-009 06/01/2025

Rates Fringes

PLASTERER: AREA #83 (BLACKFORD, DELAWARE, GRANT,
HAMILTON (NORTHERN PART), HANCOCK (NORTHERN PART),
JAY, MADISON, TIPTON, AND WABASH COUNTIES).....$ 30.60 17.19

PLAS0692-011 04/01/2025

Rates Fringes

CEMENT MASON/CONCRETE FINISHER: AREA #83 (DECATUR,
FAYETTE, FRANKLIN, HENRY, RANDOLPH, RUSH, UNION AND
WAYNE COUNTIES).....$ 32.55 22.04

PLAS0692-011 06/01/2025

Rates Fringes

PLASTERER: AREA #83 (DECATUR, FAYETTE, FRANKLIN,
HENRY, RANDOLPH, RUSH, UNION AND WAYNE COUNTIES)....$ 30.60 17.19

PLAS0692-015 06/01/2024

Rates Fringes

PLASTERER: AREA #121 (BENTON, CARROLL, CASS,
CLINTON, FOUNTAIN, HOWARD, MIAMI, MONTGOMERY,
TIPPECANOE, WARREN, WHITE AND VERMILLION (NORTHERN

PART) COUNTIES).....$ 33.76 20.05

PLAS0692-015 06/01/2025

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER: AREA #121 (BENTON, CARROLL, CASS, CLINTON, FOUNTAIN, HOWARD, MIAMI, MONTGOMERY, TIPPECANOE, WARREN, WHITE AND VERMILLION (NORTHERN PART) COUNTIES).....	$ 33.50	21.95

PLAS0692-018 06/01/2025

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER: AREA #165 (NEWTON COUNTIES).....	$ 41.24	24.55

PLAS0692-022 06/01/2025

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER: AREA #406 (SOUTHWARD ON RT. NO. 49 TO THE JASPER, BENTON AND WHITE COUNTY LINES, INCLUDING THE CITY LIMITS OF WHEATFIELD, RENSSELAER AND REMINGTON, INDIANA. TO THE WEST, THE BOUNDARY OF NEWTON COUNTY).....	$ 43.72	35.59

PLAS0692-023 06/01/2025

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER: AREA #532 (BOONE, HAMILTON (SOUTH HALF OF COUNTY NORTH TO NEW ROUTE INDIANA #32 INCLUDING NOBLESVILLE); HANCOCK COUNTY (SOUTHERN AND WESTERN PART OF HANCOCK COUNTY, NORTH TO BUT NOT INCLUDING FORTVILLE); HENDRICKS, JOHNSON, MARION AND MORGAN COUNTIES).....	$ 35.00	20.61

PLAS0692-027 04/01/2025

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER: AREA #566 (CRAWFORD, DAVIESS, DUBOIS, GIBSON, HARRISON, KNOX, MARTIN, PERRY, PIKE, POSEY, SPENCER, VANDERBURGH AND WARRICK COUNTIES).....	$ 32.50	20.77

PLUM0136-003 04/01/2025

	Rates	Fringes
PLUMBERS AND PIPEFITTERS (BROWN, DAVIESS, DUBOIS, GIBSON, JACKSON, LAWRENCE, MARTIN, MONROE, ORANGE, OWEN, PERRY, PIKE, POSEY, SPENCER, VANDERBURGH, WARRICK, AND WASHINGTON COUNTIES).....	$ 46.42	21.33

PLUM0157-002 07/01/2025

	Rates	Fringes
PLUMBERS AND PIPEFITTERS (BENTON, CARROLL, CLINTON, FOUNTAIN, MONTGOMERY, TIPPECANOE, WARREN AND WHITE COUNTIES).....	$ 46.65	23.45

PLUM0166-001 06/01/2025

	Rates	Fringes
PLUMBER AND STEAMFITTER (ADAMS, ALLEN, BLACKFORD, DE KALB, GRANT, HUNTINGTON, NOBLE, STEUBEN, WABASH, WELLS, AND WHITLEY COUNTIES).....	$ 45.06	23.16

PLUM0166-002 06/01/2025

	Rates	Fringes
PLUMBER (ELKHART, KOSCIUSKO, AND LAGRANGE COUNTIES)	$ 45.06	23.16

PLUM0172-001 06/01/2025

	Rates	Fringes
PLUMBER, PIPEFITTER, STEAMFITTER (JASPER (S OF THE N. SIDE OF THE CITY OF RENSSELEAR), MARSHALL, PULASKI AND STARKE COUNTIES)	$ 44.93	23.03

PLUM0210-003 06/01/2025

	Rates	Fringes
PLUMBER (JASPER (TO THE CITY OF RENSSELAER) AND NEWTON COUNTIES)	$ 49.77	28.56

PLUM0392-006 06/01/2024

	Rates	Fringes
PLUMBERS AND PIPEFITTERS (DEARBORN, OHIO, RIPLEY, AND SWITZERLAND COUNTIES)	$ 40.70	29.52

PLUM0440-002 06/04/2025

	Rates	Fringes
PLUMBERS AND PIPEFITTERS (BARTHOLOMEW, BOONE, HAMILTON, HANCOCK, HENDRICKS, HOWARD, JOHNSON AND MARION COUNTIES; MIAMI COUNTY (SOUTH OF A STRAIGHT LINE WHERE ROUTE 218 ENTERS W. BOUNDARY); MORGAN, SHELBY AND TIPTON COUNTIES)	$ 50.05	20.39

PLUM0440-004 06/01/2025

	Rates	Fringes
PLUMBER AND STEAMFITTER (FAYETTE, FRANKLIN, HENRY, RANDOLPH, RUSH, UNION AND WAYNE COUNTIES)	$ 50.05	20.39

PLUM0502-001 08/01/2016

	Rates	Fringes
PLUMBER/PIPEFITTER (CLARK, FLOYD AND HARRISON COUNTIES)	$ 32.00	20.13

PLUM0597-004 06/01/2018

	Rates	Fringes
PIPEFITTER (JASPER (EXCLUDING THE CITY LIMITS OF RENSSELEAR), AND NEWTON (ENTIRE COUNTY))	$ 48.50	31.12

ROOF0023-004 06/01/2024

	Rates	Fringes
ROOFER: COMPOSITION (ADAMS, ALLEN, DEKALB, ELKHART, FULTON, HUNTINGTON, KOSCIUSKO, LAGRANGE, MARSHALL, MIAMI, NOBLE, PULASKI, STARKE, STEUBEN, WABASH, WELLS, AND WHITLEY COUNTIES)	$ 34.55	21.04
ROOFER: SLATE & TILE (ADAMS, ALLEN, DEKALB, ELKHART, FULTON, HUNTINGTON, KOSCIUSKO, LAGRANGE, MARSHALL, MIAMI, NOBLE, PULASKI, STARKE, STEUBEN, WABASH, WELLS, AND WHITLEY COUNTIES)	$ 36.05	21.04

ROOF0026-002 06/01/2023

	Rates	Fringes
ROOFER (JASPER AND NEWTON COUNTIES)	$ 42.50	25.76

ROOF0042-002 08/01/2024

	Rates	Fringes
ROOFER (DEARBORN, OHIO AND RIPLEY COUNTIES)	$ 33.00	19.51

ROOF0075-001 05/01/2024

	Rates	Fringes
ROOFER: COMPOSITION (FAYETTE, RANDOLPH, UNION, AND WAYNE COUNTIES)	$ 28.73	20.81
ROOFER: SLATE & TILE (FAYETTE, RANDOLPH, UNION, AND WAYNE COUNTIES)	$ 28.95	20.81

ROOF0075-002 05/01/2021

	Rates	Fringes
ROOFER: COMPOSITION (CLINTON COUNTY)	$ 24.38	20.09
ROOFER: SLATE & TILE (CLINTON COUNTY)	$ 24.60	20.09

ROOF0106-006 04/01/2023

	Rates	Fringes
ROOFER: COMPOSITION (CRAWFORD, DAVIESS, DUBOIS, GIBSON KNOX, MARTIN, ORANGE PERRY, PIKE, POSEY, SPENCER, VANDERBURGH AND WARRICK)	$ 31.60	19.43
ROOFER: SLATE & TILE (CRAWFORD, DAVIESS, DUBOIS, GIBSON KNOX, MARTIN, ORANGE PERRY, PIKE, POSEY, SPENCER, VANDERBURGH AND WARRICK)	$ 31.60	19.43

ROOF0106-012 07/01/2025

	Rates	Fringes
ROOFER (CLARK, FLOYD, HARRISON JEFFERSON, SCOTT, SWITZERLAND, AND WASHINGTON COUNTIES)	$ 30.97	14.66

ROOF0119-002 09/01/2025

	Rates	Fringes
ROOFER (BARTHOLOMEW, BLACKFORD, BOONE, BROWN, DECATUR, DELAWARE, FRANKLIN, GRANT, HAMILTON, HANCOCK, HENDRICKS, HENRY, HOWARD, JACKSON, JAY, JENNINGS, JOHNSON, LAWRENCE, MADISON, MARION, MONROE, MONTGOMERY, MORGAN, PUTNAM, RUSH, SHELBY, AND TIPTON COUNTIES)	$ 32.00	16.61

ROOF0150-002 07/01/2024

	Rates	Fringes
ROOFER (CLAY, GREENE, OWEN, PARKE, SULLIVAN, VERMILLION AND VIGO COUNTIES)	$ 30.00	18.30

SHEE0020-003 07/01/2025

	Rates	Fringes
SHEET METAL WORKER (HVAC DUCT WORK)	$ 40.19	27.33

SHEE0020-010 07/01/2025

	Rates	Fringes
SHEET METAL WORKER (BARTHOLOMEW, BOONE, BROWN, DECATUR, DELAWARE, FAYETTE, FRANKLIN, HAMILTON, HANCOCK, HENDRICKS, HENRY, JACKSON, JENNINGS,		

JOHNSON, LAWRENCE, MADISON, MARION, MONROE,
MONTGOMERY, MORGAN, ORANGE, RIPLEY, RUSH, SHELBY,
TIPTON, UNION AND WASHINGTON COUNTIES).....$ 45.81 26.57

SHEE0020-011 07/01/2023

	Rates	Fringes
SHEET METAL WORKER (CLINTON COUNTY).....	$ 37.82	26.37

SHEE0020-024 07/01/2023

	Rates	Fringes
SHEET METAL WORKER (CLAY, GREENE, MARTIN, OWEN, PARKE, PUTNAM, SULLIVAN, VERMILLION, AND VIGO COUNTIES).....	$ 40.91	25.22

TEAM0135-003 04/01/2025

	Rates	Fringes
TRUCK DRIVER: GROUP 1 SINGLE/BATCHES AXLE STRAIGHT TRUCKS; BATCH TRUCKS, WET OR DRY 3 (34E) AXLE OR LESS; SINGLE AXLE GREASE AND MAINTENANCE TRUCK (REMAINING COUNTIES).....	$ 34.69	20.51
TRUCK DRIVER: GROUP 2 SINGLE AXLE FUEL AND WATER TRUCKS (REMAINING COUNTIES).....	$ 34.74	20.51
TRUCK DRIVER: GROUP 3 SINGLE AXLE ""DOG-LEGS"", AND TANDEM TRUCK OR DOG- LEGS; WINCH TRUCKS OR A-FRAMES WHEN USED FOR TRANSPORTATION PURPOSES; DRIVERS ON BATCH TRUCKS, WET OR DRY OVER 3 (34E) BATCHES AND TANDEM AXLE GREASE AND MAINTENANCE TRUCK (REMAINING COUNTIES).....	$ 34.79	20.51
TRUCK DRIVER: GROUP 4 TANDEM AXLE FUEL TRUCKS; TANDEM AXLE WATER TRUCKS; BUTUMINOUS DISTRIBUTORS (TWO-MAN) (REMAINING COUNTIES).....	$ 34.84	20.51
TRUCK DRIVER: GROUP 5 TANDEM TRUCKS OVER 15 TONS PAYLOAD; SINGLE AXLE SEMI TRUCKS; FARM TRACTORS HAULING MATERIAL; MIXER TRUCKS (ALL TYPES); TRUCKS PULLING TILT-TOP TRAILER SINGLE AXLE; SINGLE AXLE LOW- BOYS; TRUCK-MOUNTED PAVEMENT BREAKERS (REMAINING COUNTIES).....	$ 34.89	20.51
TRUCK DRIVER: GROUP 6 TANDEM TRUCKS OR ""DOG-LEGS""; SEMI-WATER TRUCK; SPRINKLER TRUCK; HEAVY EQUIPMENT-TYPE WATER WAGONS, 5,000 GALLONS AND UNDER; BUTUMINOUS DISTRIBUTORS (ONE-MAN) (REMAINING COUNTIES).....	$ 34.94	20.51
TRUCK DRIVER: GROUP 7 TRI-AXLE TRUCKS; TANDEM AXLE SEMI TRUCKS; EQUIPMENT WHEN NOT SELF-LOADED OR PUSHER LOADED, SUCH AS KOEHRING OR SIMILAR DUMPSTERS, TRACK TRUCKS, EUCLID BOTTOM DUMP AND HUG BOTTOM DUMP, TOURNATRAILERS, TOURNAROCKERS, ACEY WAGONS OR FOR SIMILAR EQUIPMENT (12 CU YDS OR LESS); MOBILE MIXER TRUCK; TANDEM AXLE TRUCKS PULLING TILT-TOP TRAILER; TANDEM - AXLE LOWBOY; TRI- AXLE BATCH TRUCK; TRI-AXLE GREASE AND MAINTENANCE TRUCK (REMAINING COUNTIES).....	$ 34.99	20.51
TRUCK DRIVER: GROUP 8 TANDEM-TANDEM SEMI TRUCKS; TRUCK MECHANICS AND WELDERS; HEAVY EQUIPMENT-TYPE WATER WAGON OVER 5,000 GALLONS; TRI-AXLE TRUCKS PULLING TILT-TOP TRAILER; LOW-BOYS, TANDEM-TANDEM AXLE (REMAINING COUNTIES).....	$ 35.04	20.51
TRUCK DRIVER: GROUP 9 LOW-BOYS, TANDEM TRI-AXLE; ACEY WAGONS UP TO AND INCLUDING 3 BUCKETS; EQUIPMENT WHEN NOT SELF-LOADED OR PUSHER LOADED, SUCH AS KOEHRING OR SIMILAR DUMPSTERS, TRACK TRUCKS, EUCLID BOTTOM DUMP AND HUG BOTTOM DUMP,		

TOURNATRAILERS, TOURNAROCKERS, ACEY WAGONS OR FOR
SIMILAR EQUIPMENT (OVER 12 CU YDS.) (REMAINING
COUNTIES).....$ 35.09 20.51
TRUCK DRIVER: GROUP10 PICK-UP TRUCKS
REMAINING COUNTIES.....$ 34.54 20.51
TRUCK DRIVER: GROUP11 HELPERS; GREASERS; TIRE
MEN; BATCH BOARD TENDERS; WAREHOUSEMAN REMAINING
COUNTIES.....$ 35.09 20.51
TRUCK DRIVER: GROUP12 ACEY WAGON (OVER 3
BUCKETS); QUAD AXLE TRUCKS; ARTICULATING DUMP
REMAINING COUNTIES.....$ 35.19 20.51

WELDERS - Receive rate prescribed for craft performing
operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave
for Federal Contractors applies to all contracts subject to the
Davis-Bacon Act for which the contract is awarded (and any
solicitation was issued) on or after January 1, 2017. If this
contract is covered by the EO, the contractor must provide
employees with 1 hour of paid sick leave for every 30 hours
they work, up to 56 hours of paid sick leave each year.
Employees must be permitted to use paid sick leave for their
own illness, injury or other health-related needs, including
preventive care; to assist a family member (or person who is
like family to the employee) who is ill, injured, or has other
health-related needs, including preventive care; or for reasons
resulting from, or to assist a family member (or person who is
like family to the employee) who is a victim of, domestic
violence, sexual assault, or stalking. Additional information
on contractor requirements and worker protections under the EO
is available at https://www.dol.gov/agencies/whd/government-contracts.

Note: Executive Order 13658 generally applies to contracts subject to
the Davis-Bacon Act that were awarded on or between January 1,
2015 and January 29, 2022, and that have not been renewed or
extended on or after January 30, 2022. Executive Order 13658 does
not apply to contracts subject only to the Davis-Bacon Related Acts
regardless of when they were awarded. If a contract is subject to
Executive Order 13658, the contractor must pay all covered workers at
least $13.65 per hour (or the applicable wage rate listed on this wage
determination, if it is higher) for all hours spent performing on the
contract from May 11, 2026, through December 31, 2026. The applicable
Executive Order minimum wage rate will be adjusted annually.
Additional information on contractor requirements and worker
protections under Executive Order 13658 is available at
www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within
the scope of the classifications listed may be added after
award only as provided in the labor standards contract clauses
(29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classifications
and wage rates that have been found to be prevailing for the
type(s) of construction and geographic area covered by the wage
determination. The classifications are listed in alphabetical
order under rate identifiers indicating whether the particular
rate is a union rate (current union negotiated rate), a survey

rate, a weighted union average rate, a state adopted rate, or a supplemental classification rate.

Union Rate Identifiers

A four-letter identifier beginning with characters other than SU, UAVG, SA, or SC denotes that a union rate was prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2024. PLUM is an identifier of the union whose collectively bargained rate prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2024 in the example, is the effective date of the most current negotiated rate.

Union prevailing wage rates are updated to reflect all changes over time that are reported to WHD in the rates in the collective bargaining agreement (CBA) governing the classification.

Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for those classifications, but that 100% of the data reported for the classifications reflected union rates. EXAMPLE: UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a weighted union average rate. OH indicates the State of Ohio. The next number, 0010 in the example, is an internal number used in producing the wage determination. The date, 01/01/2024 in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

Survey Rate Identifiers

The SU identifier indicates that either a single non-union rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SUFL2022-007 6/27/2024. SU indicates the rate is a single non-union prevailing rate or a weighted average of survey data for that classification. FL indicates the State of Florida. 2022 is the year of the survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 6/27/2024 in the example, indicates the survey completion date for the classifications and rates under that identifier.

SU wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the discretion to update such rates under 29 CFR 1.6(c)(1).

State Adopted Rate Identifiers

The SA identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were

adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 01/03/2024 in the example, reflects the date on which the classifications and rates under the SA identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:

a) a survey underlying a wage determination
b) an existing published wage determination
c) an initial WHD letter setting forth a position on a wage determination matter
d) an initial conformance (additional classification and rate) determination

On survey related matters, initial contact, including requests for summaries of surveys, should be directed to the WHD Branch of Wage Surveys. Requests can be submitted via email to davisbaconinfo@dol.gov or by mail to:

Branch of Wage Surveys
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

Regarding any other wage determination matter such as conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to BCWD-Office@dol.gov or by mail to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2) If an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Requests for review and reconsideration can be submitted via email to dba.reconsideration@dol.gov or by mail to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210.

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END OF GENERAL DECISION"

EXHIBIT L

TOWN OF SWEETSER ROAD CUT PERMIT

OK

GENERAL ORDINANCE 2014- 1
AN ORDINANCE REGULATING THE EXCAVATION AND RESTORATION OF STREET AND ALLEY PAVEMENT (PAVED OR UNPAVED), WITHIN THE PUBLIC RIGHTS OF WAY UNDER THE TOWN OF SWEETSER JURISDICTION

WHEREAS, the Town has a legal duty to protect the safety and welfare of persons using the public right-of-ways for transportation purposes and,

WHEREAS, other facilities owned privately or by public or government operated utilities are permitted to occupy space within the same right-of-way and,

WHEREAS, the need to protect the safety and welfare of the public should not be compromised more than necessary by such other permitted uses.

NOW, THEREFORE, BE IT ORDAINED, by the Town Council of the Town of Sweetser, Indiana, as follows:

SECTION I

The attached Street Cut Procedure at Exhibit "A" incorporated herein, shall constitute the requirements for excavation and for restoration of streets and alleys within the Town of Sweetser, Indiana. The Street Cut Procedure as shown at Exhibit "A" are those adopted by Indiana State Highway Commission and Indiana Department of Environmental Management, as currently required and as may be subsequently amended.

SECTION II

All such excavation and restoration of streets and alleys shall be done under the requirements and supervision of the Town of Sweetser Maintenance Manager, or his designated inspector to insure conformity with procedures as set forth at attached format for the Town of Sweetser's Application for Permit to Excavate a Street or Alley Right of Way as shown in the attached Exhibit "B".

SECTION III

1. Any person, entity or its agents who fails to obtain a Permit shall be deemed to have committed an Ordinance Violation.

2. Any permitee authorized by the Town of Sweetser Maintenance Manager to excavate a Street or Alley Right of Way pursuant to the Application format attached at Exhibit "B" who fails to comply with any of the provisions as set forth in such application shall be deemed to have committed an ordinance violation.

Upon conviction of any Ordinance Violation mentioned above shall be fined not less than Fifty Dollars ($50.00) and not more than Two Thousand Five Hundred Dollars ($2,500.00). Each day a violation continues after written notice has been served upon the person, entity or its agent shall constitute a separate ordinance violation. No addition Notice under this Ordinance shall be required to initiate separate actions once an action has been filed against the person or entity violating the provisions of this ordinance. In addition to the fine mentioned above, the Town of Sweetser may recover all costs of remediation and of correction occasioned by failure to comply with the provisions of the Application for Permit to Excavate the Street or Alley Right of Way together with engineering fees, consultants fees, attorney fees and court costs incurred in the Grant County Indiana Courts by the Town of Sweetser, in enforcing the provisions of any Permit to Excavate.

SECTION IV

This ordinance shall be in full force and effect after its date of passage and publication.

PASSED ADOPTED this 22 day of May, 2014, by the Sweetser Town Council of the Town of Sweetser, Grant County, Indiana.

THE TOWN COUNCIL OF SWEETSER, INDIANA

Travis J. LeMaster

TRAVIS J. LEMASTER, PRESIDENT

STEPHEN L. KELLEY, VICE PRESIDENT

CHARLES V. BRIEDE

RICHARD P. GAMBLE

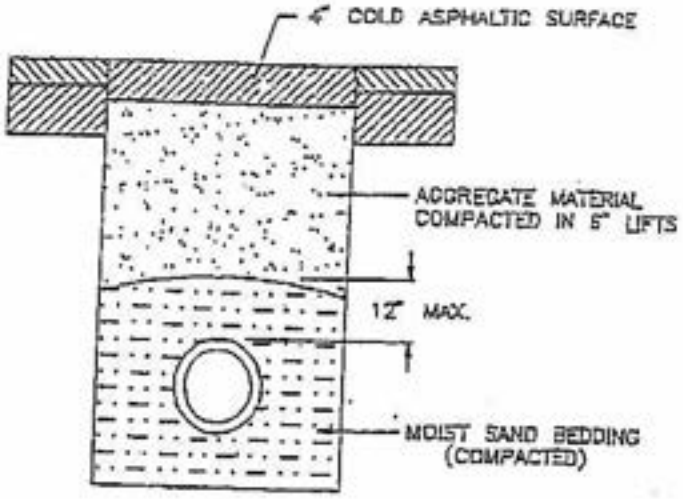
CHARLES K. DRAINE

ATTEST:

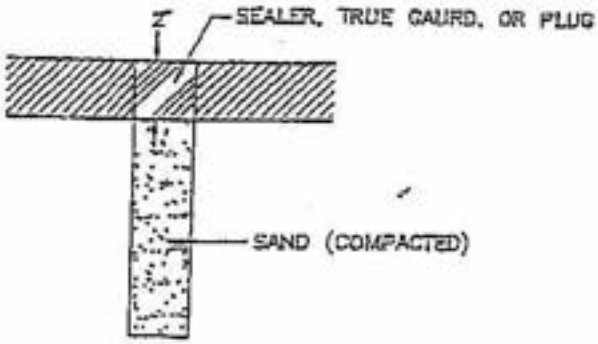
EILEEN D. LEMASTER
CLERK-TREASURER

This instrument was prepared by KIM A. ROGERS, ROGERS & ROGERS, P.C., 525 South Washington Street, Marion, IN 46953.

TEMPORARY REPAIR OF ASPHALT
OR CONCRETE STREET



REPAIR OF BARHOLES



ADJUSTMENT OF MANHOLES

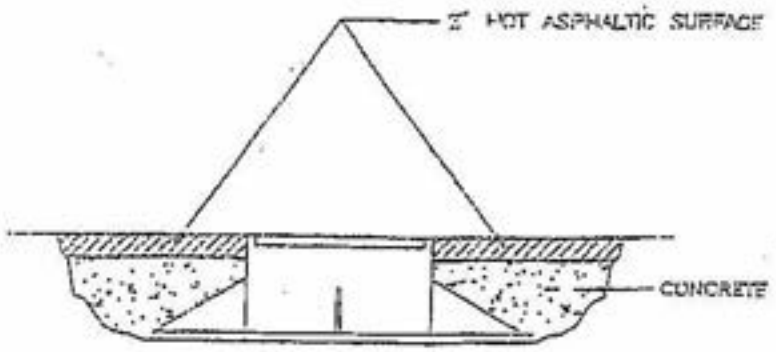


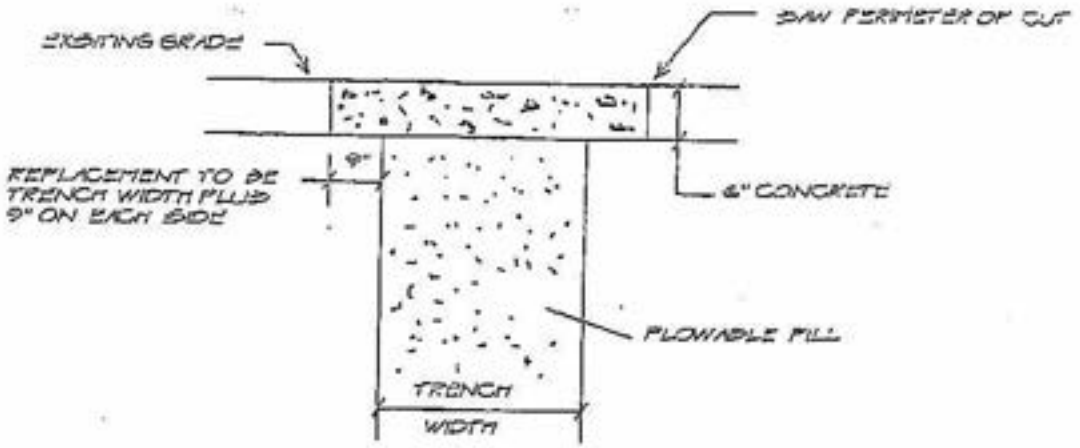
EXHIBIT "A"

temp1e03

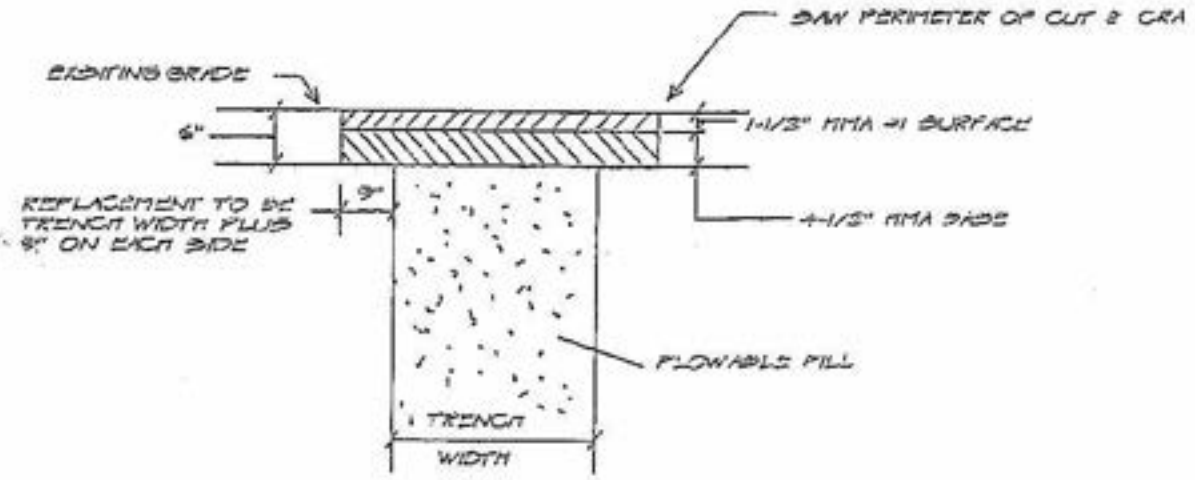
PERMANENT REPAIRS

G.O. #3-2004

1) NON-RESIDENTIAL STREETS:

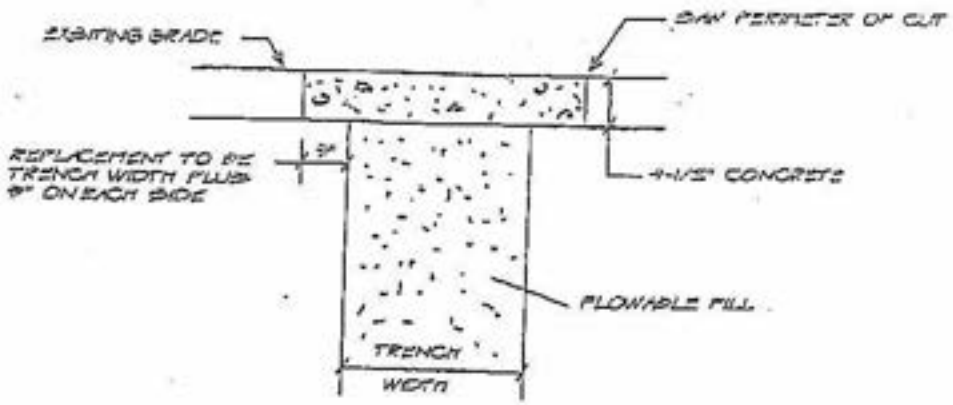


CONCRETE STREETS

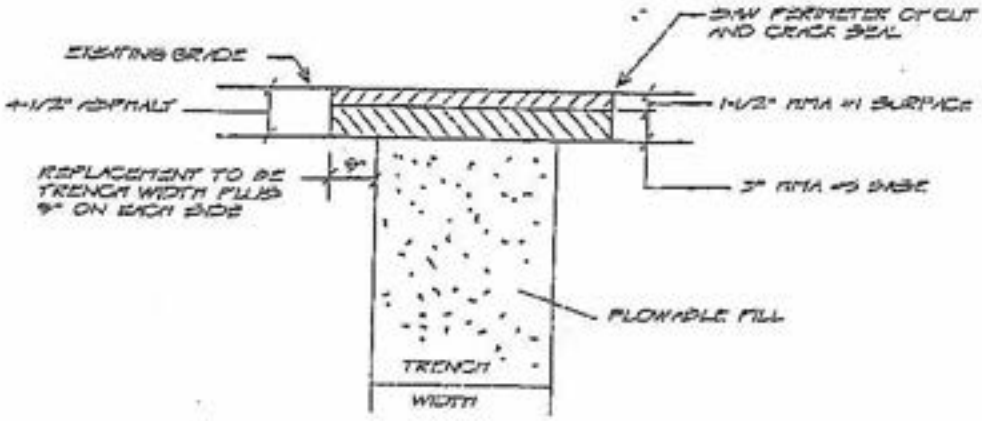


ASPHALT STREETS

2) RESIDENTIAL STREETS:

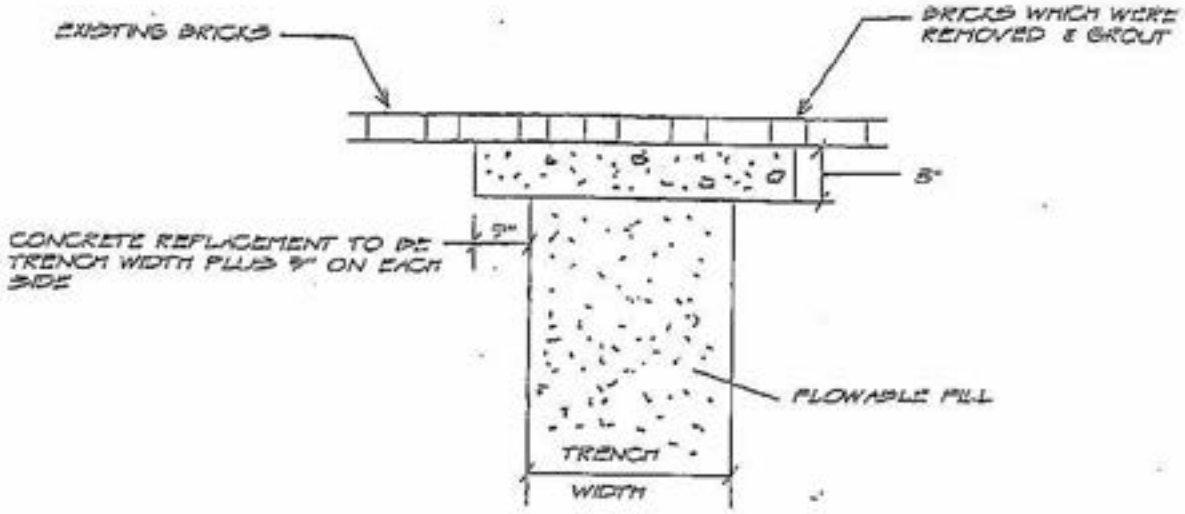


CONCRETE STREETS

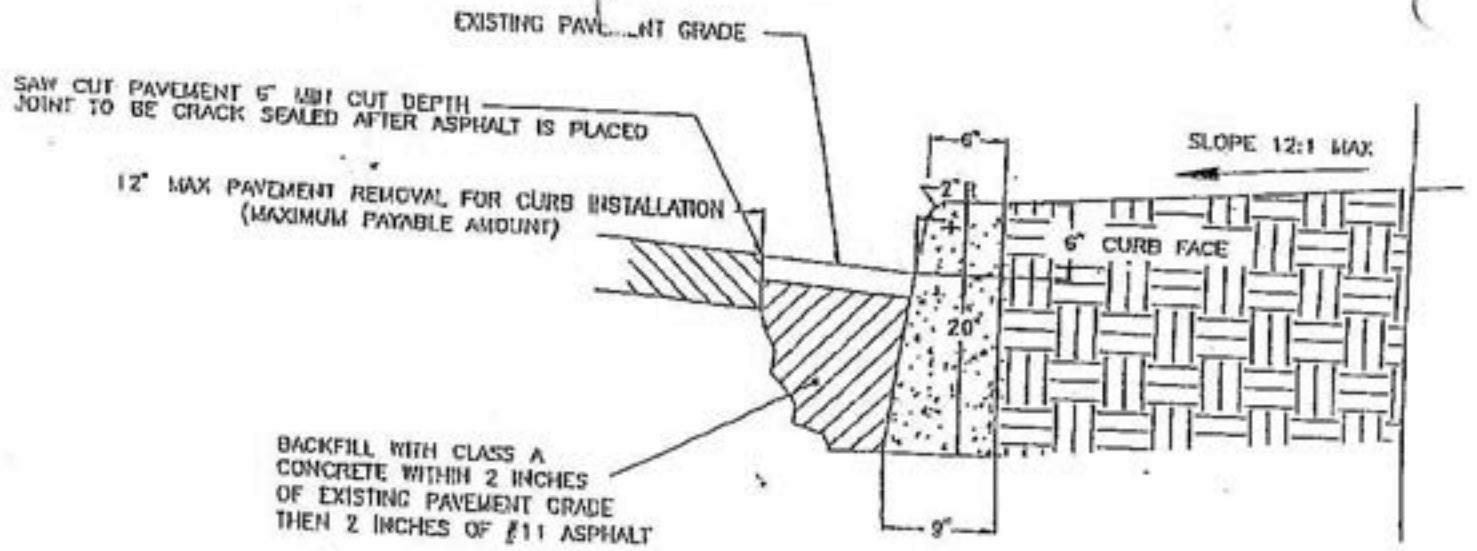


ASPHALT STREETS

NOT TO SCALE



BRICK STREETS

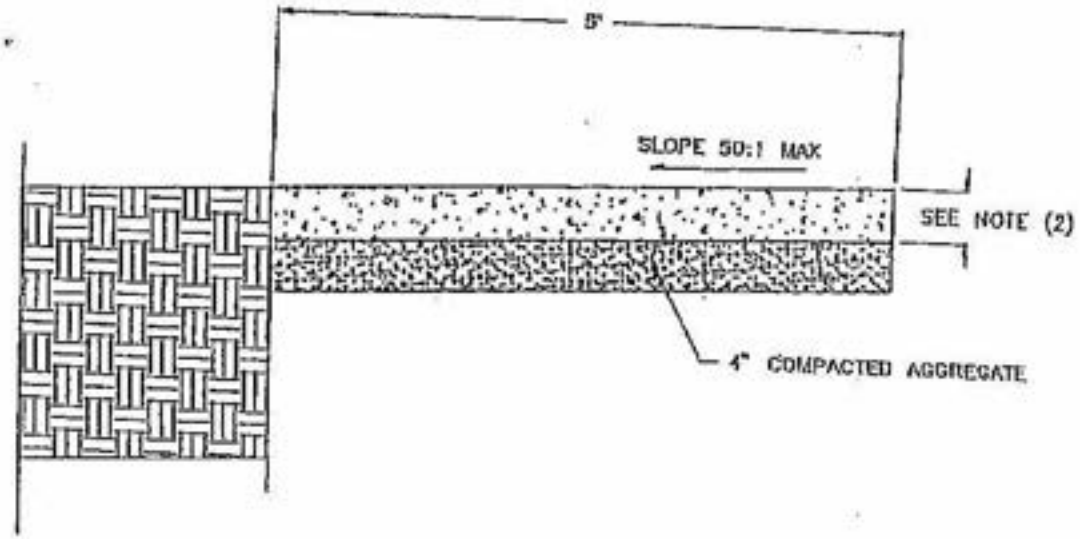


NOTES:

1) REMOVAL OF EXISTING CURB
2) NEW CURB SHALL HAVE CONTRACTION JOINTS (SAW CUT OR TOOLED) EVERY 10 FEET AND .5 INCH EXPANSION MATERIAL EVERY 100 F
3) NEW CURB TO BE PLACED ON COMPACTED OR UNDISTURBED BASE
4) NEW CURB SHALL HAVE 12:1 LONGITUDINAL SLOPE AT DRIVE APPROACHES, RAMPS, AND TERMINATION POINTS
5) DEPRESS CURB 4.5 INCHES FOR DRIVE APPROACHES
6) ALL CONCRETE SHALL BE CLASS A – 4 INCH MAX SLUMP
7) ALL DISTURBED/FILLED DIRT AREAS SHALL BE GRADED, SEEDED AND STRAWED
8) ALL ASPHALT CUTS WILL BE SAWCUT 12" BEYOND CURBFACE (THIS IS A MAXIMUM PAYABLE AMOUNT)
9) ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS

TYPICAL STRAIGHT CURB CROSS–SECTION

STRCURB

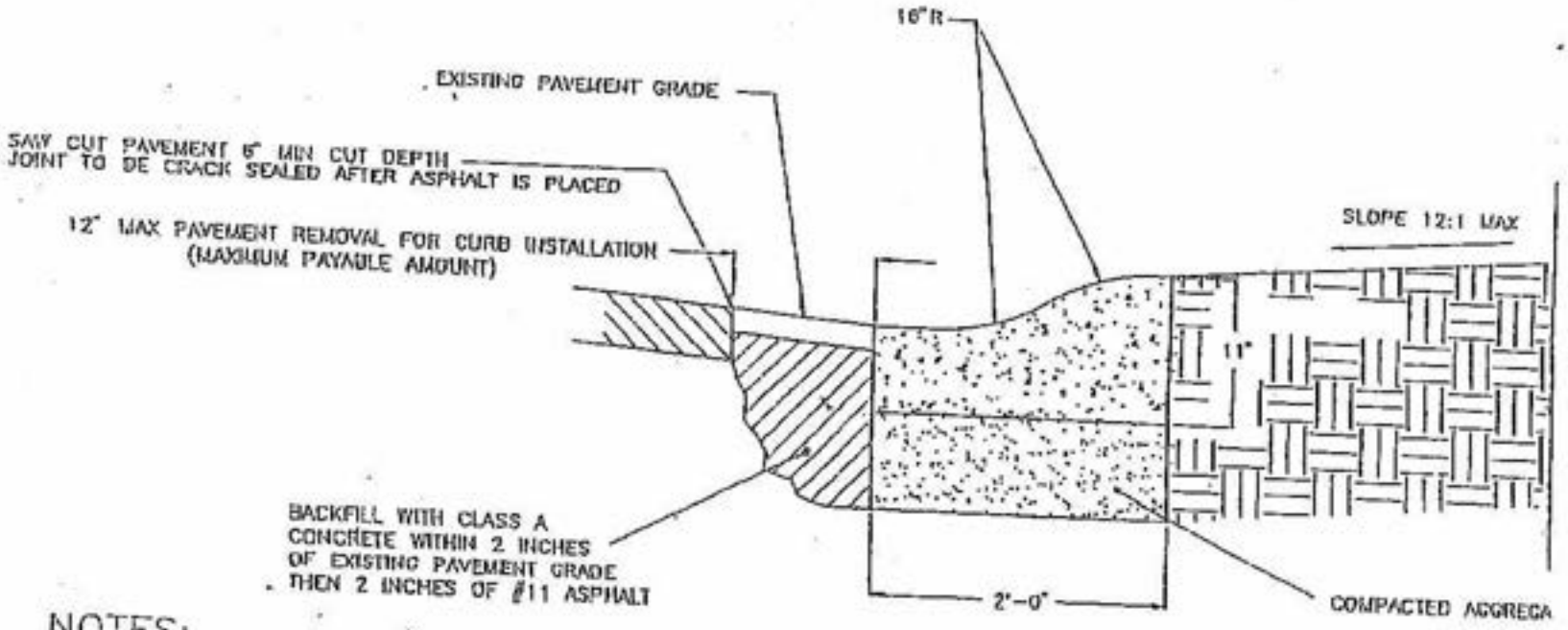


NOTES:

1) NEW SIDEWALK SHALL HAVE CONTRACTION JOINTS (TOOLED) EVERY 5 FOOT AND .5 INCH EXPANSION MATERIAL EVERY 50 FEET
2) SIDEWALKS SHALL BE 4 INCHES THICK/ 6 INCHES THICK IN DRIVE APPROACHES
3) ALL CONCRETE SHALL BE CLASS A – 4 INCH MAX SLUMP
4) NEW SIDEWALK SHALL BE PLACED ON COMPACTED OR UNDISTURBED BASE AND SHALL BE WETTED BEFORE POURING
5) NEW SIDEWALKS SHALL BE TROWELLED AND FINISHED TO A BROOM FINISH
6) EDGING AND DIVIDING TOOLS SHALL BE USED AFTER BROOMING OPERATION ON NEW SIDEWALKS
7) ALL DISTURBED/FILLED DIRT AREAS SHALL BE GRADED, SEEDED AND STRAWED
8) ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS

TYPICAL SIDEWALK CROSS–SECTION

SIDEWALK

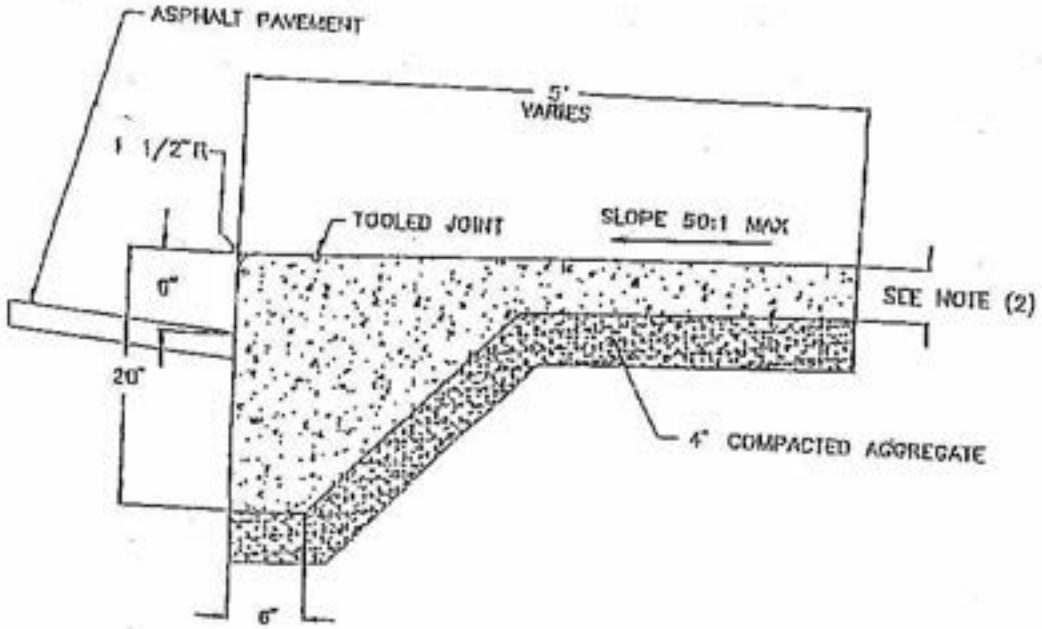


NOTES:

1) REMOVAL OF EXISTING CURB
2) NEW CURB SHALL HAVE CONTRACTION JOINTS (SAW CUT OR TOOLED) EVERY 10 FEET AND .5 INCH EXPANSION MATERIAL EVERY 100 FI
3) NEW CURB TO BE PLACED ON COMPACTED OR UNDISTURBED BASE
4) NEW CURB SHALL HAVE 12:1 LONGITUDINAL SLOPE AT DRIVE APPROACHES, RAMPS, AND TERMINATION POINTS
5) DEPRESS CURB 4.5 INCHES FOR DRIVE APPROACHES
6) ALL CONCRETE SHALL BE CLASS A – 4 INCH MAX SLUMP
7) ALL DISTURBED/FILLED DIRT AREAS SHALL BE GRADED, SEEDED AND STRAWED
8) ALL ASPHALT CUTS WILL BE SAWCUT 12" BEYOND CURBFACE (THIS IS A MAXIMUM PAYABLE AMOUNT)
9) ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS

TYPICAL ROLL CURB CROSS-SECTION

ROLLCURB



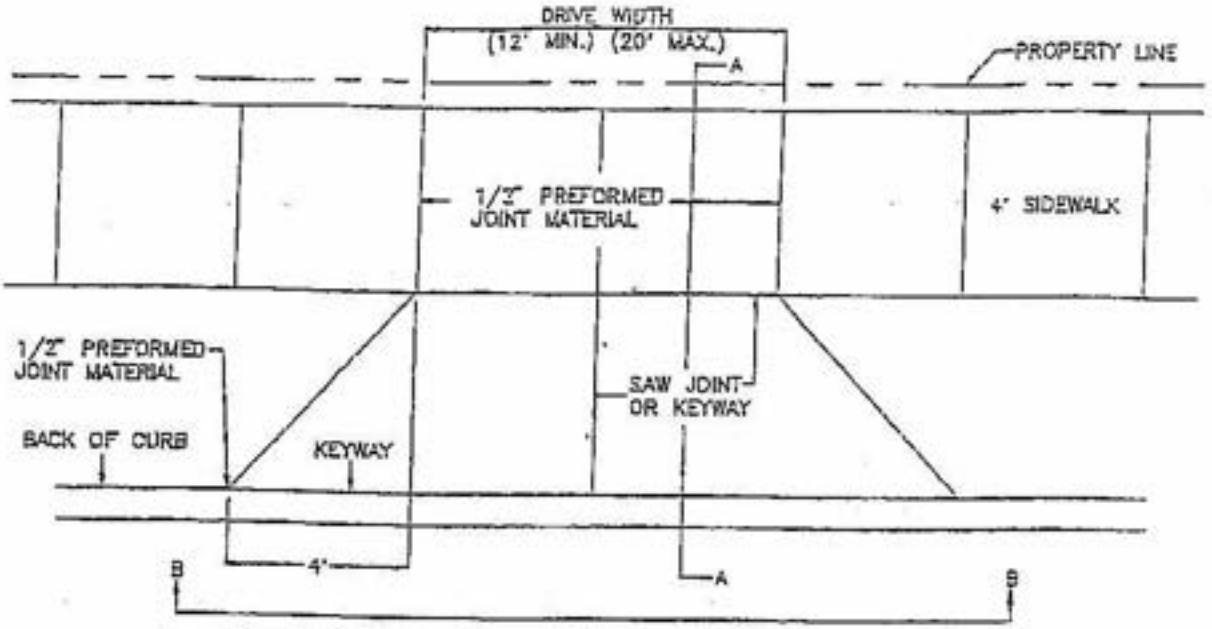
NOTES:

1) NEW SIDEWALK SHALL HAVE CONTRACTION JOINTS (TOOLED) EVERY 5 FOOT AND .5 INCH EXPANSION MATERIAL EVERY 50 FEET
2) SIDEWALKS SHALL BE 4 INCHES THICK/ 6 INCHES THICK IN DRIVE APPROACHES
3) ALL CONCRETE SHALL BE CLASS A – 4 INCH MAX SLUMP
4) NEW SIDEWALK SHALL BE PLACED ON COMPACTED OR UNDISTURBED BASE AND SHALL BE WETTED BEFORE POURING
5) NEW SIDEWALKS SHALL BE TROWELLED AND FINISHED TO A BROOM FINISH
6) EDGING AND DIVIDING TOOLS SHALL BE USED AFTER BROOMING OPERATION ON NEW SIDEWALKS
7) ALL DISTURBED/FILLED DIRT AREAS SHALL BE GRADED, SEEDED AND STRAWED
8) ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS

TYPICAL CURB AND SIDEWALK COMBINATION

CURBSIDE

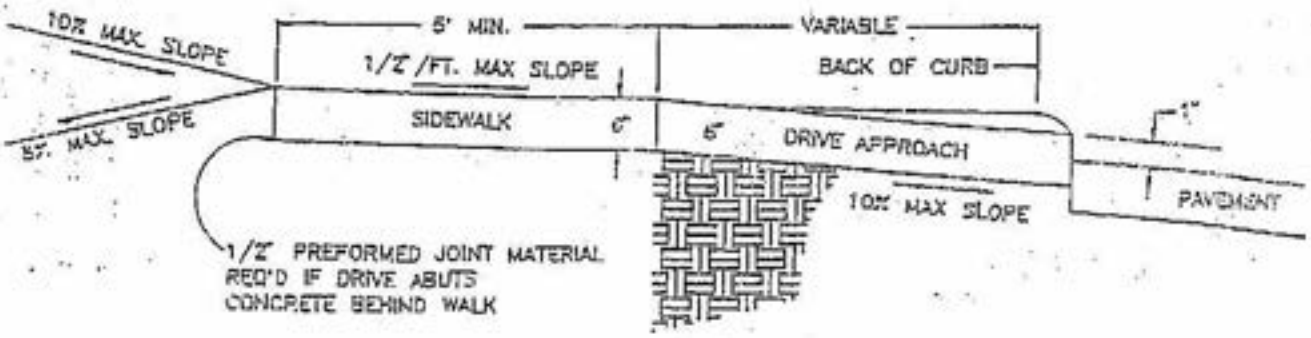
TYPICAL RESIDENTIAL DRIVE APPROACH DETAIL





VIEW FROM STREET LEVEL

SECTION B–B



SECTION A–A

DRIVEAPP

TOWN OF SWEETSER

APPLICATON FOR PERMIT TO EXCAVATE IN STREET OR ALLEY RIGHT-OF-WAY

DATE:_____, 20_____

PERSON, FIRM OR CORP. REQUESTING PERMIT

_____ _____ _____

NAME ADDRESS PHONE

CONTRACTOR_____

LOCATION OF CUT:_____

_____

SIZE OF CUT:_____

REASON FOR CUT:_____

ALL WORK SHALL BE COMPLETED WITHIN_____ DAYS AFTER THIS APPLICATION IS APPROVED.

THE PERSON, FIRM OR CORP. REQUESTING THIS PERMIT HEREBY AGREES TO THE FOLLOWING:

1. To comply with all conditions and requirements of the attached Street Cutting Procedure shown at Exhibit "A".

2. To post in a conspicuous manner the applicants name in at least three inch letter at the excavation site until such excavation is filled and completed.

3. To protect the excavation with barricades and lights and direct traffic movement during construction and at all times until a permanent pavement replacement can be made. All signs, lights and barricades and their use shall be in accordance with the INDIANA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES in force at the time this permit is issued.

4. To backfill all excavation under, or within the trench depth of any pavement, curb or sidewalk with grade "B" Borrow as set out in Section 211 of the Indiana State Highway Standard Specifications.

5. To replace all pavement, curb and sidewalk removed in a good and workmanlike manner in accordance with Section 305 of the Indiana State Highway Standard Specifications. Unless otherwise approved by the Street Superintendant at the time the permit is issued, all street pavement cuts shall be repaired immediately after the excavation is backfilled with a minimum of two (2) inches of asphaltic material (H.A.C. or winter patching material). After the trench has settled, the temporary asphalt patch shall be removed and replaced with a permanent repair consisting of a minimum of six (6) inches of concrete base and two (2) inches of H.A.C. surface. The H.A.C. surface shall be placed within five (5) days of placing the concrete base.

6. To assume any and all liability and hold the Town of Sweetser harmless for all damage to any person or property which may arise from neglect or want of skill or want of care on the part of the applicant or his employees in the prosecution of the work and to furnish a bond guaranteeing the above and also that all work will be done in accordance with this permit and that for a period of one (1) year after completion and acceptance of the work the permit holder shall guarantee the repair of all faulty work. ***Such indemnification shall include any engineering consultants fees, attorney fees and court costs incurred by the Town of Sweetser, in enforcing the provisions of this Permit to Excavate.***

CALL THE TOWN HALL 384-5333 FOR INSPECTION OF EXCAVATION BEFORE PAVEMENT IS REPLACED AND WHEN REPAIR IS COMPLETE.

APPLICANT:_____

*TITLE:*_____

THIS APPLICATION EXAMINED AND APPROVED DATE:_____

_____

Sewer/Street Superintendent

WARNING

CALL BEFORE YOU DIG 1-800-382-5544 TO HAVE ALL UNDERGROUND FACILITIES LOCATED. YOU WILL BE RESPONSIBLE FOR ANY DAMAGE IF YOU FAIL TO CALL.

EXHIBIT "B"

TOWN OF SWEETSER

APPLICATON FOR PERMIT TO EXCAVATE IN STREET OR ALLEY RIGHT-OF-WAY

DATE:_____, 20_____

PERSON, FIRM OR CORP. REQUESTING PERMIT

_____ _____ _____

NAME ADDRESS PHONE

CONTRACTOR_____

LOCATION OF CUT:_____

_____

SIZE OF CUT:_____

REASON FOR CUT:_____

ALL WORK SHALL BE COMPLETED WITHIN_____ DAYS AFTER THIS APPLICATION IS APPROVED.

THE PERSON, FIRM OR CORP. REQUESTING THIS PERMIT HEREBY AGREES TO THE FOLLOWING:

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CALL THE TOWN HALL 384-5333 FOR INSPECTION OF EXCAVATION BEFORE PAVEMENT IS REPLACED AND WHEN REPAIR IS COMPLETE.

APPLICANT:_____

*TITLE:*_____

THIS APPLICATION EXAMINED AND APPROVED DATE:_____

_____

Sewer/Street Superintendent

WARNING

CALL BEFORE YOU DIG 1-800-382-5544 TO HAVE ALL UNDERGROUND FACILITIES LOCATED. YOU WILL BE RESPONSIBLE FOR ANY DAMAGE IF YOU FAIL TO CALL.

EXHIBIT "B"

(NO TEXT FOR THIS PAGE)

ATTACHMENT D

Indiana Department of Environmental Management (IDEM) Construction Permit

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

100 N. Senate Avenue • Indianapolis, IN 46204
(800) 451-6027 • (317) 232-8603 • Fax (317) 233-6647 • www.idem.IN.gov

Mike Braun
Governor

Clint Woods
Commissioner

July 31, 2026

VIA ELECTRONIC MAIL

Kyle Taylor
Town of Sweetser
113 N Main Street
Sweetser, IN 46987

Dear Mr. Taylor:

Re: 327 IAC 3 Construction
Permit Application
Sweetser Wastewater Improvements
SRF Project Permit Approval No. L-0816
Sweetser, Indiana
Grant County

The application, plans and specifications, and supporting documents for the above-referenced project have been reviewed and processed in accordance with rules adopted under 327 IAC 3. Enclosed is the Construction Permit (Approval No. L-0816), which applies to the construction of the above-referenced proposed water pollution treatment/control facility improvements located at the site of the existing treatment facility at 0923 North County Road 400 West in Marion, Indiana.

Please review the enclosed permit carefully and become familiar with its terms and conditions. In addition, it is imperative that the applicant, consulting architect/engineer (A/E), inspector, and contractor are aware of these terms, conditions, and reporting and testing requirements.

It should be noted that any person affected or aggrieved by the agency's decision in authorizing the construction of the above-referenced facility may, within fifteen (15) days from date of mailing, appeal by filing a request with the Office of Administrative Law Proceedings for an adjudicatory hearing in accordance with IC 4-21.5-3-7 and IC 13-15-6. The procedure for appeal is outlined in more detail in Part III of the attached construction permit.

The approval applies to the technical acceptability of the submitted plans and does not imply that the entire project is eligible for SRF financing or that funds are available.

Plans and specifications were prepared by DCCM, certified by Ricardo Juan Paredes Aronsohn, P.E., and submitted for review on June 29, 2026, with additional information submitted on July 24, and July 29, 2026.

Any technical/engineering questions concerning this permit may be addressed to Lauren Yumibe of our staff, at 317/233-1764.

Sincerely,

Kevin D. Czerniakowski

Kevin D. Czerniakowski, P.E.
Section Chief
Facility Construction and
Engineering Support Section
Office of Water Quality

Project No. SRF-0861
Enclosures
cc: Grant County Health Department
Ricardo Juan Paredes Aronsohn, P.E., DCCM

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
AUTHORIZATION FOR CONSTRUCTION OF
WATER POLLUTION TREATMENT/CONTROL FACILITY
UNDER 327 IAC 3

DECISION OF APPROVAL

The Town of Sweetser, in accordance with the provisions of IC 13-15 and 327 IAC Article 3, is hereby issued a permit to construct the proposed water pollution treatment/ control facility improvements to be located at the site of the existing treatment facility at 0923 North County Road 400 West in Marion, Indiana. The permittee is required to comply with requirements set forth in Parts I, II and III hereof. The permit is effective pursuant to IC 4-21.5-3-4(d). If a petition for review and a petition for stay of effectiveness are filed pursuant to IC 13-15-6, an Environmental Law Judge may be appointed for an adjudicatory hearing. The force and effect of any contested permit provision may be stayed at that time.

NOTICE OF EXPIRATION DATE

Authorization to initiate construction of these water pollution treatment/control facility improvements shall expire at midnight one year from the date of issuance of this construction permit. In order to receive authorization to initiate construction beyond this date, the permittee shall submit such information and forms as required by the Indiana Department of Environmental Management. It is requested that this information be submitted sixty (60) days prior to the expiration date to initiate construction. This permit shall be valid for a period of five (5) years from the date below for full construction completion.

Issued on July 31, 2026, for the Indiana Department of Environmental Management.

Kevin D. Czerniakowski

Kevin D. Czerniakowski, P.E.
Section Chief
Facility Construction and
Engineering Support Section
Office of Water Quality

WATER POLLUTION TREATMENT/CONTROL FACILITY DESCRIPTION

The Sweetser Wastewater Treatment Plant is a Class I, 0.20 MGD treatment facility consisting of influent flow measurement, influent screening, single stage nitrification activated sludge, clarification, ultraviolet light disinfection, post aeration, effluent flow measurement, and aerobic digestion. Solids are hauled off-site and landfilled by contract haul. The facility will replace its existing drum screen, add a screw press to their sludge handling train, and conduct several electrical and controls upgrades both onsite and throughout its connecting lift stations. The plant rating is unchanged.

The proposed screen shall be a rotary drum screen with a capacity of 0.865 MGD, equivalent to the maximum flow capacity of the plant. A variance is granted to allow installation of the proposed drum screen without redundancy and a preceding coarse bar screen. In the event of failure, the screen will be bypassed, and flows will be directed towards the flow diversion structure. Pursuant to headworks improvements, the influent flow meter will also be replaced and installed in a meter vault.

The facility will add a screw press to replace its current geobags as part of sludge dewatering. Flows will exit the existing aerobic digester building and flow into the screw press. Grinder pumps will convey drainage back to the treatment train. Dewatered sludge will be stored in existing 20-yard dumpsters for contract haul.

Modifications are proposed for the Kelly, Bank, Eagle Drive, and Short Street Lift Stations which shall consist of controls and structural upgrades. No modifications are proposed to their connecting force mains, save for the Kelly Lift Station to add a flow meter and bypass piping. Design pumping rates and total dynamic head are unchanged. The Case Lift Station will be decommissioned and replaced with 3 grinder pump stations at the connecting properties. Flushing stations will be installed every 1,500 feet of the converted force main to ensure flows are conveyed at a minimum fluid velocity of 2 ft/s. An alternate to technical standards per 327 IAC 3-6-32 is granted to permit the installation of low-pressure sewer of less than 4 inches in diameter for the grinder pump connections. The grinder pump stations shall be privately owned and maintained.

CONDITIONS AND LIMITATIONS TO THE AUTHORIZATION FOR CONSTRUCTION OF WATER POLLUTION TREATMENT/CONTROL FACILITY

During the period beginning on the effective date of this permit and extending until the expiration date, the permittee is authorized to construct the above-described water pollution treatment/control facility. Such construction shall conform to all provisions of State Rule 327 IAC 3 and the following specific provisions:

PART I

SPECIFIC CONDITIONS AND LIMITATIONS TO THE CONSTRUCTION PERMIT

Unless specific authorization is otherwise provided under the permit, the permittee shall comply with the following conditions:

1. Additional treatment facilities shall be installed if the proposed facilities prove to be inadequate or cannot meet applicable federal or state standards.

2. Any local permits required for this project, along with zoning or easement acquisition, shall be obtained before construction is initiated.

3. After construction, this agency shall be given advance notice of the start-up of the facilities.

4. If pollution or nuisance conditions are created, immediate corrective action will be taken by the permittee.

5. If construction is located within a designated floodway, a permit may also be required from the Department of Natural Resources prior to start of construction. It is the permittee's responsibility to coordinate with that agency and obtain any required approvals if applicable. Questions may be directed to the Technical Services Section, Division of Water at 317/232-4160.

6. If this project includes a change in design flow, addition of new treatment unit(s), or modification/removal of existing treatment unit(s), an NPDES Permit modification will likely be required. This would include any CSO treatment addition/modification. Questions may be directed to the NPDES Permit Section, Office of Water Quality at 317/233-0469

7. The sewage treatment plant must be capable of providing the same degree of treatment during construction as prior to of the existing facilities. If this is not feasible, the plans for reduced degree of treatment must be submitted to the Department of Environmental Management for consideration of approval.

Failure to meet guidelines as set forth in the above conditions could be subject to enforcement proceedings as provided by 327 IAC 3-5-3.

PART II

GENERAL CONDITIONS

1. No significant or material changes in the scope of the plans or construction of this project shall be made unless the following provisions are met:

    a. Request for permit modification is made 60 days in advance of the proposed significant or material changes in the scope of the plans or construction;

    b. Submit a detailed statement of such proposed changes;

    c. Submit revised plans and specifications including a revised design summary; and

    d. Obtain a revised construction permit from this agency.

2. This permit may be modified, suspended, or revoked for cause including, but not limited to the following:

    a. Violation of any term or conditions of this permit:

    b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts.

3. Nothing herein shall be construed as guaranteeing that the proposed water pollution treatment/control facility shall meet standards, limitations or requirements of this or any other agency of state or federal government, as this agency has no direct control over the actual construction and/or operation of the proposed project.

PART III

NOTICE OF RIGHT TO ADMINISTRATIVE REVIEW

Anyone wishing to challenge this construction permit must do so by filing a Petition for Administrative Review with the Office of Administrative Law Proceedings (OALP), and serving a copy of the petition upon IDEM. The requirements for filing a Petition for Administrative Review are found in IC 4-21.5-3-7, IC 13-15-6-1 and 41 IAC 2-2-1. A summary of the requirements of these laws is provided below.

A Petition for Administrative Review must be filed with the Office of Administrative Law Proceedings (OALP) within fifteen (15) days of the issuance of this notice (eighteen (18) days if notice was received by U.S. Mail), and a copy must be served upon IDEM. Addresses are:

Director
Office of Administrative Law Proceedings
Indiana Government Center North
Room 802
100 North Senate Avenue
Indianapolis, Indiana 46204

Commissioner
Indiana Department of Environmental Management
Indiana Government Center North
Room 1301
100 North Senate Avenue
Indianapolis, Indiana 46204

The petition must contain the following information:

1. The name, address and telephone number of each petitioner.
2. A description of each petitioner's interest in the permit.
3. A statement of facts demonstrating that each petitioner is:
    a. a person to whom the order is directed;
    b. aggrieved or adversely affected by the permit; or
    c. entitled to administrative review under any law.
4. The reasons for the request for administrative review.
5. The particular legal issues proposed for review.
6. The alleged environmental concerns or technical deficiencies of the permit.
7. The permit terms and conditions that the petitioner believes would be appropriate and would comply with the law.
8. The identity of any persons represented by the petitioner.
9. The identity of the person against whom administrative review is sought.
10. A copy of the permit that is the basis of the petition.
11. A statement identifying petitioner's attorney or other representative, if any.

Failure to meet the requirements of the law with respect to a Petition for Administrative Review may result in a waiver of the Petitioner's right to seek administrative review of the permit. Examples are:

1. Failure to file a Petition by the applicable deadline;
2. Failure to serve a copy of the Petition upon IDEM when it is filed; or
3. Failure to include the information required by law.

If Petitioner seeks to have a permit stayed during the administrative review, he or she may need to file a Petition for a Stay of Effectiveness. The specific requirements for such a Petition can be found in 41 IAC 2-2-1 and 41 IAC 2-2-3.

Pursuant to IC 4-21.5-3-17, OALP will provide all parties with notice of any pre-hearing conferences, preliminary hearings, hearings, stays, or orders disposing of the review of this action. Those who are entitled to notice under IC 4-21.5-3-5(b) and would like to obtain notices of any pre-hearing conferences, preliminary hearings, hearings, stays, or orders disposing of the review of this action without intervening in the proceeding must submit a written request to OALP at the address above.

More information on the review process is available at the website for the Office of Administrative Law Proceedings at http://www.in.gov/oalp.

ATTACHMENT E

Solar Feasibility Study (CE Solutions Report)

PROSPECTIVE BIDDERS:

PLEASE USE THIS DOCUMENT AS A REFERENCE ONLY - THE SCOPE OF WORK ASSOCIATED WITH THE INSTALLATION AND ROOF IMPROVEMENTS DUE TO THE SOLAR FIELD HAVE BEEN REMOVED FROM THE PROJECT. FURTHERMORE, THE REPORT RECOMMENDS FULL ROOF REPLACEMENT.

BIDDERS TO FOLLOW GUIDANCE AS PROVIDED ON THE PLANS AND CONTRACT ITEMS FOR ASSOCIATED WORK ON THE ROOF AND CEILING IMPROVEMENTS.

CE Solutions
structural engineers

January 30, 2026

Mr. Ricardo Paredes
Project Manager – Water/Wastewater
DCCM
8770 North Street
Suite 110
Fishers, IN 46038

Re: Solar Field – Feasibility Study
Structural Engineering Services
Wastewater Treatment Plant Improvements Project
Sweetser, Indiana

CE Solutions Project No: 25-197

Dear Ricardo:

We have completed a structural feasibility study of the existing roof framing at the Wastewater Treatment Plant in Sweetser, Indiana. The study has been performed at RQAW's request as part of the above-referenced project led by RQAW to study if structural modifications/improvements are needed for the existing roof structural system to support the desired rooftop solar field. The following is a summary of our analysis and recommendations.

EXISTING CONDITIONS

The existing roof structure consists of prefabricated wood trusses with metal plate connections spaced at 4'-0" on center and spanning 54' 6". The wooden trusses are constructed with 2x6 members for the top and bottom chords and 2x4 members for the webs. Bracing the tops of the trusses are 2x4 purlins spaced at 2'- 0" on center. On top of the purlins is ½" plywood sheathing with metal roof panels above. The trusses are supported at each end by two 2x12 header beams spanning 8'-0" in between 6x6 wood posts.

ANALYSIS/EVALUATION

ROOF TRUSSES

The truss geometry was measured on site, and the existing loading and geometry was modeled in Bentley's RAM Elements software. The roof trusses' capacity was analyzed with the addition of a 5 pounds per square foot (psf) solar panel load on the roof above them along with existing rooftop dead and live loads. Analysis showed the roof trusses directly under solar panels will need additional reinforcement to safely support the new loading conditions.

HEADER BEAMS

The header beams supporting the roof trusses were analyzed to account for the additional loading due to the solar panels. Analysis showed each header beam supporting a truss with additional solar panel roof loading will need to be reinforced as well.

CE Solutions, Inc.
8770 North Street
Suite 100
Fishers, IN 46038
317.818.1912

cesolutionsinc.com

PLYWOOD SHEATHING

The existing plywood that spans the wood trusses and supports the metal roof deck above appears to have extensive mold damage affecting it. The mold is demonstrative of moisture conditions in the field that reduce the structural integrity of the sheathing.

DROPPED CEILING

For the case of a dropped ceiling being added underneath the improved trusses, a dead load was applied to the bottom chord of the trusses in analysis. If this potential option is selected, the truss will require additional reinforcement to safely support the new load.

RECOMMENDATIONS

The following recommendations are proposed for reinforcing the existing roof structure.

ROOF TRUSSES

To reinforce the existing roof trusses, CE Solutions recommends mirroring/duplicating the existing members and connecting these new members to the existing truss. This entails attaching 2x6 members along the length of the top chord members and the bottom chord members and attaching 2x4 members along the lengths of the interior webs. At the intersections of web and chord members, there will be plywood gusset plates on the outsides of both trusses with nails joining the new and existing members.

HEADER BEAMS

To reinforce the existing header beams, CE Solutions recommends adding two new 2x12 members to the existing boards. The new boards will be connected to the posts with supplemental nailing.

PLYWOOD SHEATHING

It is recommended that the existing plywood sheathing is removed and replaced with new plywood sheathing. CE Solutions also recommends applying a protective coating to protect the wood from future mold/water damage that could happen from the climate conditions.

DROPPED CEILING

If the option for a dropped ceiling is pursued, in addition to the reinforcement required to improve trusses for solar panel additions as outlined above, some web members will require a larger size member to support the ceiling attached below it.

OPINION OF PROBABLE CONSTRUCTION COST

CE Solutions anticipates the structural improvements to cost an estimated $7/sf of improvements. The cost impact of different options of percentage of roof to be covered by solar panels is shown below:

25% Coverage	$15,500
50% Coverage	$31,000
100% Coverage	$62,000

CONCLUDING REMARKS

Please note that our structural feasibility study was limited strictly to those items identified in this summary and to the extent noted. Should you have any questions or wish to discuss our structural analysis further, please do not hesitate to contact the undersigned. Thank you again for choosing CE Solutions for your structural engineering needs on this very important project.

Very truly yours,



Josh Stone, EI
Project Manager

ATTACHMENT F

2013 Sweetser Wastewater Treatment Plant Bid Set

PROSPECTIVE BIDDERS:

PLEASE USE THIS DOCUMENT AS A REFERENCE ONLY.

NOTE THAT THIS PLAN SET IS FROM THE 2013 BID PHASE FOR THE CONSTRUCTION OF THE SWEETSER WASTEWATER TREATMENT PLANT (WWTP) PREPARED BY TRIAD ASSOCIATES INC, AND NOT THE AS-BUILTS.

DCCM IS NOT RESPONSIBLE FOR ANY DISCREPANCIES AND/OR DEVIATIONS FROM THE WORK SHOWN ON THE 2013 PLAN SET PREPARED BY TRIAD ASSOCIATES INC, AND IS THE RESPONSIBILITY OF THE BIDDER TO UNDERSTAND THE EXISTING CONDITIONS OF THE WWTP.

PROPOSED WASTEWATER TREATMENT PLANT PROJECT

FOR THE

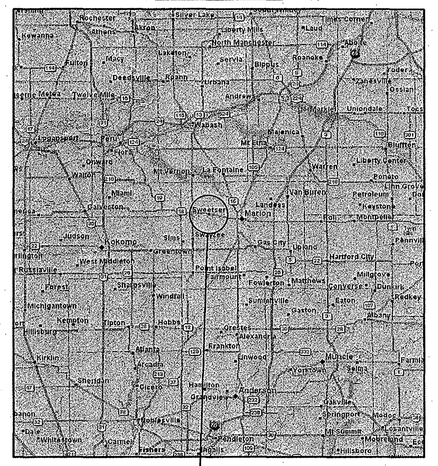
TOWN OF SWEETSER
GRANT COUNTY, IN.

MAY 2013

SHEET INDEX

SHEET NO.	DESCRIPTION
1	TITLE SHEET AND INDEX
G1	PROPOSED FLOW SCHEMATIC AND HYDRAULIC PROFILE
C1	EXISTING PROJECT SITE PLAN
C2	PROPOSED SITE PLAN
A1	PROPOSED BUILDING LAYOUT
A2	PROPOSED LABORATORY FLOOR PLAN
A3	PROPOSED UV/BLOWER BUILDING FLOOR PLAN
A4	PROPOSED ROOM FINISH AND DOOR/WINDOW SCHEDULES
A5	PROPOSED WALL SECTIONS
A6	PROPOSED BUILDING ELEVATIONS
A7	PROPOSED STORAGE STRUCTURE
S1	PROPOSED TREATMENT PLANT PLAN
S2	PROPOSED TREATMENT PLANT SECTIONS AND DETAILS
S3	PROPOSED CLARIFIER PLAN, SECTION AND DETAILS
S4	PROPOSED UV/POST AERATION TANK PLAN, SECTIONS AND DETAILS, AND PROPOSED BLOWER PAD PLAN AND SECTION
S5	STRUCTURAL DETAILS
P1	PROPOSED PLANT PIPING PLAN
P2	PROPOSED ROTO SCREEN PLAN AND DETAILS
P3	PROPOSED TREATMENT PLANT PLAN AND SECTION
P4	PROPOSED TREATMENT PLANT SECTION AND DETAILS
P5	PROPOSED CLARIFIER PLAN, SECTIONS AND DETAILS
P6	PROPOSED UV/POST AERATION TANK PLAN, SECTIONS AND DETAILS
P7	PROPOSED OUTFALL SEWER PLAN AND PROFILE
P8	PROPOSED WELL DETAILS
P9 & P10	MISCELLANEOUS DETAILS
LS1	PROPOSED FORCEMAIN/L.S. SITE PLAN
LS2 & LS3	EXISTING FORCEMAIN PLAN AND PROFILE
LS4	PROPOSED FORCEMAIN PLAN AND PROFILE
LS5 & LS6	PROPOSED LIFT STATION SITE AND DETAILS
LS7	PROPOSED LIFT STATION MISCELLANEOUS DETAILS
E1	PROPOSED ELECTRICAL SITE PLAN
E2	PROPOSED PLANT ELECTRICAL PLAN
E3	PROPOSED PLANT LIGHTING PLAN
E4	PROPOSED LABORATORY ELECTRICAL PLAN
E5	PROPOSED ELECTRICAL RISER DIAGRAM AND ELECTRICAL SCHEDULES

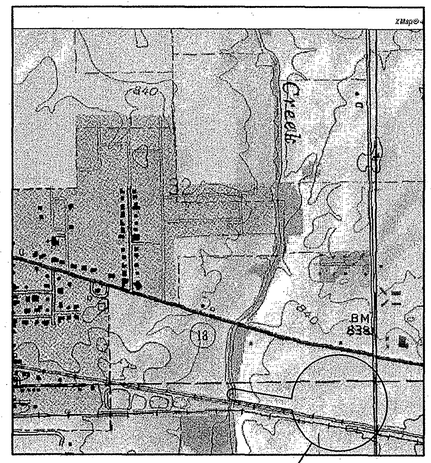
AREA MAP



AREA LOCATION

N

LOCATION MAP



PROJECT LOCATION

TOWN COUNCIL

TRAVIS LeMASTER, PRESIDENT

STEVE KELLEY, VICE PRESIDENT

RICHARD GAMBLE, MEMBER

CHUCK BRIEDE, MEMBER

CARL MOORMAN, MEMBER

TOWN CLERK-TREASURER

EILEEN LeMASTER

TOWN ATTORNEY

KIM ROGERS

TOWN MAINTENANCE MANAGER

DEVIN COLE

PLANS PREPARED BY:

TRIAD ASSOCIATES INC.
5835 LAWTON LOOP EAST DRIVE
INDIANAPOLIS, INDIANA 46216
PHONE: 317-377-5230 FAX: 317-377-5241

NOTE:
ADDITIONAL RIGHT-OF-WAY OR EASEMENTS MAY NEED TO BE ACQUIRED FOR INSTALLATION OF SEWER.

DON'T DIG BLIND
CALL BEFORE YOU DIG
within INDIANA
1-800-382-5544
outside INDIANA
1-800-428-5200
"TOLL FREE"

PER INDIANA STATE LAW IS-69-1991, IT IS AGAINST THE LAW TO EXCAVATE WITHOUT NOTIFYING THE UNDERGROUND LOCATION SERVICE TWO (2) WORKING DAYS BEFORE COMMENCING WORK.

NOTE: CONTRACTOR TO VERIFY ALL UTILITY LOCATIONS PRIOR TO THE START OF CONSTRUCTION

THESE PLANS CERTIFIED BY:

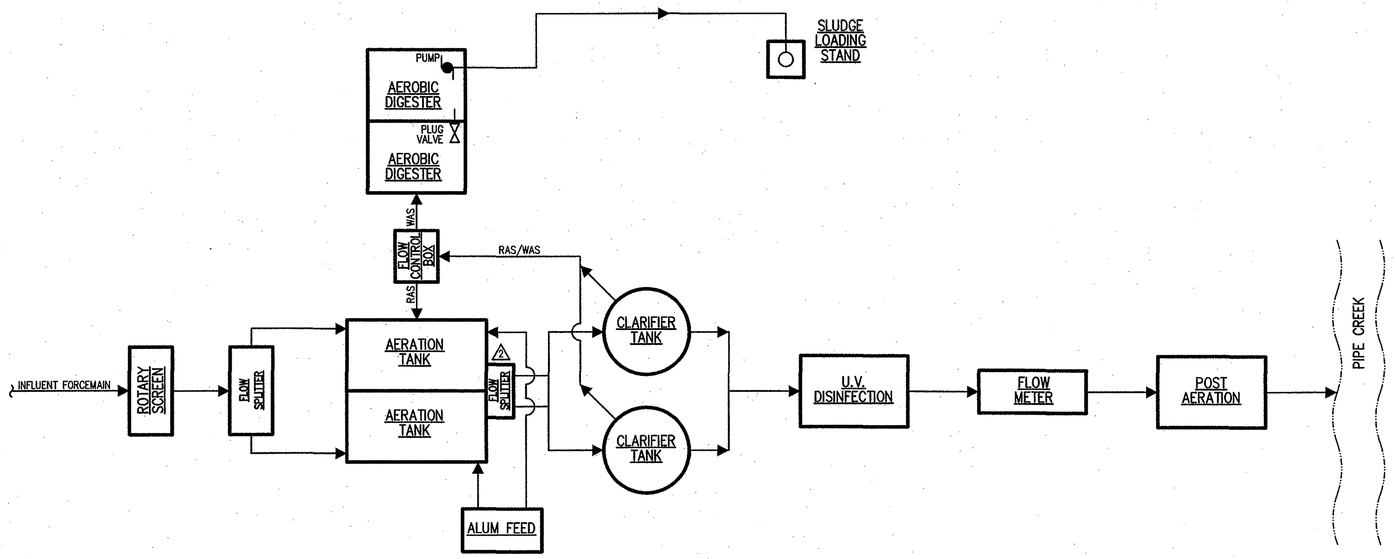
James W. Frazell, Professional Engineer

JAMES W. FRAZELL
REGISTERED
No. 17208
STATE OF INDIANA
PROFESSIONAL ENGINEER
4/17/13

RE-DESIGN SET 06-17-13

DESIGN SUMMARY

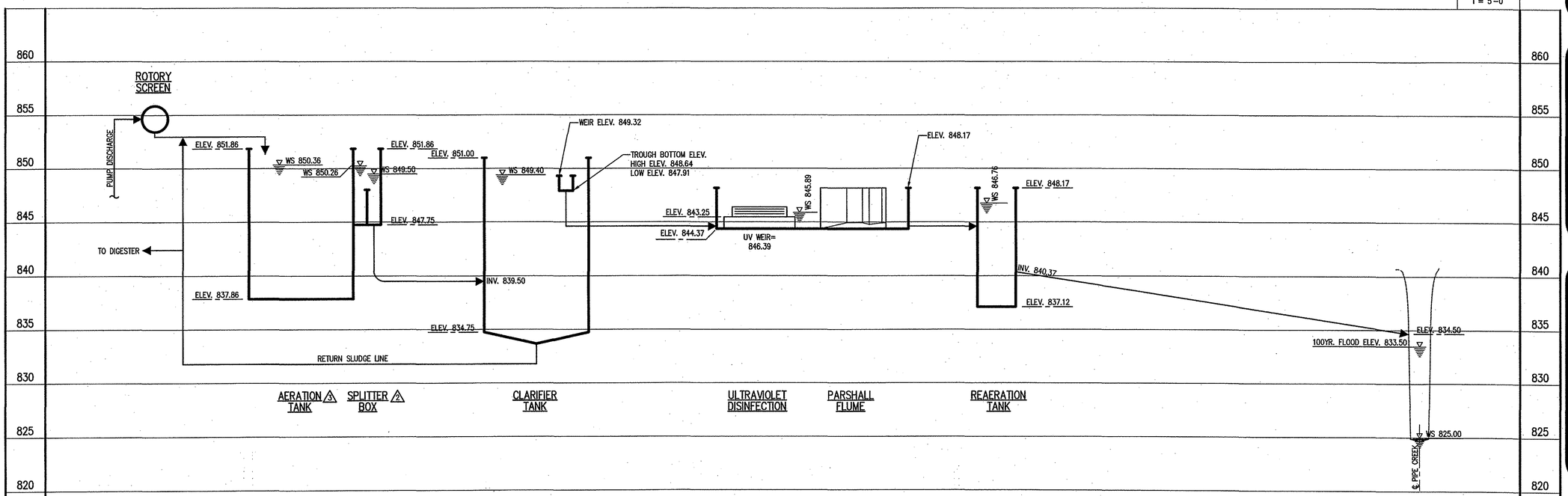
PLANT COMPONENT	DESIGN PARAMETERS	DESIGN CAPACITY
PLANT FLOW	DESIGN AVERAGE DESIGN PEAK HOURLY POPULATION EQUIVALENT	150,000 GPD 865,000 GPD 1,582
DESIGN LOADINGS	BOD_5 TSS NH_3-N	215 mg/l (269 lb./day) 200 mg/l (250 lb./day) 35 mg/l (43.8 lb/day)
AERATION TANK	CONCRETE TANK w/ FINE BUBBLE DIFFUSERS	
	VOLUME	20,306 CF 151,890 GALLONS
	DAILY ORGANIC LOADING	269 lbs. BOD 5/day
	ORGANIC LOADING PER 1000 CUBIC FEET	13.2 lbs. BOD/1000 CF
	HYDRAULIC DETENTION	24 HRS. @ 150,000 GPD
AERATION/BLOWERS	3 POSITIVE DISPLACEMENT	325 SCFM/EA. (FOR AERATION TANKS, DIGESTER AND POST-AIR)
	AIR REQUIRED (AERATION TANK ONLY)	320 SCFM
CLARIFIER	2 UNIT, 25'ø x 14' SWD	
	SURFACE AREA	981 SF
	SURFACE SETTLING RATE	881 GPD / SF
	RETENTION TIME	16.4 HOURS @ DESIGN FLOW
	WEIR OVERFLOW RATE	5,986 GALS/day/FT @ PEAK HOURLY FLOW
ULTRA-VIOLET DISINFECTION	LOW-INTENSITY, HORIZONTAL	
	CONTACT TIME	8.7 SECONDS @ Q_p
	CAPACITY	.88 MGD
POST-AERATION	FINE BUBBLE DIFFUSERS	30 SCFM
PROPOSED RETURN/WASTE	SUB PUMP SYSTEM	0 – 15ED0% RETURN
PROPOSED AEROBIC DIGESTER	TOTAL DIGESTION VOLUME	79,822 GALLONS
	RETENTION TIME	153 DAYS @ 3% D.S.



FLOW SCHEMATIC

NOT TO SCALE

VERTICAL SCALE
1"= 5'-0"



HYDRAULIC PROFILE

RE- DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	JRN
8/01/13	2 ADDED FLOW SPLITTER BOX	D.A.P.
8/01/13	3 CHANGED ELEVATIONS	D.A.P.

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER 8/2/13

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TRIAD ASSOCIATES INC.
5835 LAWTON LOOP EAST DRIVE
INDIANAPOLIS, INDIANA 46216
PHONE: 317-377-5230 FAX: 317-377-5241

DESIGNED FOR:

THE TOWN OF SWEETSER
GRANT COUNTY, INDIANA

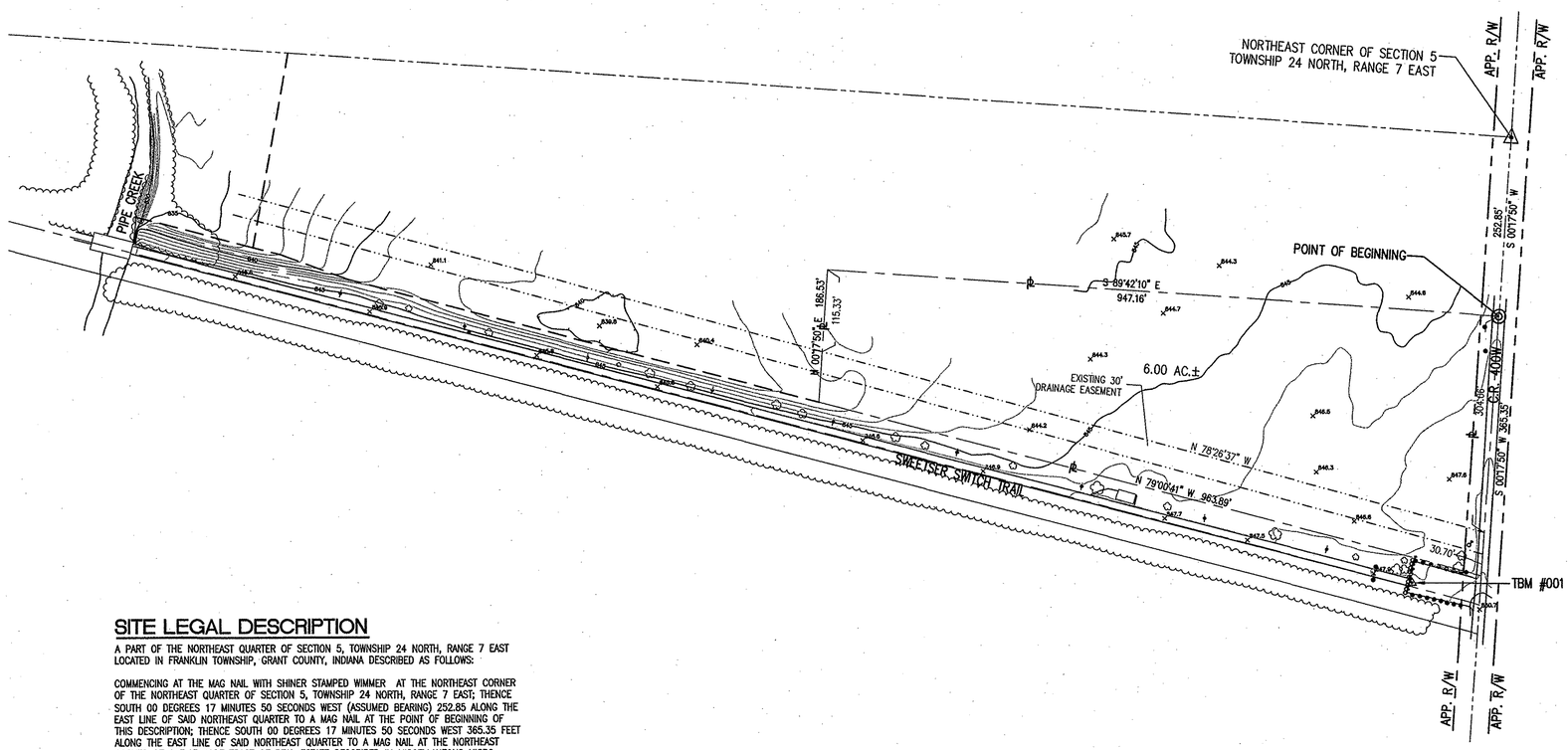
SHEET TITLE:

PROPOSED FLOW SCHEMATIC AND HYDRAULIC PROFILE

JOB NUMBER: 201115D	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1=50	PLOT DATE: 08/01/13
DRAWN BY: D.A.P.	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-FlowHydREV2	

SHEET No.

G1



SITE LEGAL DESCRIPTION

A PART OF THE NORTHEAST QUARTER OF SECTION 5, TOWNSHIP 24 NORTH, RANGE 7 EAST LOCATED IN FRANKLIN TOWNSHIP, GRANT COUNTY, INDIANA DESCRIBED AS FOLLOWS:

COMMENCING AT THE MAG NAIL WITH SHINER STAMPED WIMMER AT THE NORTHEAST CORNER OF THE NORTHEAST QUARTER OF SECTION 5, TOWNSHIP 24 NORTH, RANGE 7 EAST; THENCE SOUTH 00 DEGREES 17 MINUTES 50 SECONDS WEST (ASSUMED BEARING) 252.85 ALONG THE EAST LINE OF SAID NORTHEAST QUARTER TO A MAG NAIL AT THE POINT OF BEGINNING OF THIS DESCRIPTION; THENCE SOUTH 00 DEGREES 17 MINUTES 50 SECONDS WEST 365.35 FEET ALONG THE EAST LINE OF SAID NORTHEAST QUARTER TO A MAG NAIL AT THE NORTHEAST CORNER OF A 5.15 ACRE TRACT OF REAL ESTATE DESCRIBED IN MISCELLANEOUS MICRO MC9600 PAGE 0260 (INSTRUMENT NUMBER 031741); THENCE NORTH 79 DEGREES 00 MINUTES 41 SECONDS WEST 963.89 FEET ALONG THE NORTHERLY LINE OF SAID 5.15 ACRE TRACT TO 5/8 INCH IRON ROD WITH YELLOW CAP STAMPED MILLER SURVEYING; THENCE NORTH 00 DEGREES 17 MINUTES 50 SECONDS EAST 186.53 FEET TO A 5/8 INCH IRON ROD WITH YELLOW CAP STAMPED MILLER SURVEYING THAT BEARS NORTH 89 DEGREES 42 MINUTES 10 SECONDS WEST FROM THE POINT OF BEGINNING; THENCE SOUTH 89 DEGREES 42 MINUTES 10 SECONDS EAST 947.16 FEET TO THE POINT OF BEGINNING CONTAINING 6.00 ACRES MORE OR LESS.

EXISTING SITE PLAN

SCALE: 1"=100'

NORTH

BENCHMARK INFORMATION

INDOT BENCHMARK #27-G-0042
ISHC BRONZE PLUG IN END BENT WALL OF BRIDGE ON STATE ROAD 18 OVER PIPE CREEK JUST WEST OF COUNTY ROAD 400W. ELEV. 817.06

INDOT BENCHMARK #27-F-0002
BRASS PLUG ON SIDEWALK, SOUTHWEST CORNER OF RAILROAD STRUCTURE. ELEV. 876.10

TBM #001
4"ø YELLOW POST IN CENTERLINE OF SWEETSER SWITCH TRAIL, EAST SIDE OF POST AT TOP OF BLACKTOP. ELEV. 853.19

RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	JRN

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER
6/17/13

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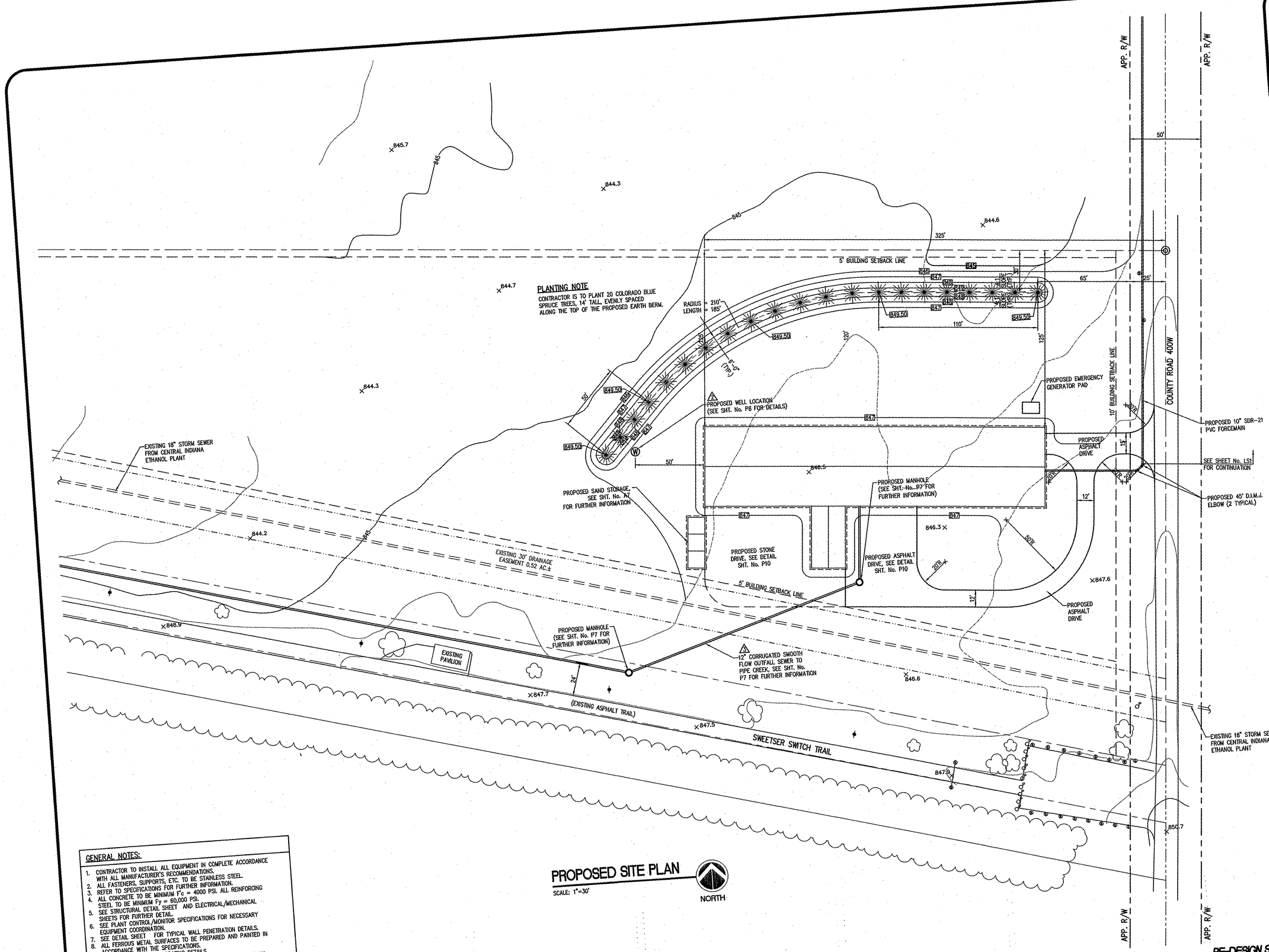
SHEET TITLE:

EXISTING PROJECT SITE PLAN

JOB NUMBER: 201115D	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1=100	PLOT DATE: 06/17/13
DRAWN BY: D.A.P.	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-ExSiteREV2	

SHEET No.

C1



PROPOSED SITE PLAN

SCALE: 1"=30'

NORTH

GENERAL NOTES:

1. CONTRACTOR TO INSTALL ALL EQUIPMENT IN COMPLETE ACCORDANCE WITH ALL MANUFACTURER'S RECOMMENDATIONS.
2. ALL FASTENERS, SUPPORTS, ETC. TO BE STAINLESS STEEL.
3. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION.
4. ALL CONCRETE TO BE MINIMUM F'c = 4000 PSI. ALL REINFORCING STEEL TO BE MINIMUM Fy = 60,000 PSI.
5. SEE STRUCTURAL DETAIL SHEET AND ELECTRICAL/MECHANICAL SHEETS FOR FURTHER DETAIL.
6. SEE PLANT CONTROL/MONITOR SPECIFICATIONS FOR NECESSARY EQUIPMENT COORDINATION.
7. SEE DETAIL SHEET FOR TYPICAL WALL PENETRATION DETAILS.
8. ALL FERROUS METAL SURFACES TO BE PREPARED AND PAINTED IN ACCORDANCE WITH THE SPECIFICATIONS.
9. SEE DETAIL SHEET FOR GRATING DETAILS.
10. CONTRACTOR TO COORDINATE WITH ALL OTHER APPLICABLE PLAN SHEETS AND SPECIFICATIONS.
11. CONTRACTOR RESPONSIBLE FOR TRANSFERRING ALL SUITABLE TREATMENT MATERIAL FROM EXISTING TANKS TO THE PROPOSED TANKS.
12. CONTRACTOR TO VERIFY EQUIPMENT MOUNTING ELEVATIONS AND DIMENSIONS PRIOR TO CONSTRUCTION.
13. CONTRACTOR IS TO VISIT THE SITE PRIOR TO CONSTRUCTION IN ORDER TO IDENTIFY ANY EXISTING CONFLICTS TO BE ADDRESSED.

RE-DESIGN SET 06-17-13

REVISIONS:

DATE		DESCRIPTION	BY
5/17/13		PROJECT REVISIONS	JRN
8/01/13	1	RELOCATED PROPOSED WELL	D.A.P.
8/01/13	2	REVISED PIPE TYPE	D.A.P.

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER — 8/2/13

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PHONE: 317-377-5230 FAX: 317-377-5241

DESIGNED FOR:

THE TOWN OF SWEETSER
GRANT COUNTY, INDIANA

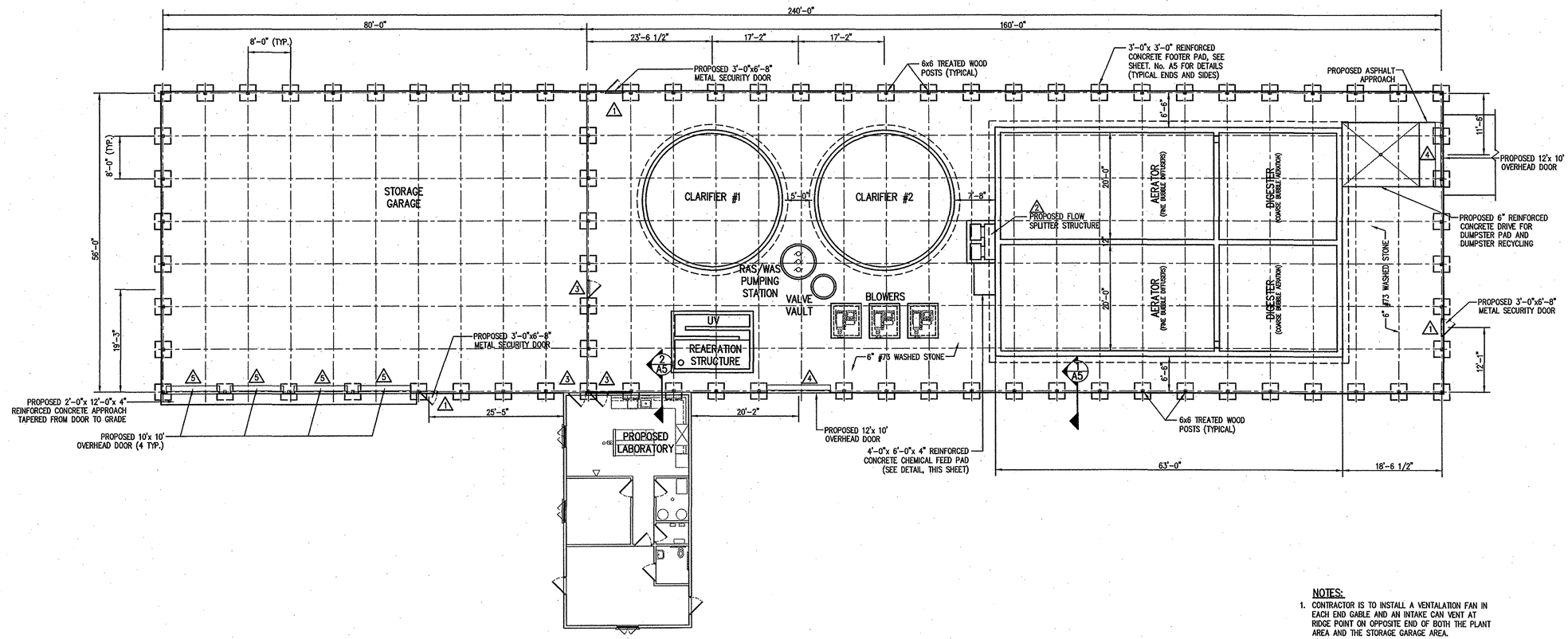
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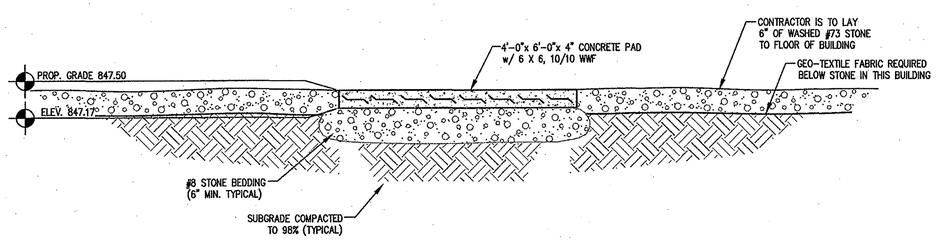
PROPOSED SITE PLAN

JOB NUMBER: 201115D	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1=30	PLOT DATE: 08/01/13
DRAWN BY: D.A.P.	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-PropSiteREV2	

SHEET No.

C2





CHEMICAL FEED PAD DETAIL

NOT TO SCALE

PROPOSED PLANT FLOOR PLAN

SCALE: 3/32" = 1'-0"

NORTH

NOTES:

1. CONTRACTOR IS TO INSTALL A VENTALATION FAN IN EACH END GABLE AND AN INTAKE CAN VENT AT RIDGE POINT ON OPPOSITE END OF BOTH THE PLANT AREA AND THE STORAGE GARAGE AREA.
2. CONTRACTOR IS TO INSTALL A MINIMUM OF 20% TRANSLUCENT PANELS TO THE PROPOSED ROOF SYSTEM IN BOTH THE PLANT AREA AND THE STORAGE GARAGE AREA.

GENERAL NOTES:

1. CONTRACTOR TO INSTALL ALL EQUIPMENT IN COMPLETE ACCORDANCE WITH ALL MANUFACTURER'S RECOMMENDATIONS.
2. ALL FASTENERS, SUPPORTS, ETC. TO BE STAINLESS STEEL.
3. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION.
4. ALL CONCRETE TO BE MINIMUM F'c = 4000 PSI. ALL REINFORCING STEEL TO BE MINIMUM Fy = 60,000 PSI.
5. SEE STRUCTURAL DETAIL SHEET AND ELECTRICAL/MECHANICAL SHEETS FOR FURTHER DETAIL.
6. SEE PLANT CONTROL/MONITOR SPECIFICATIONS FOR NECESSARY EQUIPMENT COORDINATION.
7. SEE DETAIL SHEET FOR TYPICAL WALL PENETRATION DETAILS.
8. ALL FERROUS METAL SURFACES TO BE PREPARED AND PAINTED IN ACCORDANCE WITH THE SPECIFICATIONS.
9. SEE DETAIL SHEET FOR GRATING DETAILS.
10. CONTRACTOR TO COORDINATE WITH ALL OTHER APPLICABLE PLAN SHEETS AND SPECIFICATIONS.
11. CONTRACTOR RESPONSIBLE FOR TRANSFERRING ALL SUITABLE TREATMENT MATERIAL FROM EXISTING TANKS TO THE PROPOSED TANKS.
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13. CONTRACTOR IS TO VISIT THE SITE PRIOR TO CONSTRUCTION IN ORDER TO IDENTIFY ANY EXISTING CONFLICTS TO BE ADDRESSED.

RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
3/17/13	PROJECT REVISIONS	DAP
8/01/13	1 ADDED FLOW SPLITTER STRUCTURE	D.A.P.

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER 8/6/13

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DESIGNED FOR:

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GRANT COUNTY, INDIANA

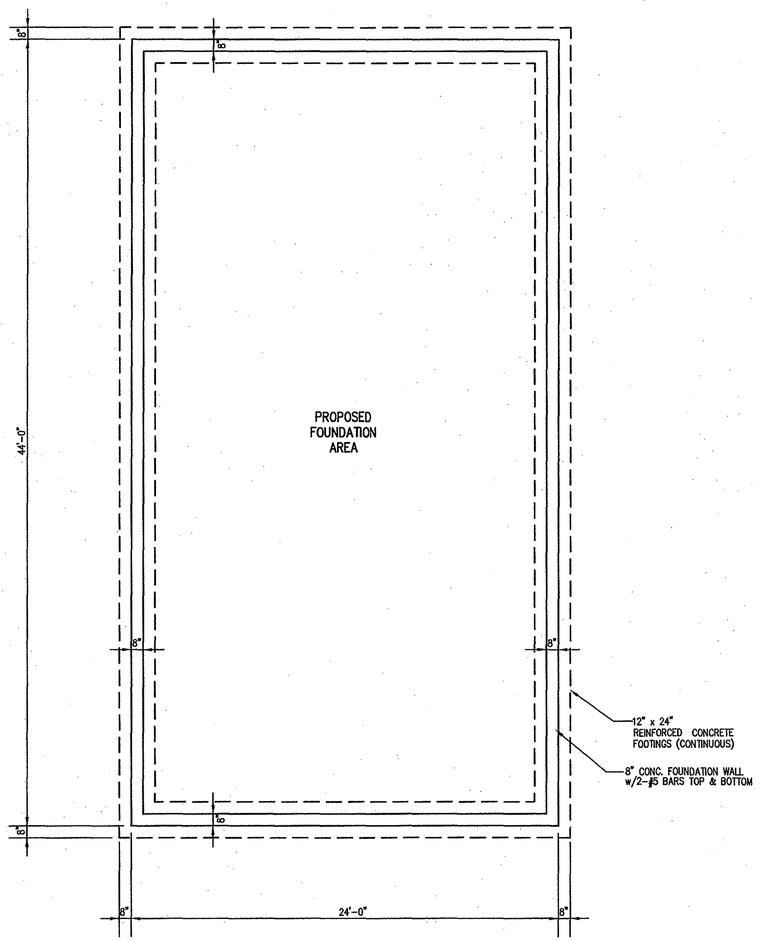
SHEET TITLE:

PROPOSED PLANT FLOOR PLAN & STORAGE GARAGE

JOB NUMBER: 201115D	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1:1	PLOT DATE: 08/01/13
DRAWN BY: JET/DAP	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-LayoutREV2	

SHEET No.

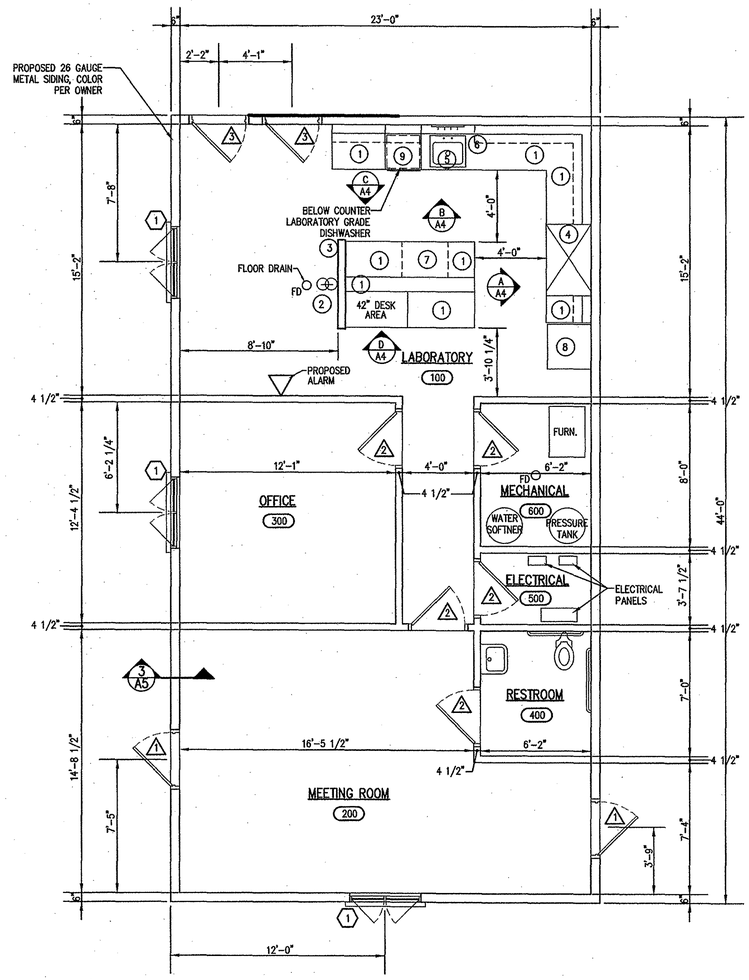
A1



FOUNDATION PLAN

SCALE: 1/4"= 1'-0"

NORTH



FLOOR PLAN

SCALE: 1/4"= 1'-0"

NORTH

GENERAL NOTES:

1. CONTRACTOR TO INSTALL ALL EQUIPMENT IN COMPLETE ACCORDANCE WITH ALL MANUFACTURER'S RECOMMENDATIONS.
2. ALL FASTENERS, SUPPORTS, ETC. TO BE STAINLESS STEEL.
3. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION.
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6. SEE PLANT CONTROL/MONITOR SPECIFICATIONS FOR NECESSARY EQUIPMENT COORDINATION.
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13. CONTRACTOR IS TO VISIT THE SITE PRIOR TO CONSTRUCTION IN ORDER TO IDENTIFY ANY EXISTING CONFLICTS TO BE ADDRESSED.

KEY NOTES:

1. 1" MODIFIED EPOXY RESINTOP 14" BACKSPLASH AND DRIP LIP
2. EMERGENCY SHOWER AND EYEWASH UNIT
3. 2"x4" GYPSUM BOARD ISOLATION WALL
4. 48" FUME HOOD UNIT
5. EPOXY RESIN SINK UNIT
6. LABORATORY PEG BOARD
7. INCUBATOR (BY OTHERS)
8. REFRIGERATOR (BY OTHERS)
9. BELOW COUNTER TOP, LABORATORY GRADE DISHWASHER

LEGEND

- (1) WINDOW SCHEDULE DESIGNATION
- 1 DOOR SCHEDULE DESIGNATION
- (100) ROOM DESIGNATION
- B / A3 INTERIOR ELEVATION DESIGNATION

RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	DAP

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER

5/17/13

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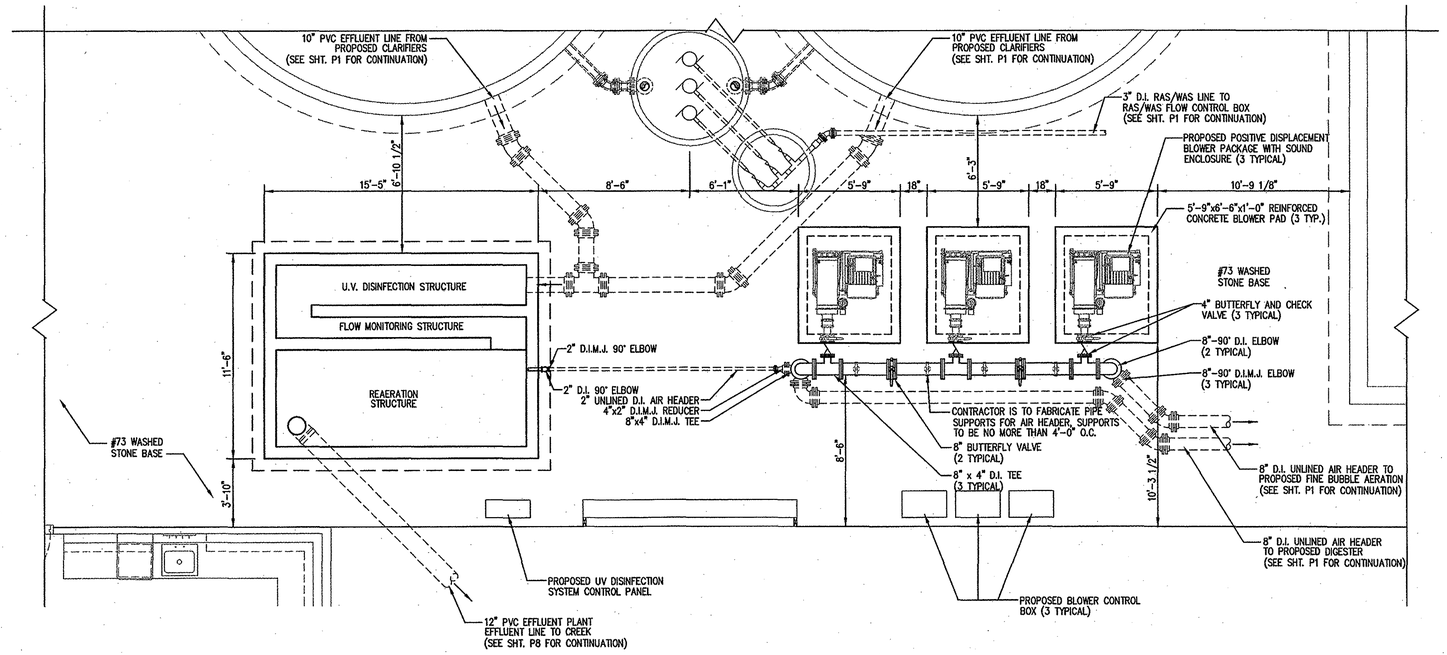
SHEET TITLE:

PROPOSED LABORATORY FOUNDATION AND FLOOR PLANS

JOB NUMBER: 201115D	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1=48	PLOT DATE: 06/17/13
DRAWN BY: D.A.P.	DATE: JUNE, 2012
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-Lab01REV2	

SHEET No.

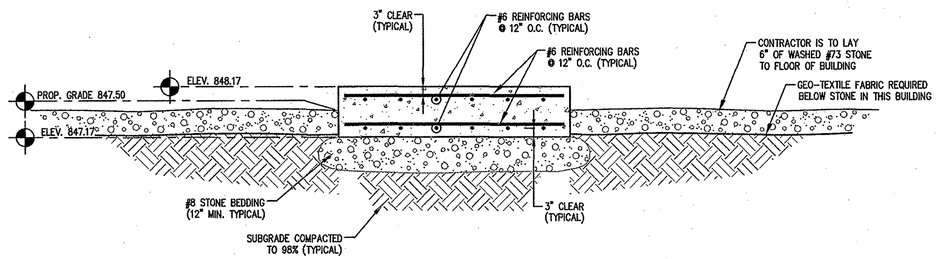
A2



FLOOR PLAN

SCALE: 1/4"= 1'-0"

NORTH



BLOWER PAD SECTION

SCALE: 1/2"= 1'-0"

GENERAL NOTES:

1. CONTRACTOR TO INSTALL ALL EQUIPMENT IN COMPLETE ACCORDANCE WITH ALL MANUFACTURER'S RECOMMENDATIONS.
2. ALL FASTENERS, SUPPORTS, ETC. TO BE STAINLESS STEEL.
3. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION.
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12. CONTRACTOR TO VERIFY EQUIPMENT MOUNTING ELEVATIONS AND DIMENSIONS PRIOR TO CONSTRUCTION.
13. CONTRACTOR IS TO VISIT THE SITE PRIOR TO CONSTRUCTION IN ORDER TO IDENTIFY ANY EXISTING CONFLICTS TO BE ADDRESSED.

RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	JRN

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER 6/17/13

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DESIGNED FOR:

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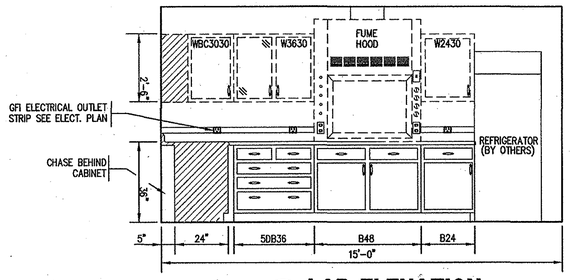
SHEET TITLE:

PROPOSED ULTRA-VIOLET DISINFECTION AND BLOWERS

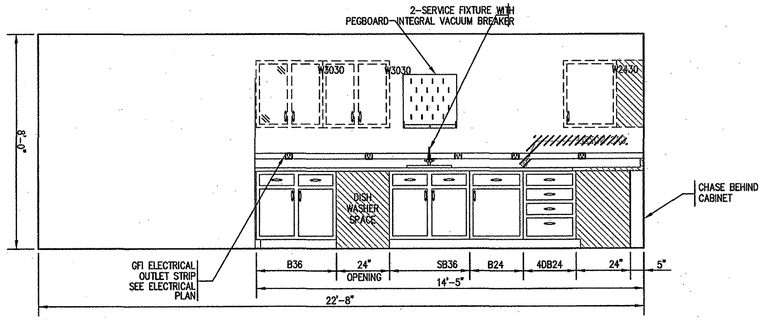
JOB NUMBER: 201115D	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1=48	PLOT DATE: 06/07/13
DRAWN BY: D.A.P.	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-UVBlow01REV2	

SHEET No.

A3



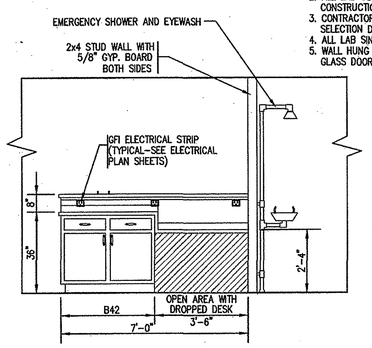
A/A4 **LAB ELEVATION**
SCALE: 3/8" =1'-0"



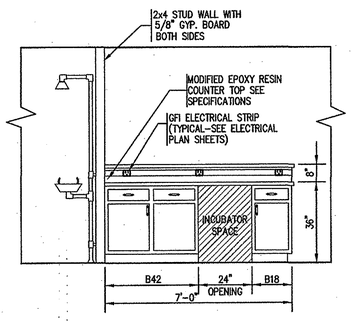
B/A4 **LAB ELEVATION**
SCALE: 3/8" =1'-0"

NOTES:

1. ALL CABINETS TO BE SOLID HARDWOOD CONSTRUCTION. SEE SPECIFICATIONS FOR FURTHER INFORMATION.
2. ALL LAB COUNTER TOPS SHALL BE 1" EPOXY RESIN CONSTRUCTION WITH 5" INTEGRAL BACKSPLASH.
3. CONTRACTOR TO SUBMIT STAIN SAMPLES FOR SELECTION DURING CONSTRUCTION.
4. ALL LAB SINKS TO BE EPOXY RESIN CONSTRUCTION.
5. WALL HUNG CABINETS TO HAVE SHATTER RESISTANT GLASS DOORS.



C/A4 **LAB ELEV. TABLE**
SCALE: 3/8" =1'-0"



D/A4 **LAB ELEV. TABLE**
SCALE: 3/8" =1'-0"

ROOM FINISH SCHEDULE

ROOM NUMBER	ROOM NAME	FLOORS					BASE			WALLS					WAINSCOT			CEILING						REMARKS
		CONCRETE SEALER	VINYL COMPOSITION TILE	CARPET	EXPOSED T&G PLYWOOD (PAINTED)	#73 WASHED STONE	RUBBER	CERAMIC TILE COVE		EXPOSED WOOD FRAMING	PAINTED 1/2" DRYWALL	PAINTED PLYWOOD	6" VINYL BACKED INSULATION	SATIN PAINT	SEMI GLOSS PAINT	GLOSS PAINT	MOISTURE RESISTANT PRESSURE TREATED PLYWOOD	HEIGHT	PAINTED GYPSUM BOARD	FLAT PAINT	SEMI-GLOSS PAINT	2X4 SUSPENDED CEILING TILE SYSTEM. EPOXY PAINT	PRESSURE TREATED PLYWOOD	EXPOSED ROOF TRUSSES	HEIGHT	
CONTROL BUILDING																									
100	LABORATORY	●					●				●				●				●	●					8'-0"±	
200	MEETING ROOM & HALLWAY	●					●				●				●				●	●					8'-0"±	
300	OFFICE	●					●				●				●				●	●					8'-0"±	
400	RESTROOM	●					●				●				●				●	●					8'-0"±	
500	ELECTRICAL ROOM	●					●				●				●				●	●					8'-0"±	
600	MECHANICAL ROOM	●					●				●				●				●	●					8'-0"±	

DOOR SCHEDULE

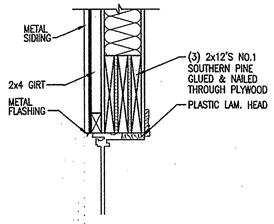
DOOR # / ROOM #	LOCATION	DOOR				FRAME		LOUVERS/LITES	HARDWARE SET #	THRESHOLD MATERIAL	REMARKS
		SIZE	THICKNESS	TYPE	MATERIAL	TYPE	MATERIAL				
1 100	LABORATORY	3'-0" x 6'-8"	1 3/4"	B	INSUL. METAL	STEEL	HOLLOW METAL	–	1	SEE SPEC'S.	1 HOUR RATED ASSEMBLY (2 DOORS)
2 200	MEETING ROOM	3'-0" x 6'-8"	1 3/4"	B	INSUL. METAL	STEEL	HOLLOW METAL	–	1	SEE SPEC'S.	
1 200	MEETING ROOM	3'-0" x 6'-8"	1 3/4"	B	INSUL. METAL	STEEL	HOLLOW METAL	–	2	SEE SPEC'S.	(2 DOORS)
2 300	OFFICE	3'-0" x 6'-8"	1 3/4"	A	INSUL. METAL	STEEL	HOLLOW METAL	–	1	SEE SPEC'S.	
2 400	RESTROOM	3'-0" x 6'-8"	1 3/4"	A	INSUL. METAL	STEEL	HOLLOW METAL	–	1	SEE SPEC'S.	
2 500	ELECTRICAL ROOM	3'-0" x 6'-8"	1 3/4"	B	INSUL. METAL	STEEL	HOLLOW METAL	–	1	SEE SPEC'S.	
2 600	MECHANICAL ROOM	3'-0" x 6'-8"	1 3/4"	B	INSUL. METAL	STEEL	HOLLOW METAL	–	1	SEE SPEC'S.	
1	PLANT	3'-0" x 6'-8"	1 1/4"	B	INSUL. METAL	STEEL	HOLLOW METAL	–	2	SEE SPEC'S.	(2 DOORS)
4	PLANT	12'-0" x 10'-0" O.H.	–	A	–	STEEL	HOLLOW METAL	(4) 18" X 12" TEMP.	–	SEE SPEC'S.	(2 DOORS)
1	STORAGE GARAGE	3'-0" x 6'-8"	1 1/4"	B	INSUL. METAL	STEEL	HOLLOW METAL	–	2	SEE SPEC'S.	
3	STORAGE GARAGE	3'-0" x 6'-8"	1 3/4"	B	INSUL. METAL	STEEL	HOLLOW METAL	–	1	SEE SPEC'S.	1 HOUR RATED ASSEMBLY
5	STORAGE GARAGE	10'-0" x 10'-0" O.H.	–	A	INSUL. PANELS	STEEL	HOLLOW METAL	(4) 18" X 12" TEMP.	–	SEE SPEC'S.	(4 DOORS)

WINDOW SCHEDULE

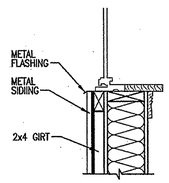
MARK	LOCATION	APPROX. OPENING SIZE		WINDOW TYPE	FRAME				REMARKS
		WIDTH	HEIGHT		TYPE	JAMB	SILL	HEAD	
1	LABORATORY	4'-0"	4'-1"	4242 DOUBLE PANE INSUL. CASEMENT	VINYL CLAD WOOD	WJ1	WS1	WH1	(TOTAL OF TWO WINDOW UNITS)
1	MEETING ROOM	4'-0"	4'-1"	4242 DOUBLE PANE INSUL. CASEMENT	VINYL CLAD WOOD	WJ1	WS1	WH1	(TOTAL OF TWO WINDOW UNITS)
1	OFFICE	4'-0"	4'-1"	4242 DOUBLE PANE INSUL. CASEMENT	VINYL CLAD WOOD	WJ1	WS1	WH1	(TOTAL OF TWO WINDOW UNITS)

GENERAL NOTES:

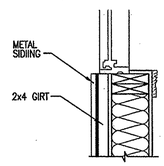
1. CONTRACTOR TO COORDINATE WITH OTHER APPLICABLE PLAN SHEETS FOR IMPROVEMENTS.
2. SEE SHEET S5 FOR FURTHER REINFORCED CONCRETE STRUCTURAL DETAILS.



HEAD DETAIL



SILL DETAIL



JAM DETAIL

WINDOW DETAILS

SCALE: NONE

RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	DAP

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER 6/7/13

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TRIAD ASSOCIATES INC.
5835 LAWTON LOOP EAST DRIVE
INDIANAPOLIS, INDIANA 46216
PHONE: 317-377-5230 FAX: 317-377-5241

DESIGNED FOR:

THE TOWN OF SWEETSER
GRANT COUNTY, INDIANA

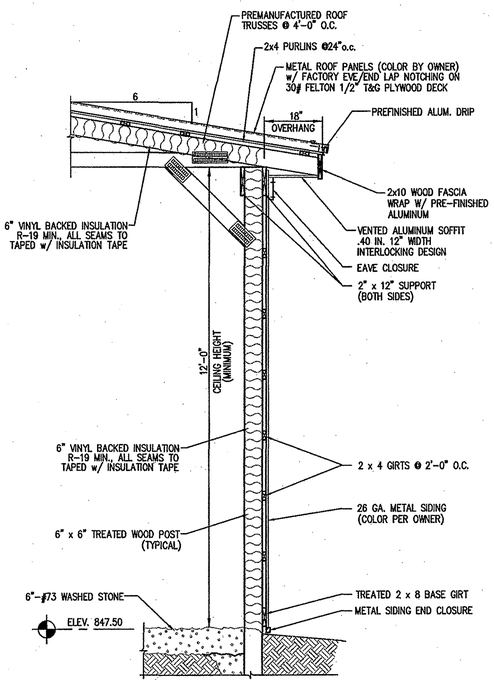
SHEET TITLE:

PROPOSED LABORATORY CABINET ELEVATIONS AND DOOR, WINDOW AND ROOM FINISH SCHEDULES

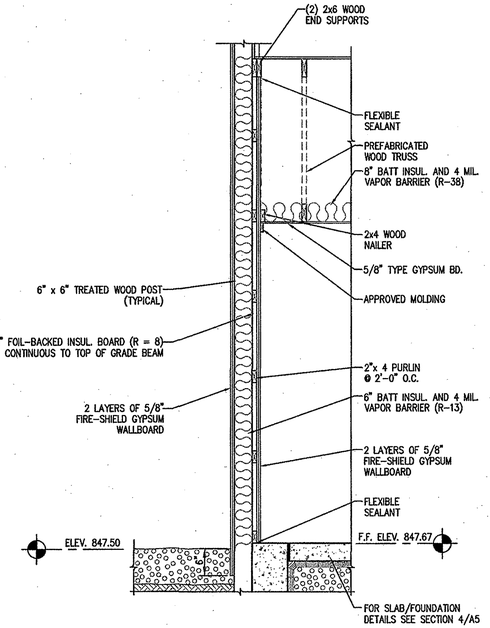
JOB NUMBER: 201115D	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1=32	PLOT DATE: 06/17/13
DRAWN BY: D.A.P.	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-Lab02REV2	

SHEET No.

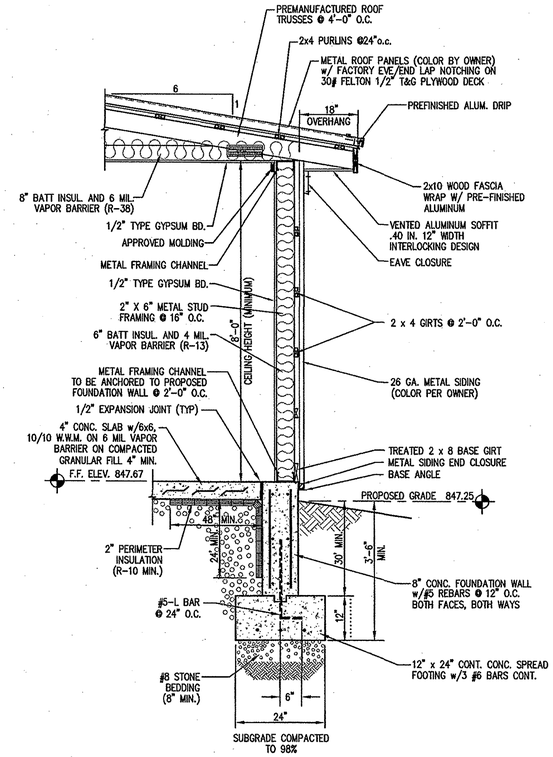
A4



WALL SECTION 1/A5
NOT TO SCALE



WALL SECTION 2/A5
NOT TO SCALE



WALL SECTION 3/A5
NOT TO SCALE

GENERAL NOTES:

1. CONTRACTOR TO INSTALL ALL EQUIPMENT IN COMPLETE ACCORDANCE WITH ALL MANUFACTURER'S RECOMMENDATIONS.
2. ALL FASTENERS, SUPPORTS, ETC. TO BE STAINLESS STEEL.
3. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION.
4. ALL CONCRETE TO BE MINIMUM F'c = 4000 PSI. ALL REINFORCING STEEL TO BE MINIMUM Fy = 60,000 PSI.
5. SEE STRUCTURAL DETAIL SHEET AND ELECTRICAL/MECHANICAL SHEETS FOR FURTHER DETAIL.
6. SEE PLANT CONTROL/MONITOR SPECIFICATIONS FOR NECESSARY EQUIPMENT COORDINATION.
7. SEE DETAIL SHEET FOR TYPICAL WALL PENETRATION DETAILS.
8. ALL FERROUS METAL SURFACES TO BE PREPARED AND PAINTED IN ACCORDANCE WITH THE SPECIFICATIONS.
9. SEE DETAIL SHEET FOR GRATING DETAILS.
10. CONTRACTOR TO COORDINATE WITH ALL OTHER APPLICABLE PLAN SHEETS AND SPECIFICATIONS.
11. CONTRACTOR RESPONSIBLE FOR TRANSFERRING ALL SUITABLE TREATMENT MATERIAL FROM EXISTING TANKS TO THE PROPOSED TANKS.
12. CONTRACTOR TO VERIFY EQUIPMENT MOUNTING ELEVATIONS AND DIMENSIONS PRIOR TO CONSTRUCTION.
13. CONTRACTOR IS TO VISIT THE SITE PRIOR TO CONSTRUCTION IN ORDER TO IDENTIFY ANY EXISTING CONFLICTS TO BE ADDRESSED.

RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	JRN

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER 6/17/13

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TRIAD ASSOCIATES INC.
5835 LAWTON LOOP EAST DRIVE
INDIANAPOLIS, INDIANA 46216
PHONE: 317-377-5230 FAX: 317-377-5241

DESIGNED FOR:

THE TOWN OF SWEETSER
GRANT COUNTY, INDIANA

SHEET TITLE:

PROPOSED PLANT, LABORATORY AND UV/BLOWER BUILDING WALL SECTIONS

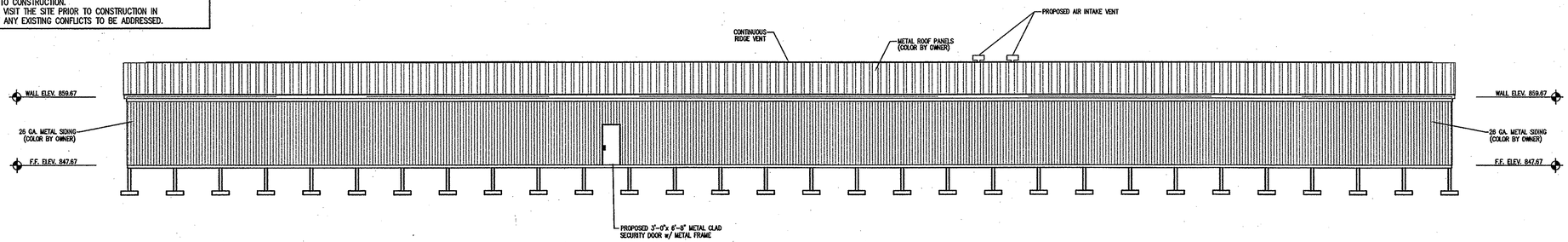
JOB NUMBER: 201115D	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1=48	PLOT DATE: 06/17/13
DRAWN BY: D.A.P.	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-WallSecREV2	

SHEET No.

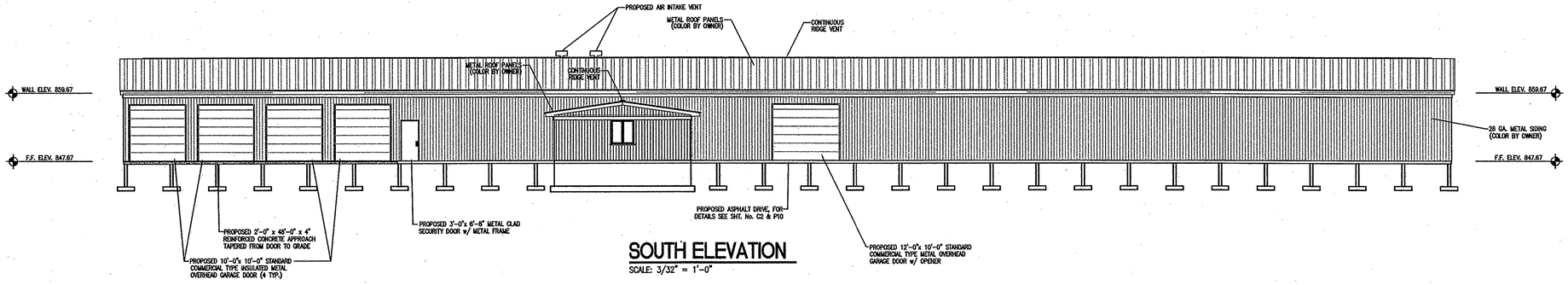
A5

GENERAL NOTES:

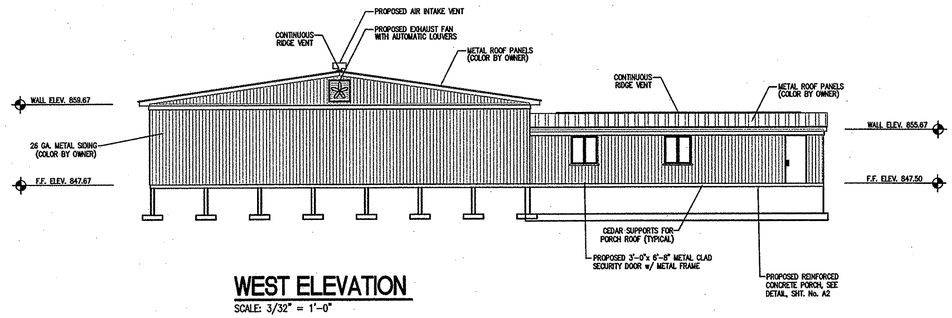
1. CONTRACTOR TO INSTALL ALL EQUIPMENT IN COMPLETE ACCORDANCE WITH ALL MANUFACTURER'S RECOMMENDATIONS.
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6. SEE PLANT CONTROL/MONITOR SPECIFICATIONS FOR NECESSARY EQUIPMENT COORDINATION.
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13. CONTRACTOR IS TO VISIT THE SITE PRIOR TO CONSTRUCTION IN ORDER TO IDENTIFY ANY EXISTING CONFLICTS TO BE ADDRESSED.



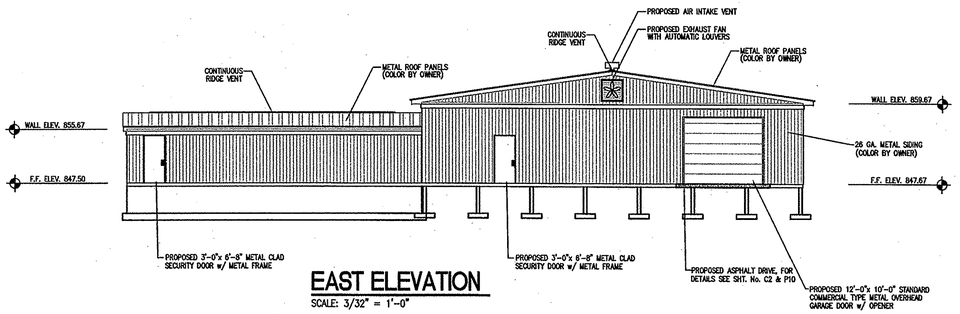
NORTH ELEVATION
SCALE: 3/32" = 1'-0"



SOUTH ELEVATION
SCALE: 3/32" = 1'-0"



WEST ELEVATION
SCALE: 3/32" = 1'-0"



EAST ELEVATION
SCALE: 3/32" = 1'-0"

RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	JRN

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER 5/17/13

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TRIAD ASSOCIATES INC.
5835 LAWTON LOOP EAST DRIVE
INDIANAPOLIS, INDIANA 46216
PHONE: 317-377-5230 FAX: 317-377-5241

DESIGNED FOR:

THE TOWN OF SWEETSER
GRANT COUNTY, INDIANA

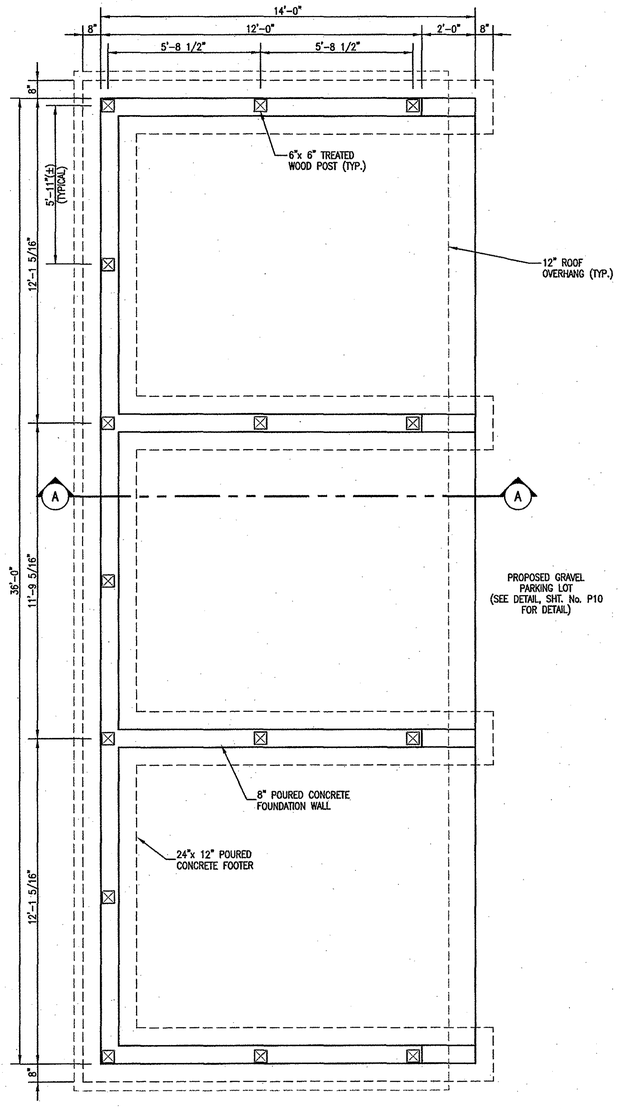
SHEET TITLE:

PROPOSED PLANT, LABORATORY AND UV/BLOWER BUILDING ELEVATIONS

JOB NUMBER: 201115D	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1=1	PLOT DATE: 06/17/13
DRAWN BY: D.A.P.	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115d-ElevsREV2	

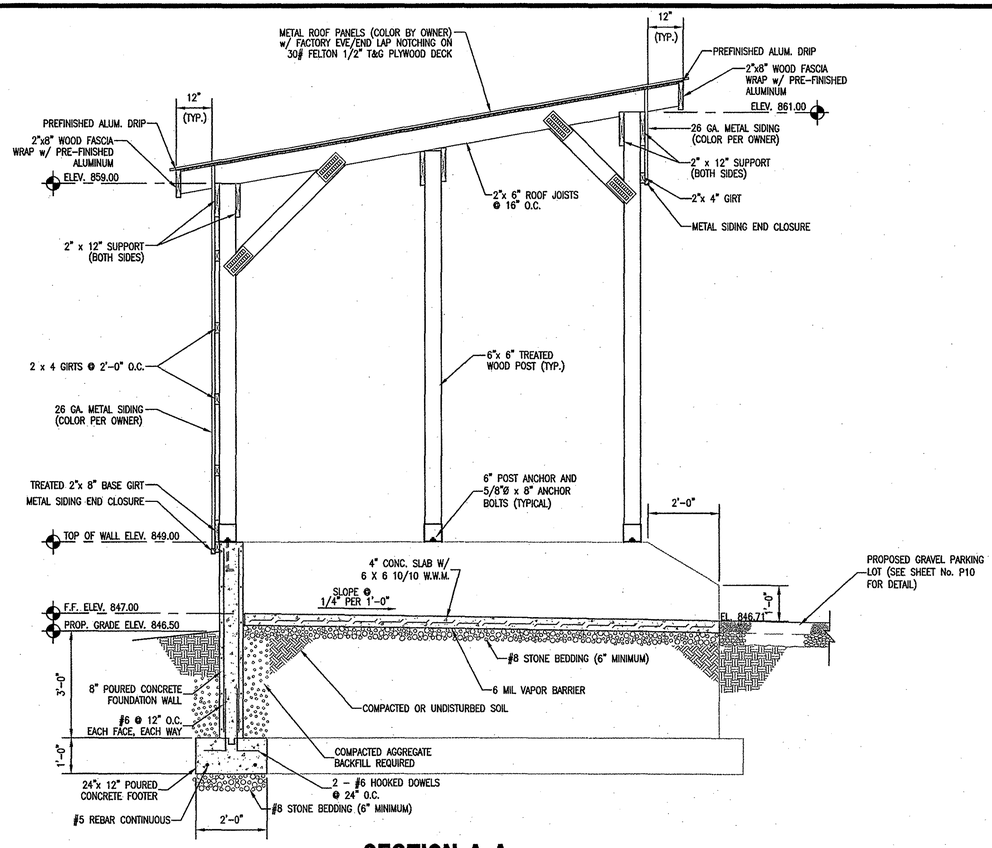
SHEET No.

A6



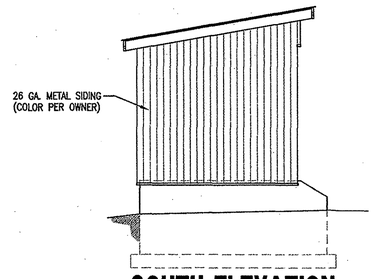
PROPOSED STORAGE BUILDING PLAN

3/8" = 1'-0"



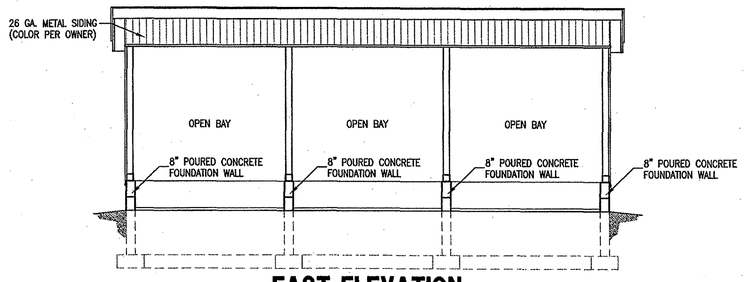
SECTION A-A

1/2" = 1'-0"



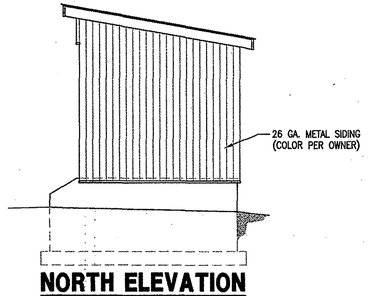
SOUTH ELEVATION

SCALE: 3/16" = 1'-0"



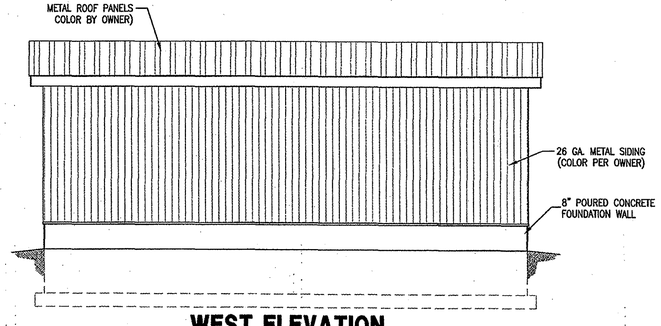
EAST ELEVATION

SCALE: 3/16" = 1'-0"



NORTH ELEVATION

SCALE: 3/16" = 1'-0"



WEST ELEVATION

SCALE: 3/16" = 1'-0"

GENERAL NOTES:

1. CONTRACTOR TO INSTALL ALL EQUIPMENT IN COMPLETE ACCORDANCE WITH ALL MANUFACTURER'S RECOMMENDATIONS.
2. ALL FASTENERS, SUPPORTS, ETC. TO BE STAINLESS STEEL.
3. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION.
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13. CONTRACTOR IS TO VISIT THE SITE PRIOR TO CONSTRUCTION IN ORDER TO IDENTIFY ANY EXISTING CONFLICTS TO BE ADDRESSED.

RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER 6/17/13

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TRIAD ASSOCIATES INC.
5835 LAWTON LOOP EAST DRIVE
INDIANAPOLIS, INDIANA 46216
PHONE: 317-377-5230 FAX: 317-377-5241

DESIGNED FOR:

THE TOWN OF SWEETSER
GRANT COUNTY, INDIANA

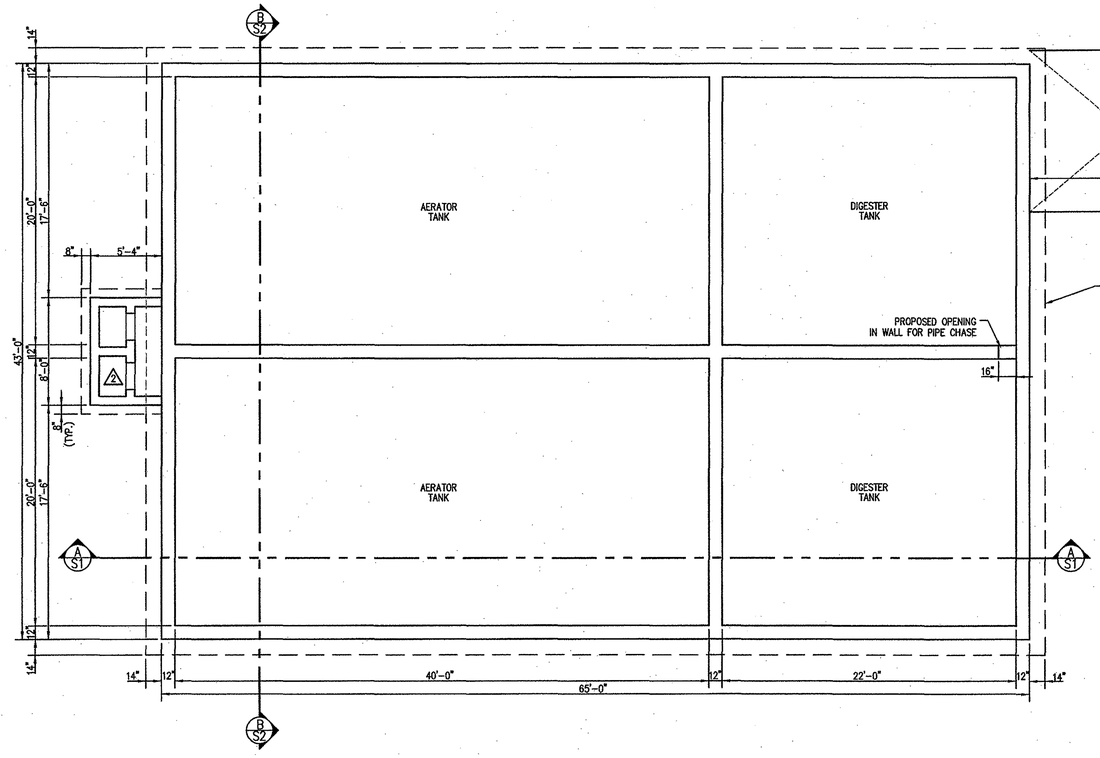
SHEET TITLE:

PROPOSED STORAGE BUILDING

JOB NUMBER: 201115D	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1=1	PLOT DATE: 06/17/13
DRAWN BY: D.A.P.	DATE: May, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-StorageStrucREV2	

SHEET No.

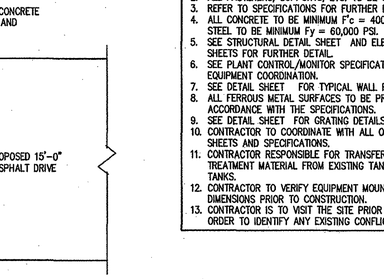
A7

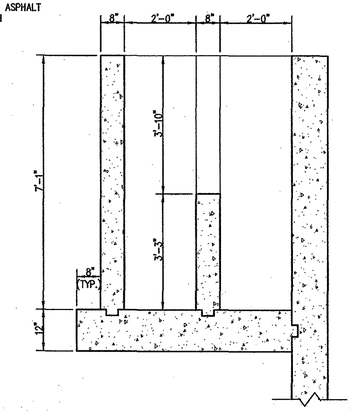


PROPOSED TREATMENT TANK PLAN
SCALE: 3/16" = 1'-0"

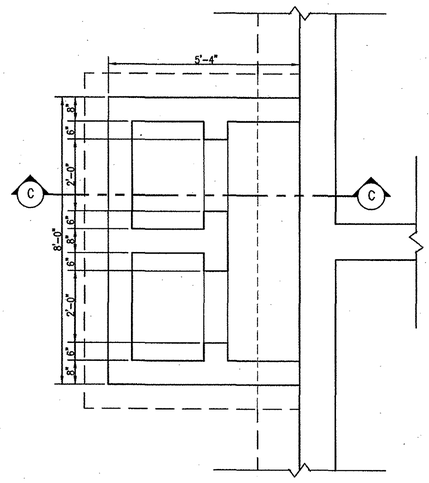
NORTH

SECTION A-A
SCALE: 3/16" = 1'-0"





⚠2 SECTION C-C
SCALE: 1/2" = 1'-0"



⚠2 PROPOSED FLOW SPLITTER STRUCTURE
SCALE: 1/2" = 1'-0"

GENERAL NOTES:

1. CONTRACTOR TO INSTALL ALL EQUIPMENT IN COMPLETE ACCORDANCE WITH ALL MANUFACTURER'S RECOMMENDATIONS.
2. ALL FASTENERS, SUPPORTS, ETC. TO BE STAINLESS STEEL.
3. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION.
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13. CONTRACTOR IS TO VISIT THE SITE PRIOR TO CONSTRUCTION IN ORDER TO IDENTIFY ANY EXISTING CONFLICTS TO BE ADDRESSED.

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	JRN
8/01/13	⚠2 ADDED FLOW SPLITTER STRUCTURE	D.A.P.

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER
8/2/13

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INDIANAPOLIS, INDIANA 46216
PHONE: 317-377-5230 FAX: 317-377-5241

DESIGNED FOR:

THE TOWN OF SWEETSER
GRANT COUNTY, INDIANA

SHEET TITLE:

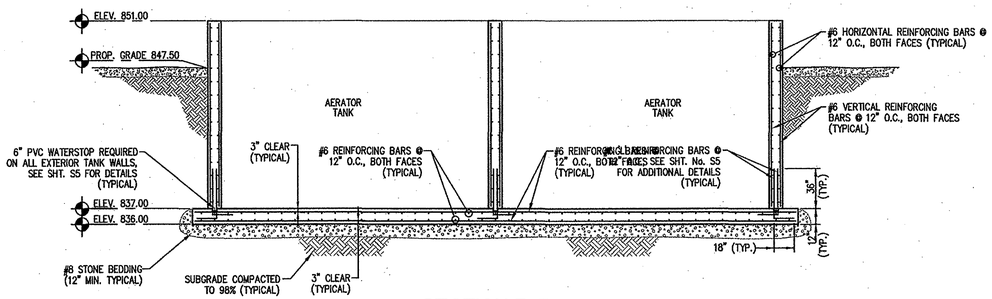
PROPOSED TREATMENT TANK STRUCTURAL PLAN AND SECTION

JOB NUMBER: 201115D	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1=64	PLOT DATE: 08/01/13
DRAWN BY: D.A.P.	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-TankStruc1REV2	

SHEET No.

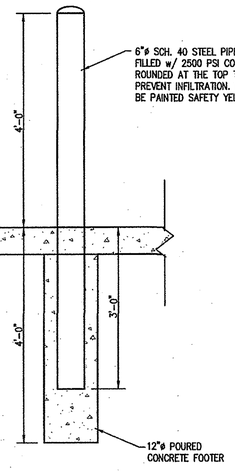
S1

RE-DESIGN SET 06-17-13



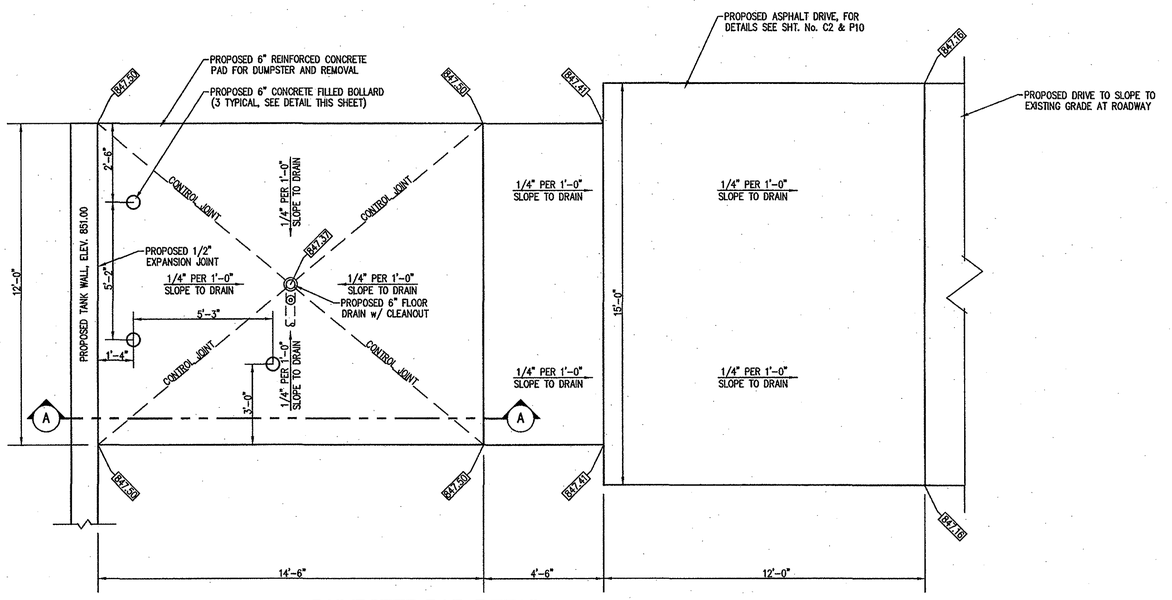
SECTION B-B

SCALE: 3/16" = 1'-0"



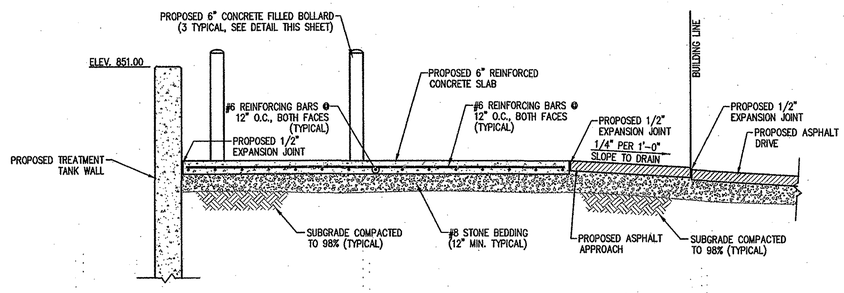
BOLLARD DETAIL

NOT TO SCALE



DUMPSTER PAD DETAIL

SCALE: 3/8" = 1'-0"



DUMPSTER PAD SECTION

SCALE: 3/8" = 1'-0"

GENERAL NOTES:

1. CONTRACTOR TO INSTALL ALL EQUIPMENT IN COMPLETE ACCORDANCE WITH ALL MANUFACTURER'S RECOMMENDATIONS.
2. ALL FASTENERS, SUPPORTS, ETC. TO BE STAINLESS STEEL.
3. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION.
4. ALL CONCRETE TO BE MINIMUM F'c = 4000 PSI. ALL REINFORCING STEEL TO BE MINIMUM Fy = 60,000 PSI.
5. SEE STRUCTURAL DETAIL SHEET AND ELECTRICAL/MECHANICAL SHEETS FOR FURTHER DETAIL.
6. SEE PLANT CONTROL/MONITOR SPECIFICATIONS FOR NECESSARY EQUIPMENT COORDINATION.
7. SEE DETAIL SHEET FOR TYPICAL WALL PENETRATION DETAILS.
8. ALL FERROUS METAL SURFACES TO BE PREPARED AND PAINTED IN ACCORDANCE WITH THE SPECIFICATIONS.
9. SEE DETAIL SHEET FOR GRATING DETAILS.
10. CONTRACTOR TO COORDINATE WITH ALL OTHER APPLICABLE PLAN SHEETS AND SPECIFICATIONS.
11. CONTRACTOR RESPONSIBLE FOR TRANSFERRING ALL SUITABLE TREATMENT MATERIAL FROM EXISTING TANKS TO THE PROPOSED TANKS.
12. CONTRACTOR TO VERIFY EQUIPMENT MOUNTING ELEVATIONS AND DIMENSIONS PRIOR TO CONSTRUCTION.
13. CONTRACTOR IS TO VISIT THE SITE PRIOR TO CONSTRUCTION IN ORDER TO IDENTIFY ANY EXISTING CONFLICTS TO BE ADDRESSED.

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	JRN

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER 6/17/13

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TRIAD ASSOCIATES INC.
5835 LAWTON LOOP EAST DRIVE
INDIANAPOLIS, INDIANA 46216
PHONE: 317-377-5230 FAX: 317-377-5241

DESIGNED FOR:

THE TOWN OF SWEETSER
GRANT COUNTY, INDIANA

SHEET TITLE:

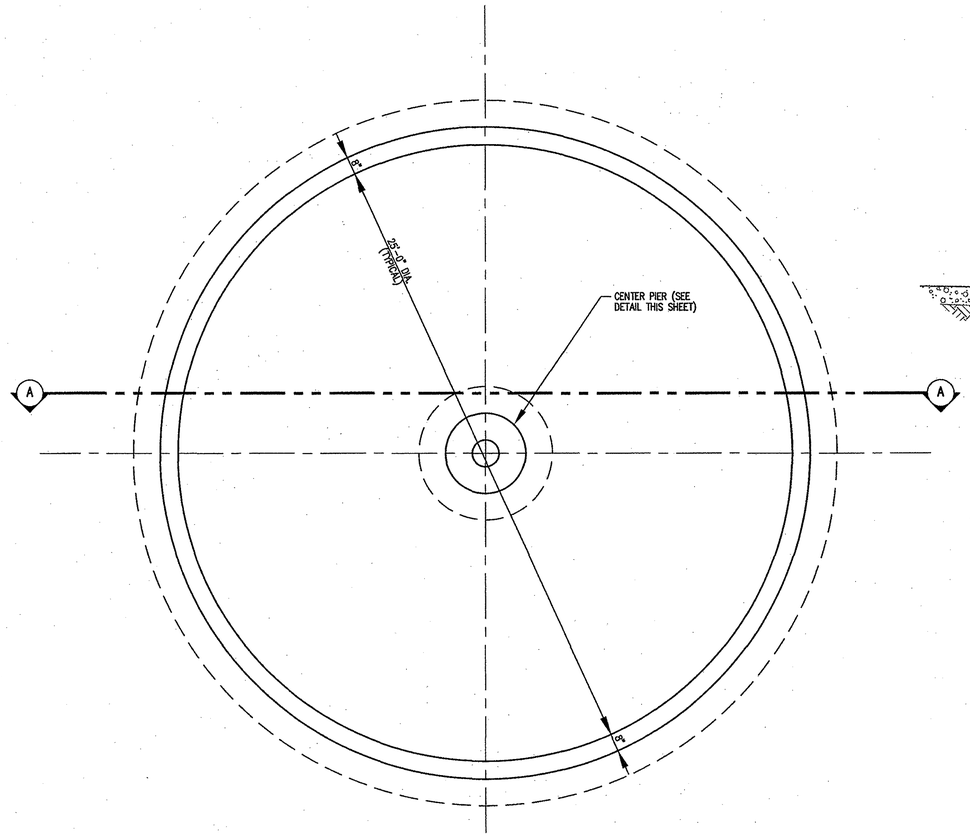
PROPOSED TREATMENT TANK STRUCTURAL SECTION AND DETAILS

JOB NUMBER: 201115D	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1=64	PLOT DATE: 06/17/13
DRAWN BY: D.A.P.	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-TankStruc2REV2	

SHEET No.

S2

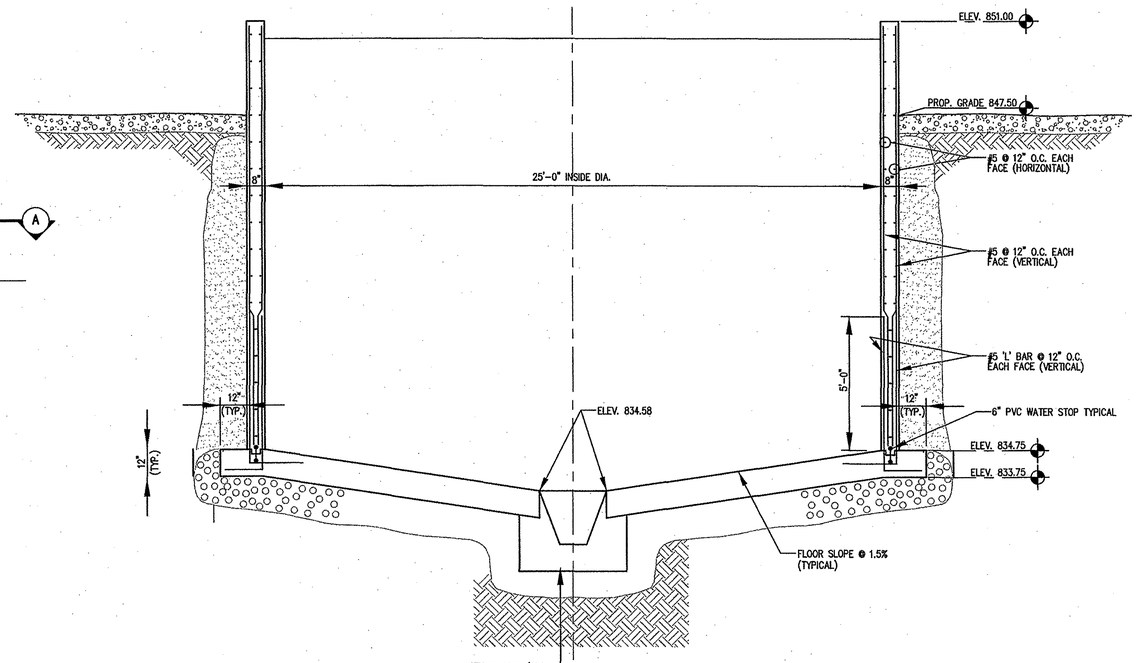
RE-DESIGN SET 06-17-13



PROPOSED CLARIFIER PLAN VIEW

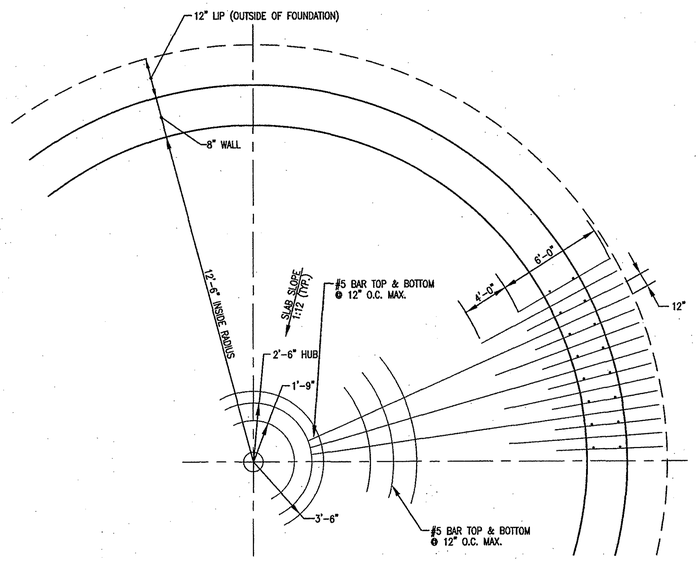
NOT TO SCALE

NOTE:
COORDINATE SLUDGE HOPPER REINFORCING – SEE CENTER PIER DETAILS THIS SHEET



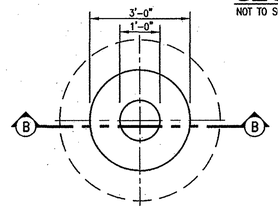
SECTION A-A

NOT TO SCALE



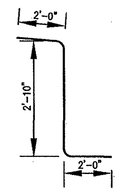
SLAB REINFORCING PLAN

NOT TO SCALE



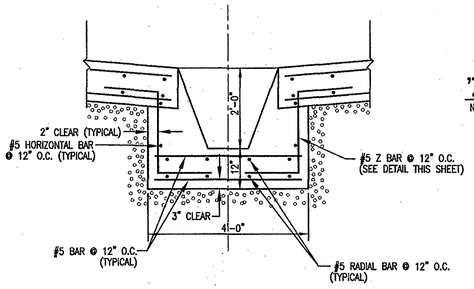
CENTER PIER DETAIL

NOT TO SCALE



'Z' BAR DETAIL

NOT TO SCALE



SECTION B-B

NOT TO SCALE

NOTE: CONSULT MANUFACTURER'S DRAWING FOR FINAL DIMENSIONAL DATA

GENERAL NOTES:

1. CONTRACTOR TO INSTALL ALL EQUIPMENT IN COMPLETE ACCORDANCE WITH ALL MANUFACTURER'S RECOMMENDATIONS.
2. ALL FASTENERS, SUPPORTS, ETC. TO BE STAINLESS STEEL.
3. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION.
4. ALL CONCRETE TO BE MINIMUM F'c = 4000 PSI. ALL REINFORCING STEEL TO BE MINIMUM Fy = 60,000 PSI.
5. SEE STRUCTURAL DETAIL SHEET AND ELECTRICAL/MECHANICAL SHEETS FOR FURTHER DETAIL.
6. SEE PLANT CONTROL/MONITOR SPECIFICATIONS FOR NECESSARY EQUIPMENT COORDINATION.
7. SEE DETAIL SHEET FOR TYPICAL WALL PENETRATION DETAILS.
8. ALL FERROUS METAL SURFACES TO BE PREPARED AND PAINTED IN ACCORDANCE WITH THE SPECIFICATIONS.
9. SEE DETAIL SHEET FOR GRATING DETAILS.
10. CONTRACTOR TO COORDINATE WITH ALL OTHER APPLICABLE PLAN SHEETS AND SPECIFICATIONS.
11. CONTRACTOR RESPONSIBLE FOR TRANSFERRING ALL SUITABLE TREATMENT MATERIAL FROM EXISTING TANKS TO THE PROPOSED TANKS.
12. CONTRACTOR TO VERIFY EQUIPMENT MOUNTING ELEVATIONS AND DIMENSIONS PRIOR TO CONSTRUCTION.
13. CONTRACTOR IS TO VISIT THE SITE PRIOR TO CONSTRUCTION IN ORDER TO IDENTIFY ANY EXISTING CONFLICTS TO BE ADDRESSED.

RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	JRN

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER

6/17/13

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PHONE: 317-377-5230 FAX: 317-377-5241

DESIGNED FOR:

THE TOWN OF SWEETSER
GRANT COUNTY, INDIANA

SHEET TITLE:

PROPOSED CLARIFIER STRUCTURAL PLAN, SECTION AND DETAILS

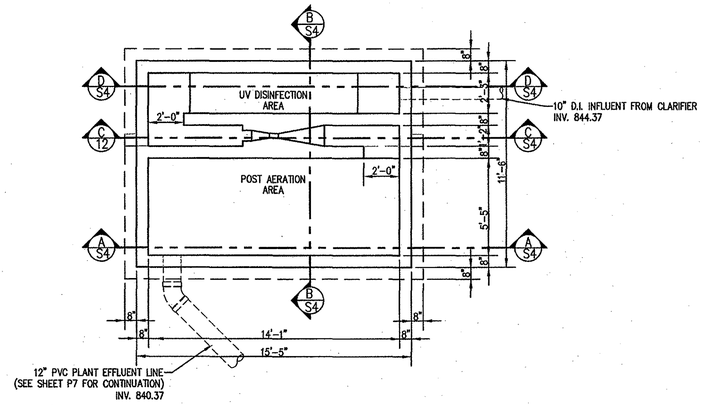
JOB NUMBER: 201115D	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1=32	PLOT DATE: 06/17/13
DRAWN BY: D.A.P.	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-ClarStrucREV2	

SHEET No.

S3

GENERAL NOTES:

1. CONTRACTOR TO INSTALL ALL EQUIPMENT IN COMPLETE ACCORDANCE WITH ALL MANUFACTURER'S RECOMMENDATIONS.
2. ALL FASTENERS, SUPPORTS, ETC. TO BE STAINLESS STEEL.
3. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION.
4. ALL CONCRETE TO BE MINIMUM F'c = 4000 PSI. ALL REINFORCING STEEL TO BE MINIMUM Fy = 60,000 PSI.
5. SEE STRUCTURAL DETAIL SHEET AND ELECTRICAL/MECHANICAL SHEETS FOR FURTHER DETAIL.
6. SEE PLANT CONTROL/MONITOR SPECIFICATIONS FOR NECESSARY EQUIPMENT COORDINATION.
7. SEE DETAIL SHEET FOR TYPICAL WALL PENETRATION DETAILS.
8. ALL FERROUS METAL SURFACES TO BE PREPARED AND PAINTED IN ACCORDANCE WITH THE SPECIFICATIONS.
9. SEE DETAIL SHEET FOR GRATING DETAILS.
10. CONTRACTOR TO COORDINATE WITH ALL OTHER APPLICABLE PLAN SHEETS AND SPECIFICATIONS.
11. CONTRACTOR RESPONSIBLE FOR TRANSFERRING ALL SUITABLE TREATMENT MATERIAL FROM EXISTING TANKS TO THE PROPOSED TANKS.
12. CONTRACTOR TO VERIFY EQUIPMENT MOUNTING ELEVATIONS AND DIMENSIONS PRIOR TO CONSTRUCTION.
13. CONTRACTOR IS TO VISIT THE SITE PRIOR TO CONSTRUCTION IN ORDER TO IDENTIFY ANY EXISTING CONFLICTS TO BE ADDRESSED.

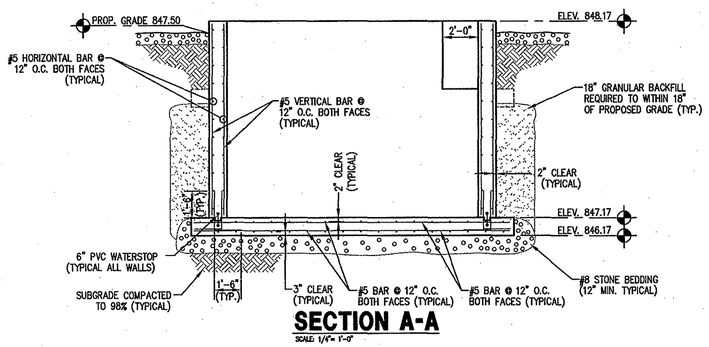


U.V./REAERATION STRUCTURE PLAN VIEW

SCALE: 1/4"= 1'-0"

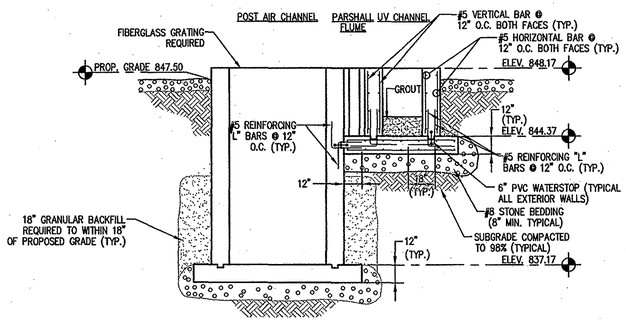
GENERAL NOTES:

1. CONTRACTOR TO INSTALL ALL EQUIPMENT IN COMPLETE ACCORDANCE WITH ALL MANUFACTURER'S RECOMMENDATIONS.
2. ALL FASTENERS, SUPPORTS, ETC. TO BE STAINLESS STEEL.
3. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION.
4. ALL CONCRETE TO BE MINIMUM F'c = 4000 PSI. ALL REINFORCING STEEL TO BE MINIMUM Fy = 60,000 PSI.
5. SEE STRUCTURAL DETAIL SHEET S5 AND ELECTRICAL/MECHANICAL SHEETS FOR FURTHER DETAIL.
6. SEE DETAIL SHEET P9 FOR TYPICAL WALL PENETRATION DETAILS.
7. ALL FERROUS METAL SURFACES TO BE PREPARED AND PAINTED IN ACCORDANCE WITH THE SPECIFICATIONS.
8. SEE DETAIL SHEET P10 FOR GRATING DETAILS.
9. CONTRACTOR TO COORDINATE WITH ALL OTHER APPLICABLE PLAN SHEETS AND SPECIFICATIONS.
10. CONTRACTOR RESPONSIBLE FOR TRANSFERRING ALL SUITABLE TREATMENT MATERIAL FROM EXISTING TANKS TO THE PROPOSED TANKS.
11. CONTRACTOR TO VERIFY EQUIPMENT MOUNTING ELEVATIONS AND DIMENSIONS PRIOR TO CONSTRUCTION.
12. CONTRACTOR SHALL CHAMFER ALL UPPER EDGES OF TANK FOR DETAIL SEE SHEET S5.



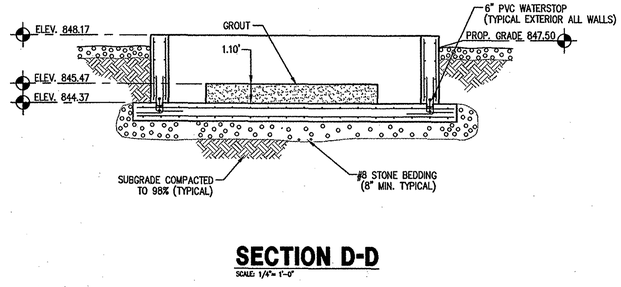
SECTION A-A

SCALE: 1/4"= 1'-0"



SECTION B-B

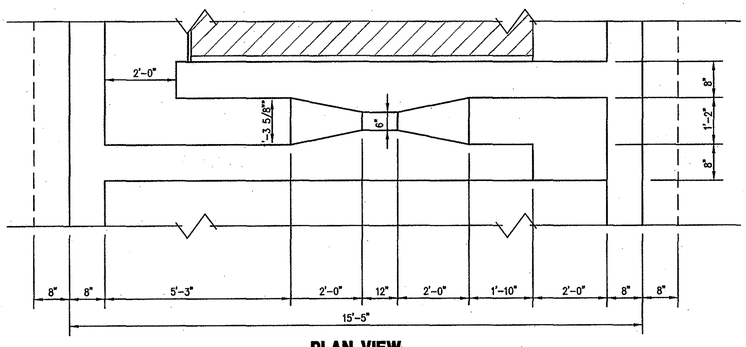
SCALE: 1/4"= 1'-0"



SECTION D-D

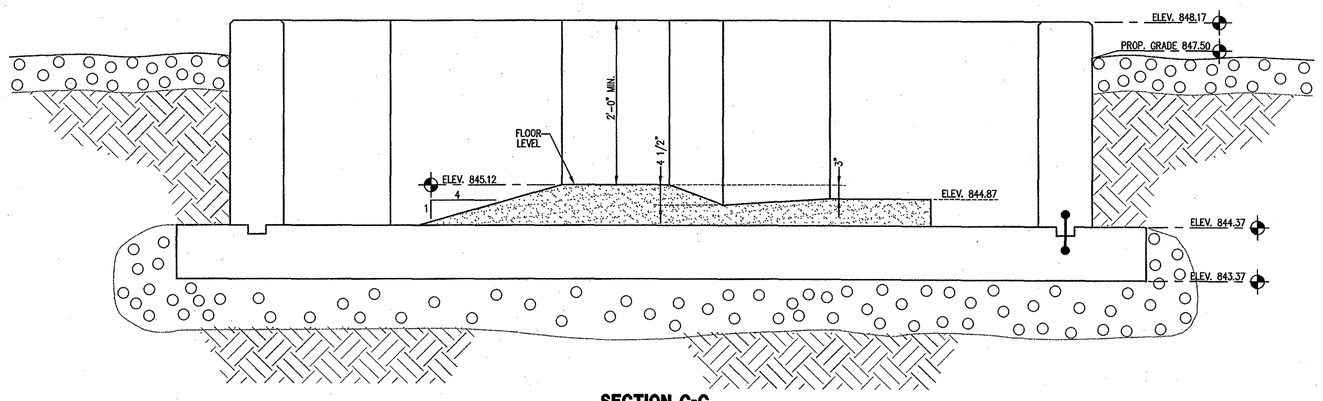
SCALE: 1/4"= 1'-0"

REINFORCING TYPICAL ALL SECTIONS (SEE SHEET No. S5 FOR FURTHER DETAILS AND INSTRUCTIONS)



PLAN VIEW

SCALE: 1/2"= 1'-0"



SECTION C-C

SCALE: 3/4"= 1'-0"

PARSHALL FLUME DETAILS

RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	JRN

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER

5/17/13

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TRIAD ASSOCIATES INC.
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INDIANAPOLIS, INDIANA 46216
PHONE: 317-377-5230 FAX: 317-377-5241

DESIGNED FOR:

THE TOWN OF SWEETSER
GRANT COUNTY, INDIANA

SHEET TITLE:

PROPOSED POST-AERATION, ULTRA VIOLET DISINFECTION AND METERING STRUCTURE STRUCTURAL PLAN AND SECTIONS

JOB NUMBER: 201115D	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1=48	PLOT DATE: 06/17/13
DRAWN BY: D.A.P.	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-UVStrucREV2	

SHEET No.

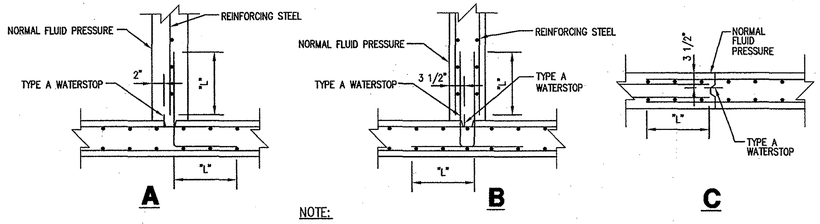
S4

GENERAL NOTES

1. REINFORCING DETAILS SHOWN REPRESENT MINIMUM REQUIREMENTS. ALTERNATE BUT EQUAL METHODS ARE ACCEPTABLE, BUT THEY SHALL NOT BE USED WITHOUT PRIOR APPROVAL BY THE ENGINEER.
2. "L" REPRESENTS THE MINIMUM DEVELOPMENT LENGTHS ACCORDING TO ACI 318, BASED ON GRADE 60 STEEL REINFORCING AND 4,000 PSI (211 kg/sm) 28-DAY CONCRETE.
3. ALL DOWELS SHALL BE THE SAME SIZE AND SPACING AS THE BARS THAT ARE BEING DOWELLED OR AS SHOWN ELSEWHERE ON THE DRAWINGS.
4. THE REINFORCING DETAILS SHOWN ON THIS DRAWING ARE INTENDED TO ESTABLISH BASIC REINFORCING REQUIREMENTS FOR VARIOUS GENERAL TYPES OF HORIZONTAL AND VERTICAL JOINTS IN REINFORCED CONCRETE STRUCTURES. DETAILS DESIGNATED AS "PLAN" ARE HORIZONTAL JOINTS AND DETAILS DESIGNATED AS "SECTION" ARE VERTICAL JOINTS. OTHER DETAILS ARE SELF-EXPLANATORY. WHEN A CONDITION EXISTS IN A STRUCTURE THAT CONFORMS TO ONE OF THESE DETAILS, THE REINFORCING REQUIREMENTS SHOWN ON THE APPLICABLE DETAIL SHALL BE INCORPORATED INTO THE STRUCTURE UNLESS THE CONDITION IS SPECIFICALLY DETAILED ELSEWHERE ON THE DRAWINGS.
5. THE FOLLOWING CONCRETE COVER SHALL BE PROVIDED FOR REINFORCEMENT UNLESS OTHERWISE INDICATED:
   A) CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH: 3 IN. (BOTTOM MAT AND SIDES OF SLABS OR OTHER CONCRETE CAST AGAINST THE EARTH).
   B) CONCRETE EXPOSED TO EARTH, WEATHER OR FLUID SURFACES: 2 IN. (TANK WALLS, BEAMS, SLABS, COLUMNS).
   C) CONCRETE NOT EXPOSED TO EARTH IN CONTACT WITH GROUND: 1 1/2 IN.
6. AN UNDIMENSIONED BEND REPRESENTS A STANDARD HOOK.
7. WHERE ONE GRID OF REINFORCING IS REQUIRED IN A WALL OR SLAB THE GRID SHALL BE CENTERED IN THE ELEMENT, UNLESS OTHERWISE LOCATED ON THE PLANS WITH A CLEAR DISTANCE TO EITHER SIDE OF THE ELEMENT.
8. ALL REINFORCING SPLICES TO MEET ACI REQUIREMENTS.

NOTES:

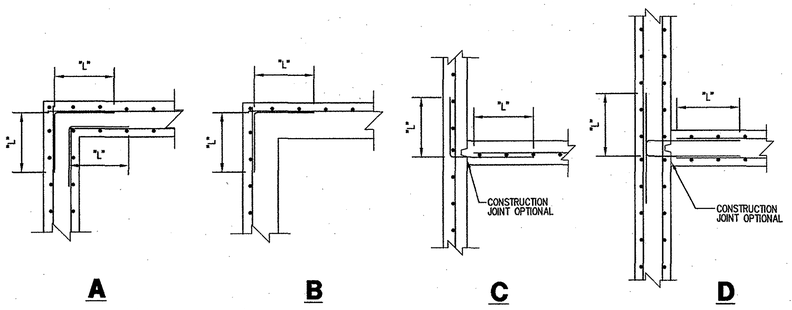
1. REINFORCE EACH FACE AS SHOWN FOR 12" (30.48 cm) OR GREATER WALLS OR SLABS. REINFORCE IN CENTER FOR WALLS OR SLABS LESS THAN 12" (30.48 cm) THICK.
2. MAXIMUM "A" FOR WALLS = 4'-0" (1.22 m). MAXIMUM "A" & "B" FOR SLABS = 4'-0" (1.22 m). LARGER OPENINGS REQUIRE SPECIAL TREATMENT.



NOTE:
1. DETAILS APPLY FOR HORIZONTAL OR VERTICAL JOINTS.

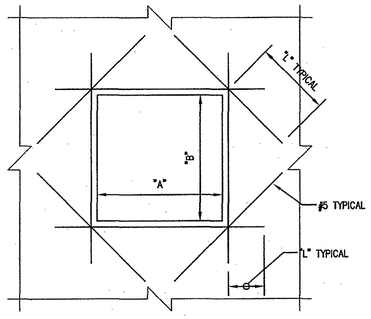
WATERPROOF CONSTRUCTION JOINT DETAILS

NOT TO SCALE



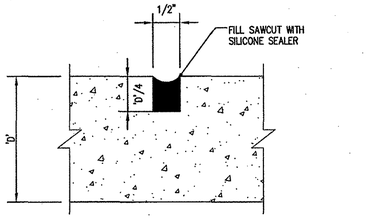
HORIZONTAL REINFORCING CORNER DETAILS

NOT TO SCALE



WALL OR SLAB OPENING DETAIL

NOT TO SCALE



NOTES:

MATERIALS SHALL BE AS DESCRIBED IN THE DETAILED SPECIFICATIONS.

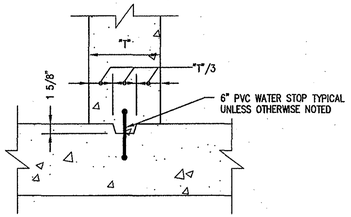
"W" SHALL BE AS SHOWN ELSEWHERE ON THE DRAWINGS, IF NOT "W" SHALL BE 1/3".

DETAIL APPLIES TO HORIZONTAL AND VERTICAL JOINTS.

W	D	D (MIN.)
1/2"	W	< 1/4"
1/2"	W/2	> 1/2"

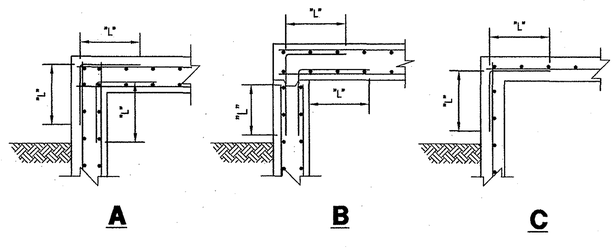
SLAB CONTROL JOINT COMPOSITION

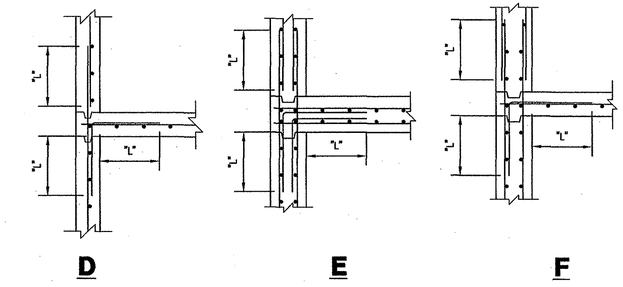
NOT TO SCALE

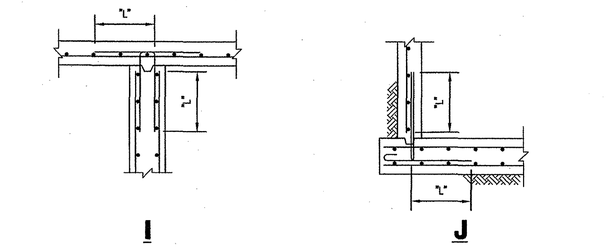


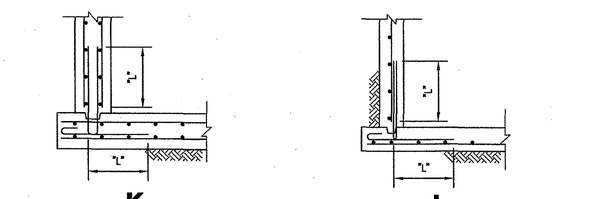
KEYWAY DETAIL

NOT TO SCALE



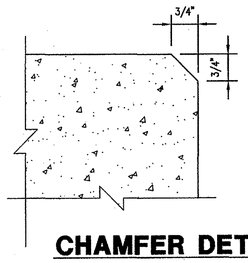






VERTICAL REINFORCING CORNER DETAILS

NOT TO SCALE

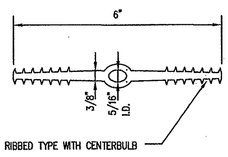


CHAMFER DETAIL

NOT TO SCALE

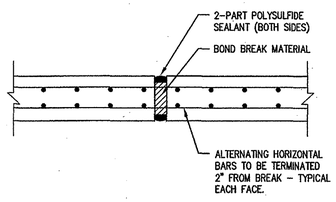
NOTE:

1. EXPOSED CORNER DETAIL SHALL BE USED ON ALL EXPOSED EDGES UNLESS OTHERWISE NOTED



TYPE A WATERSTOP

NOT TO SCALE



TYPICAL WALL CONTROL JOINT

NOT TO SCALE

RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	JRN

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER 6/17/13

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INDIANAPOLIS, INDIANA 46216
PHONE: 317-377-5230 FAX: 317-377-5241

DESIGNED FOR:

THE TOWN OF SWEETSER
GRANT COUNTY, INDIANA

SHEET TITLE:

PROPOSED STRUCTURAL DETAILS

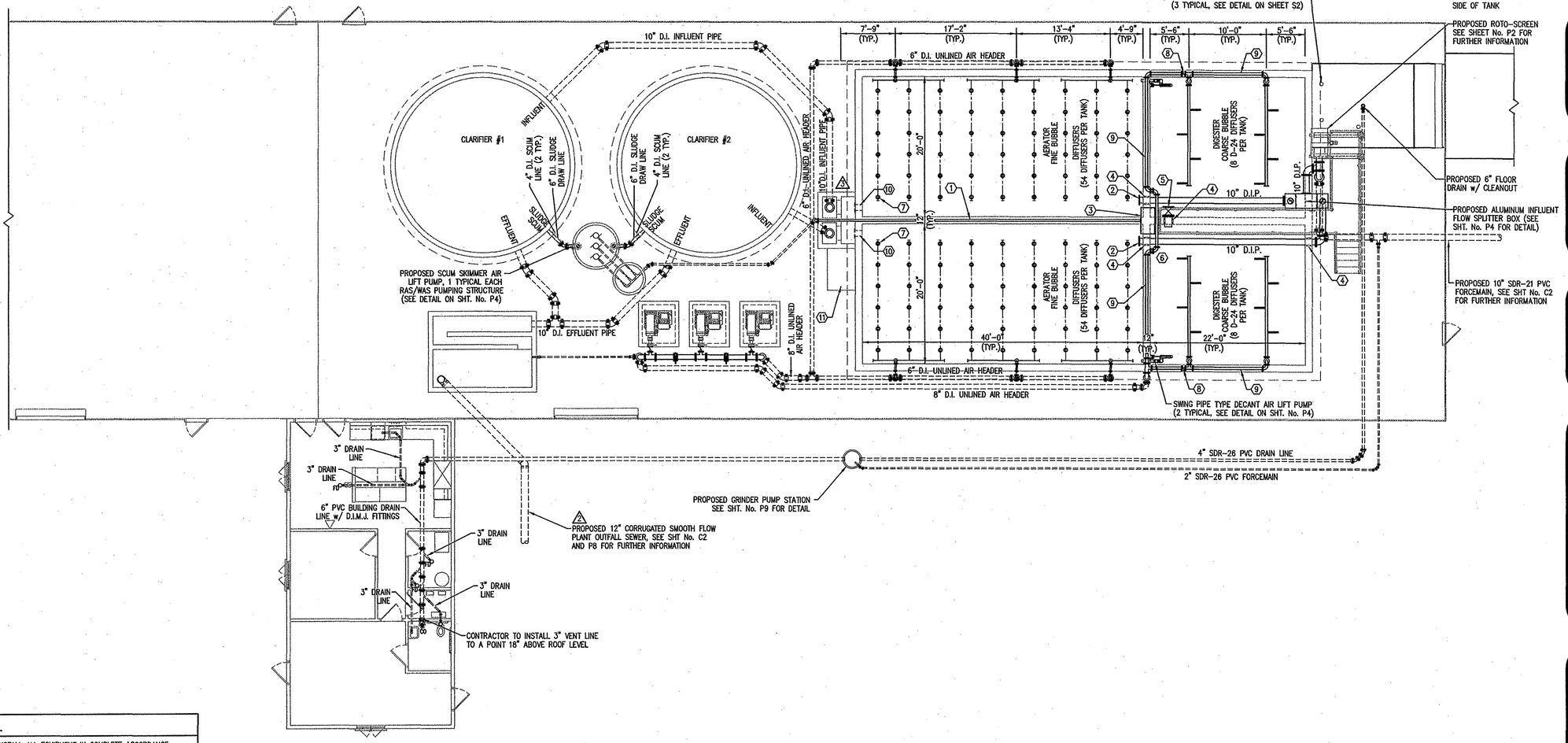
JOB NUMBER: 201115D	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1=1	PLOT DATE: 06/17/13
DRAWN BY: D.A.P.	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-StrDetREV2	

SHEET No.

S5

PROJECT KEYNOTES:

1. PROPOSED 3" D.I. RAS/WAS RETURN LINE. CONTRACTOR IS TO FABRICATE PIPE SUPPORT ANCHORS, TO BE INSTALLED @ 4'-0" O.C. ALONG LENGTH OF WALL
2. PROPOSED INFLUENT FROM SPLITTER BOX TO AERATION TANK
3. PROPOSED RAS/WAS FLOW CONTROL BOX (SEE SHT. No. P4 FOR DETAILS)
4. PROPOSED LINK-SEAL REQUIRED (SEE SHT. No. P9 FOR DETAILS)
5. PROPOSED 12" PLUG VALVE w/ HANDWHEEL OPERATION FROM WALKWAY
6. PROPOSED 12" D.I. TRANSFER PIPE BETWEEN TANKS
7. PROPOSED FINE BUBBLE MEMBRANE DIFFUSER DISC, TYPICAL OF BOTH AERATION TANKS (SEE SPECIFICATIONS FOR MORE INFORMATION)
8. PROPOSED 4" BUTTERFLY VALVE
9. PROPOSED 4" D.I. UNLINED AIR HEADER. CONTRACTOR IS TO FABRICATE PIPE SUPPORT ANCHORS, TO BE INSTALLED @ 4'-0" O.C. ALONG LENGTH OF WALL
10. PROPOSED 10" D.I. AERATOR TANK EFFLUENT PIPE
11. PROPOSED ALUM CHEMICAL FEED CONCRETE PAD (FOR EQUIPMENT DETAIL, SEE SHT. No. P9)



GENERAL NOTES:

1. CONTRACTOR TO INSTALL ALL EQUIPMENT IN COMPLETE ACCORDANCE WITH ALL MANUFACTURER'S RECOMMENDATIONS.
2. ALL FASTENERS, SUPPORTS, ETC. TO BE STAINLESS STEEL.
3. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION.
4. ALL CONCRETE TO BE MINIMUM F'c = 4000 PSI. ALL REINFORCING STEEL TO BE MINIMUM Fy = 60,000 PSI.
5. SEE STRUCTURAL DETAIL SHEET AND ELECTRICAL/MECHANICAL SHEETS FOR FURTHER DETAIL.
6. SEE PLANT CONTROL/MONITOR SPECIFICATIONS FOR NECESSARY EQUIPMENT COORDINATION.
7. SEE DETAIL SHEET FOR TYPICAL WALL PENETRATION DETAILS.
8. ALL FERROUS METAL SURFACES TO BE PREPARED AND PAINTED IN ACCORDANCE WITH THE SPECIFICATIONS.
9. SEE DETAIL SHEET FOR GRATING DETAILS.
10. CONTRACTOR TO COORDINATE WITH ALL OTHER APPLICABLE PLAN SHEETS AND SPECIFICATIONS.
11. CONTRACTOR RESPONSIBLE FOR TRANSFERRING ALL SUITABLE TREATMENT MATERIAL FROM EXISTING TANKS TO THE PROPOSED TANKS.
12. CONTRACTOR TO VERIFY EQUIPMENT MOUNTING ELEVATIONS AND DIMENSIONS PRIOR TO CONSTRUCTION.
13. CONTRACTOR IS TO VISIT THE SITE PRIOR TO CONSTRUCTION IN ORDER TO IDENTIFY ANY EXISTING CONFLICTS TO BE ADDRESSED.

PROPOSED PLANT PIPING

SCALE: 1/8" = 1'-0"

NORTH

RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	JRN
8/01/13	2 REVISED PIPE TYPE	D.A.P.
8/01/13	3 ADDED FLOW SPLITTER STRUCTURE	D.A.P.

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER 8/2/13

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TRIAD ASSOCIATES INC.
5835 LAWTON LOOP EAST DRIVE
INDIANAPOLIS, INDIANA 46216
PHONE: 317-377-5230 FAX: 317-377-5241

DESIGNED FOR:

THE TOWN OF SWEETSER
GRANT COUNTY, INDIANA

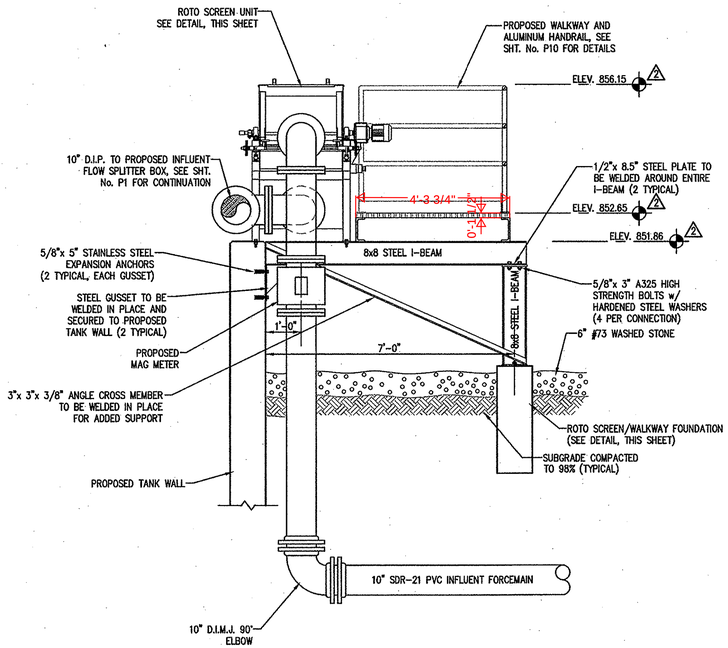
SHEET TITLE:

PROPOSED PLANT PIPING PLAN

JOB NUMBER: 201115D	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1=64	PLOT DATE: 08/01/13
DRAWN BY: D.A.P.	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-PipingREV2	

SHEET No.

P1

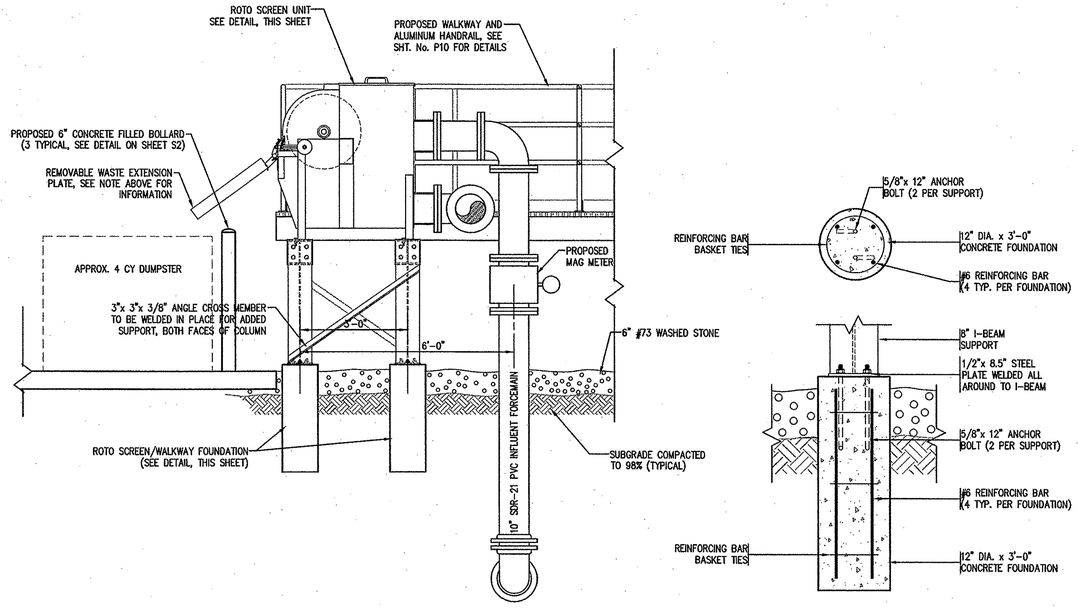


ROTO SCREEN/WALKWAY ELEVATIONS

SCALE: 1/2" = 1'-0"

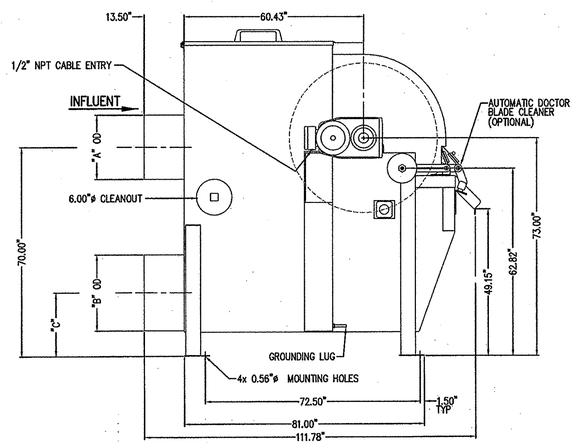
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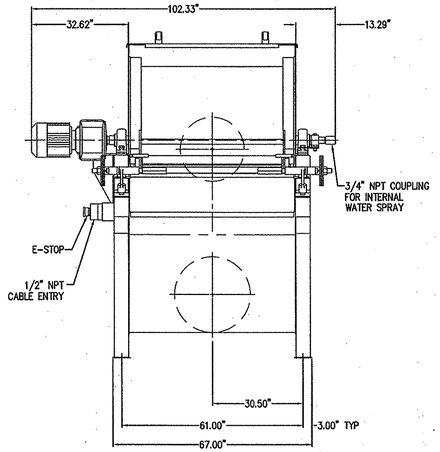
CONTRACTOR IS TO FABRICATE A REMOVABLE EFFLUENT WASTE EXTENSION PLATE SUITABLE TO REACH FROM ROTO SCREEN TO DUMPSTER LOCATION.



ROTO SCREEN/WALKWAY SUPPORT FOUNDATION DETAIL

NOT TO SCALE





ROTO SCREEN MANUFACTURERS DIMENSIONS

SCALE: 1/2" = 1'-0"

GENERAL NOTES:

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RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	JRN
8/02/13	2 REVISED ELEVATIONS	D.A.P.

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER 8/2/13

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PHONE: 317-377-5230 FAX: 317-377-5241

DESIGNED FOR:

THE TOWN OF SWEETSER
GRANT COUNTY, INDIANA

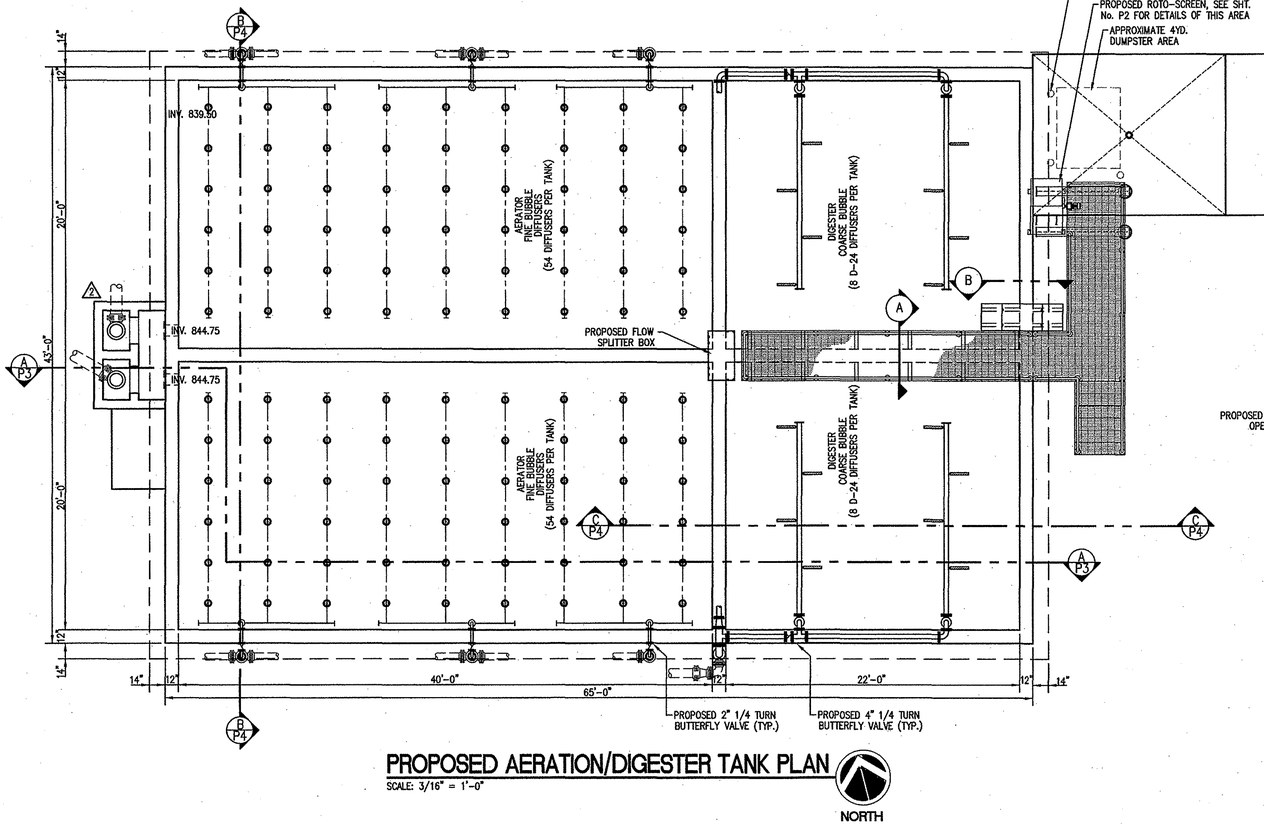
SHEET TITLE:

PROPOSED ROTO-SCREEN PLAN AND SECTIONS

JOB NUMBER: 201115D	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1=24	PLOT DATE: 08/02/13
DRAWN BY: D.A.P.	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-RotoScreenREV2	

SHEET No.

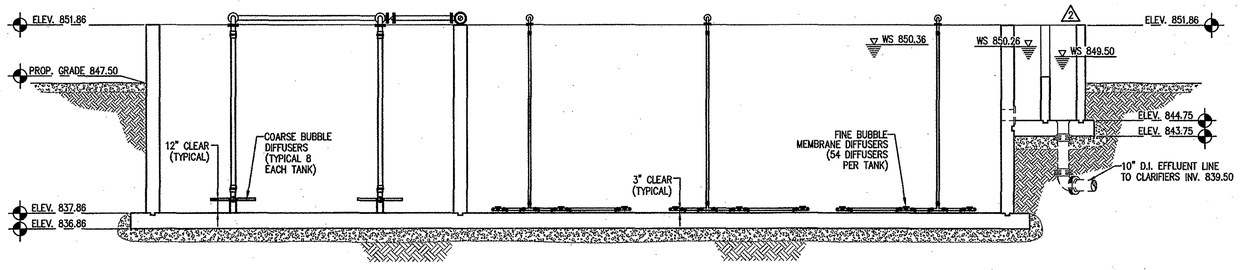
P2



PROPOSED AERATION/DIGESTER TANK PLAN

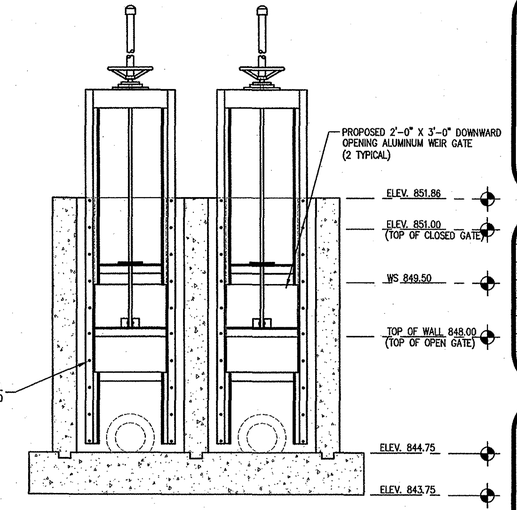
SCALE: 3/16" = 1'-0"

NORTH



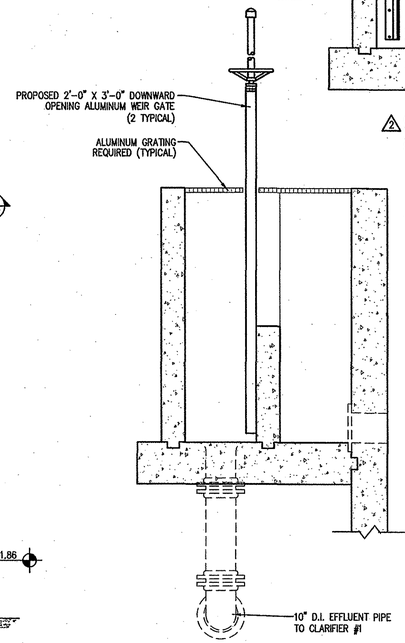
SECTION A-A

SCALE: 3/16" = 1'-0"



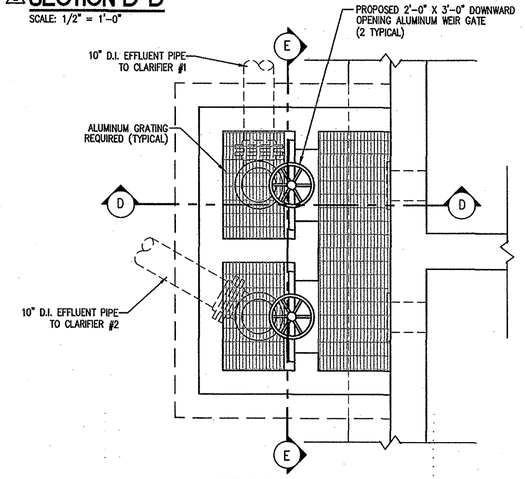
⚠2 SECTION E-E

SCALE: 1/2" = 1'-0"



⚠2 SECTION D-D

SCALE: 1/2" = 1'-0"

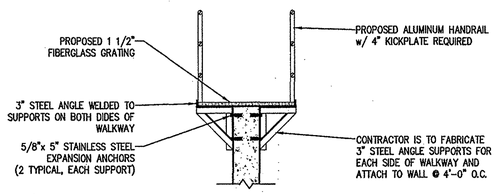


⚠2 PROPOSED FLOW SPLITTER STRUCTURE

SCALE: 1/2" = 1'-0"

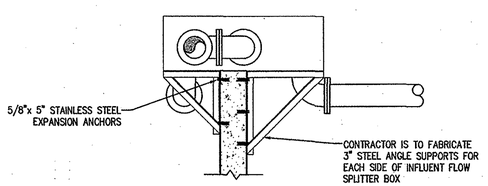
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DETAIL "A"

NOT TO SCALE



DETAIL "B"

NOT TO SCALE

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	JRN
8/02/13	⚠1 ADDED FLOW SPLITTER STRUCTURE	D.A.P.

APPROVED BY:

8/2/13

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER

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PHONE: 317-377-5230 FAX: 317-377-5241

DESIGNED FOR:

THE TOWN OF SWEETSER
GRANT COUNTY, INDIANA

SHEET TITLE:

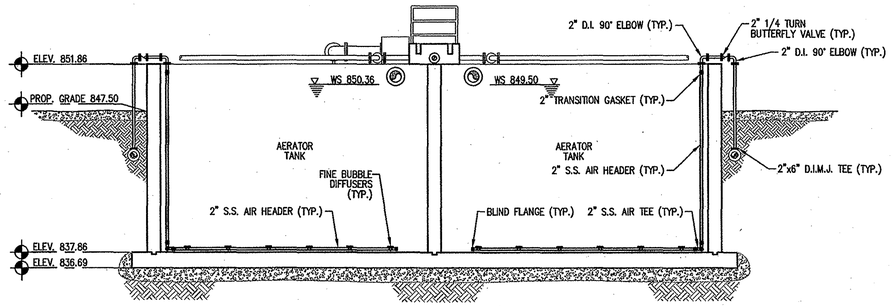
PROPOSED TREATMENT TANK PLAN AND SECTIONS

JOB NUMBER: 201115D	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1=64	PLOT DATE: 08/02/13
DRAWN BY: D.A.P.	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-TankREV2	

SHEET No.

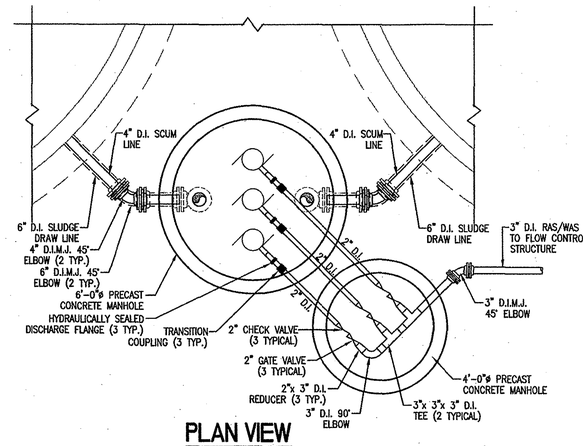
P3

RE-DESIGN SET 06-17-13

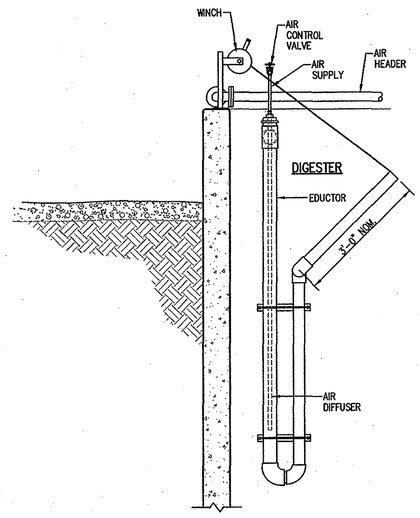


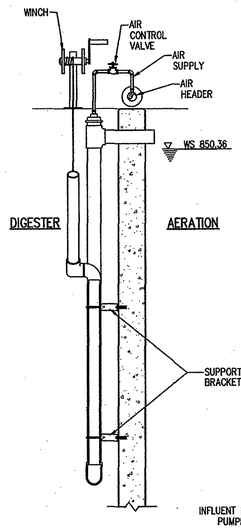
⚠2 SECTION B-B

SCALE: 3/16" = 1'-0"



PLAN VIEW

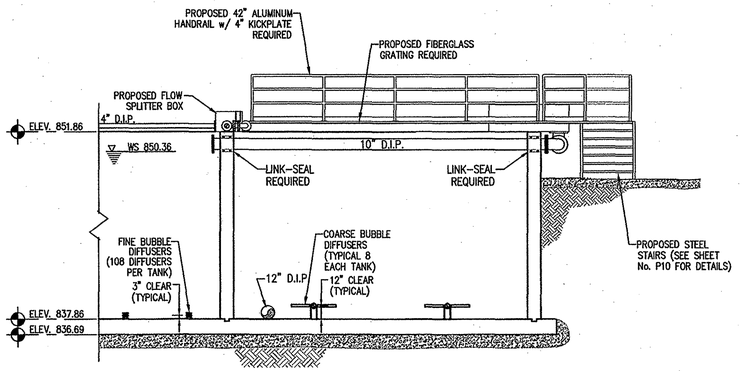




SWING ARM DIAMETER	EDUCTOR DIAMETER	AIR SUPPLY DIAMETER
3"	4"	3/4"
4"	5"	3/4"
5"	6"	1"

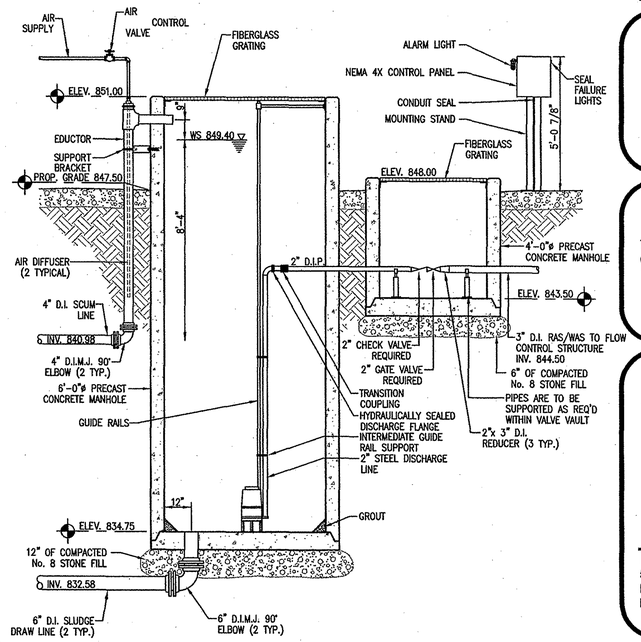
⚠2 SWING PIPE TYPE DECANT AIR LIFT DETAIL

SCALE: 3/8" = 1'-0"



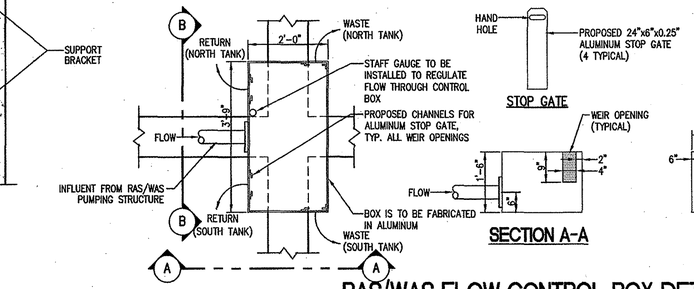
⚠2 SECTION C-C

SCALE: 3/16" = 1'-0"

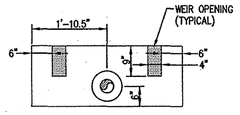


RAS/WAS PUMP STRUCTURE DETAIL

SCALE: 3/8" = 1'-0"



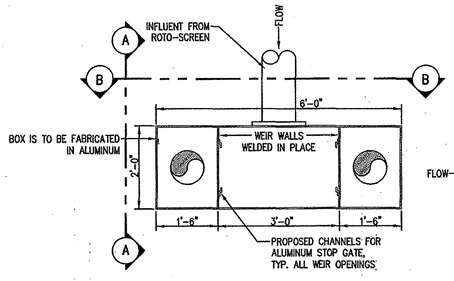
SECTION A-A

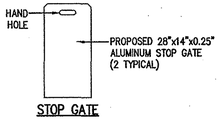


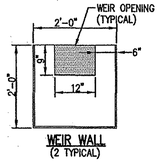
SECTION B-B

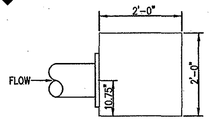
RAS/WAS FLOW CONTROL BOX DETAILS

SCALE: 3/4" = 1'-0"

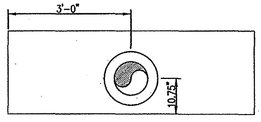








SECTION A-A



SECTION B-B

INFLUENT FLOW SPLITER BOX DETAILS

SCALE: 3/4" = 1'-0"

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RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	JRN
8/01/13	⚠2 REVISED ELEVATIONS	D.A.P.

APPROVED BY:

JAMES W. FRAZELL, REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER 8/2/13

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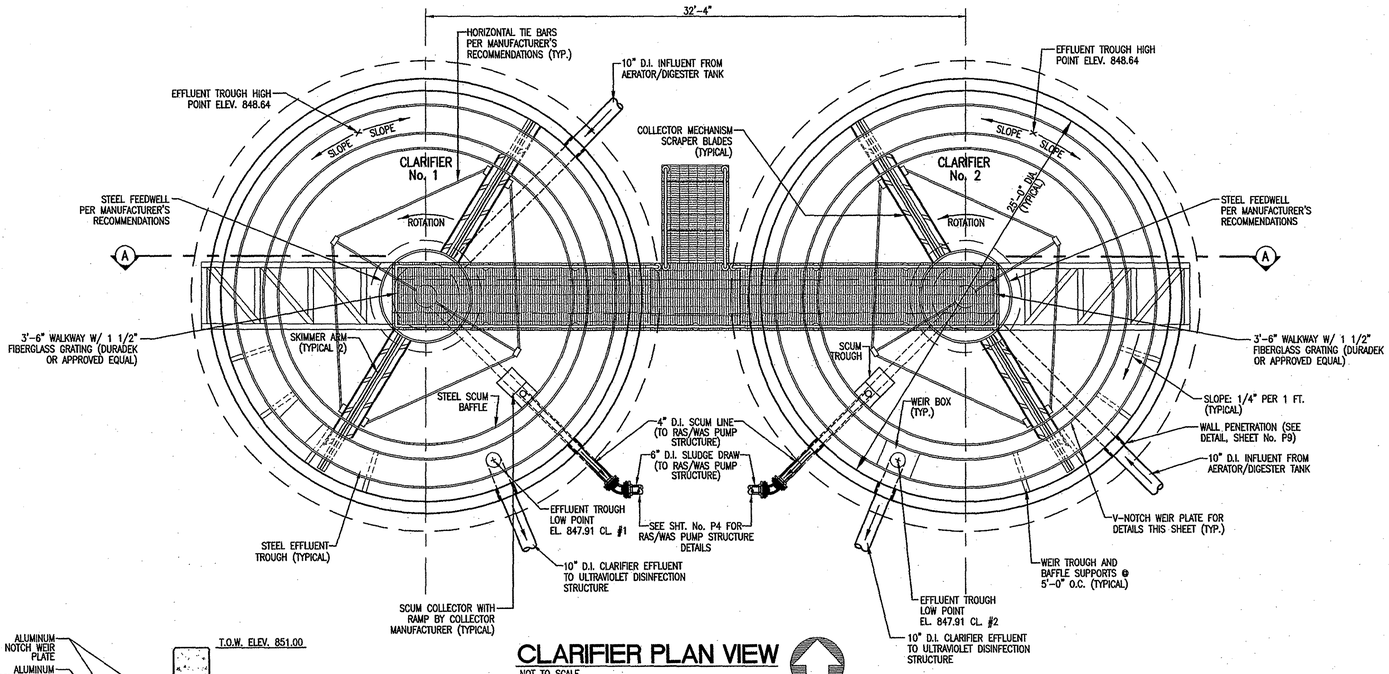
SHEET TITLE:

PROPOSED TREATMENT TANK SECTIONS AND DETAILS

JOB NUMBER: 201115D	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1=64	PLOT DATE: 08/02/13
DRAWN BY: D.A.P.	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-Tank2REV2	

SHEET No.

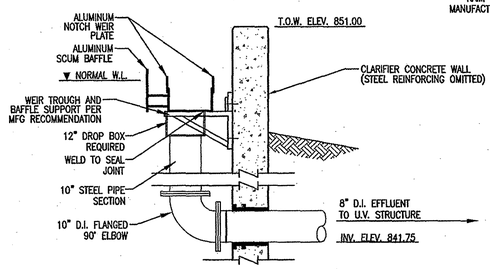
P4



CLARIFIER PLAN VIEW

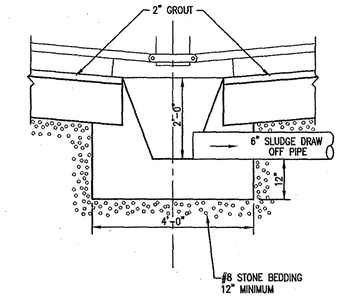
NOT TO SCALE

NORTH



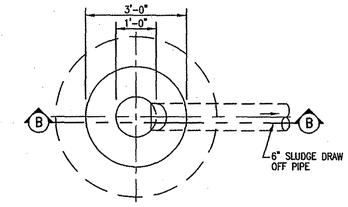
EFFLUENT DETAIL

NOT TO SCALE



SECTION B-B

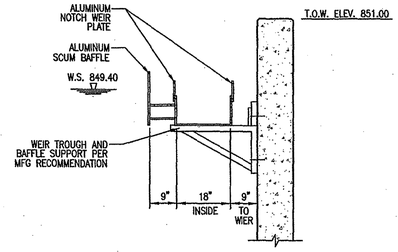
NOT TO SCALE



CENTER PIER DETAIL

NOT TO SCALE

NOTE: CONSULT MANUFACTURER'S DRAWING FOR FINAL DIMENSIONAL DATA

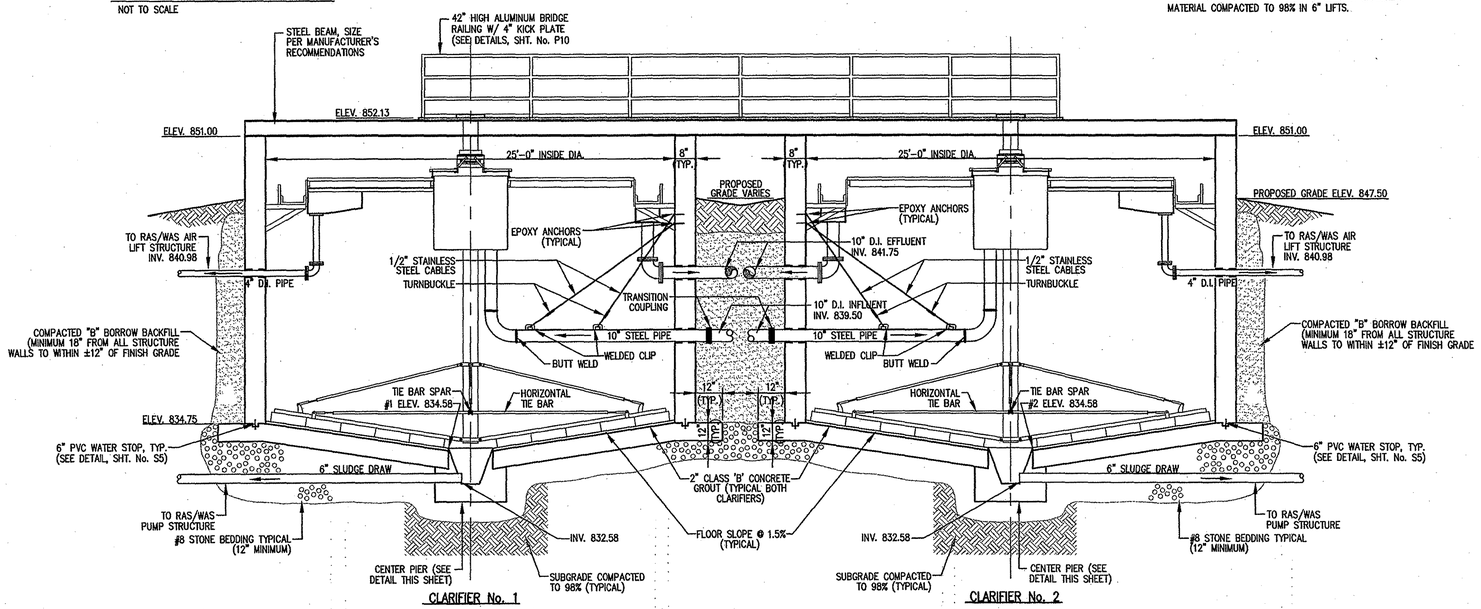


WEIR DETAIL

NOT TO SCALE

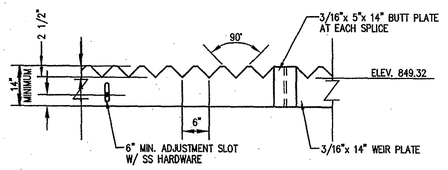
NOTES:

CONTRACTOR TO REMOVE 2' OF EXISTING EARTH BELOW SLAB. AREA BELOW SLAB TO BE FILLED WITH GRANULAR MATERIAL COMPACTED TO 98% IN 6" LIFTS.



SECTION A-A

NOT TO SCALE



ADJUSTABLE WEIR DETAIL

NOT TO SCALE

GENERAL NOTES:

1. CONTRACTOR TO INSTALL ALL EQUIPMENT IN COMPLETE ACCORDANCE WITH ALL MANUFACTURER'S RECOMMENDATIONS.
2. ALL FASTENERS, SUPPORTS, ETC. TO BE STAINLESS STEEL.
3. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION.
4. ALL CONCRETE TO BE MINIMUM F'c = 4000 PSI. ALL REINFORCING STEEL TO BE MINIMUM Fy = 60,000 PSI.
5. SEE STRUCTURAL DETAIL SHEET AND ELECTRICAL/MECHANICAL SHEETS FOR FURTHER DETAIL.
6. SEE PLANT CONTROL/MONITOR SPECIFICATIONS FOR NECESSARY EQUIPMENT COORDINATION.
7. SEE DETAIL SHEET FOR TYPICAL WALL PENETRATION DETAILS.
8. ALL FERROUS METAL SURFACES TO BE PREPARED AND PAINTED IN ACCORDANCE WITH THE SPECIFICATIONS.
9. SEE DETAIL SHEET FOR GRATING DETAILS.
10. CONTRACTOR TO COORDINATE WITH ALL OTHER APPLICABLE PLAN SHEETS AND SPECIFICATIONS.
11. CONTRACTOR RESPONSIBLE FOR TRANSFERRING ALL SUITABLE TREATMENT MATERIAL FROM EXISTING TANKS TO THE PROPOSED TANKS.
12. CONTRACTOR TO VERIFY EQUIPMENT MOUNTING ELEVATIONS AND DIMENSIONS PRIOR TO CONSTRUCTION.
13. CONTRACTOR IS TO VISIT THE SITE PRIOR TO CONSTRUCTION IN ORDER TO IDENTIFY ANY EXISTING CONFLICTS TO BE ADDRESSED.

RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	JRN
8/02/13	REMOVED DRAIN HOLES FROM 10" INFLUENT LINE (2 TYPICAL)	D.A.P.

APPROVED BY:

8/2/13

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER

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TRIAD ASSOCIATES INC.
5835 LAWTON LOOP EAST DRIVE
INDIANAPOLIS, INDIANA 46216
PHONE: 317-377-5230 FAX: 317-377-5241

DESIGNED FOR:

THE TOWN OF SWEETSER
GRANT COUNTY, INDIANA

SHEET TITLE:

PROPOSED CLARIFIER PLAN SECTION AND DETAILS

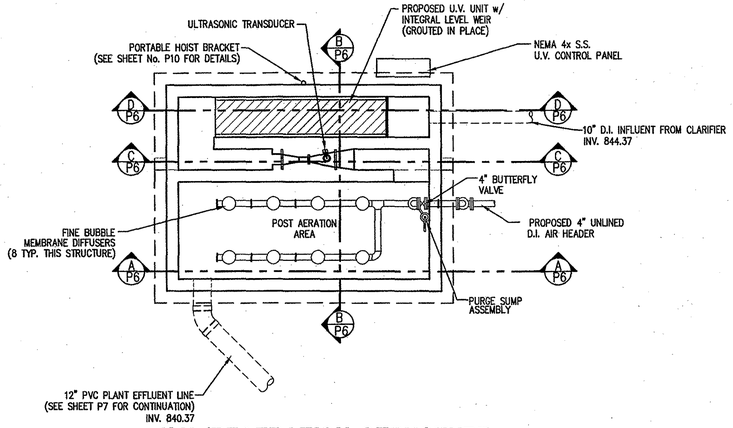
JOB NUMBER: 201115D	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1=48	PLOT DATE: 08/02/13
DRAWN BY: D.A.P.	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-ClarPlanREV2	

SHEET No.

P5

GENERAL NOTES:

1. CONTRACTOR TO INSTALL ALL EQUIPMENT IN COMPLETE ACCORDANCE WITH ALL MANUFACTURER'S RECOMMENDATIONS.
2. ALL FASTENERS, SUPPORTS, ETC. TO BE STAINLESS STEEL.
3. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION.
4. ALL CONCRETE TO BE MINIMUM F'c = 4000 PSI. ALL REINFORCING STEEL TO BE MINIMUM Fy = 60,000 PSI.
5. SEE STRUCTURAL DETAIL SHEET AND ELECTRICAL/MECHANICAL SHEETS FOR FURTHER DETAIL.
6. SEE PLANT CONTROL/MONITOR SPECIFICATIONS FOR NECESSARY EQUIPMENT COORDINATION.
7. SEE DETAIL SHEET FOR TYPICAL WALL PENETRATION DETAILS.
8. ALL FERROUS METAL SURFACES TO BE PREPARED AND PAINTED IN ACCORDANCE WITH THE SPECIFICATIONS.
9. SEE DETAIL SHEET FOR GRATING DETAILS.
10. CONTRACTOR TO COORDINATE WITH ALL OTHER APPLICABLE PLAN SHEETS AND SPECIFICATIONS.
11. CONTRACTOR RESPONSIBLE FOR TRANSFERRING ALL SUITABLE TREATMENT MATERIAL FROM EXISTING TANKS TO THE PROPOSED TANKS.
12. CONTRACTOR TO VERIFY EQUIPMENT MOUNTING ELEVATIONS AND DIMENSIONS PRIOR TO CONSTRUCTION.
13. CONTRACTOR IS TO VISIT THE SITE PRIOR TO CONSTRUCTION IN ORDER TO IDENTIFY ANY EXISTING CONFLICTS TO BE ADDRESSED.

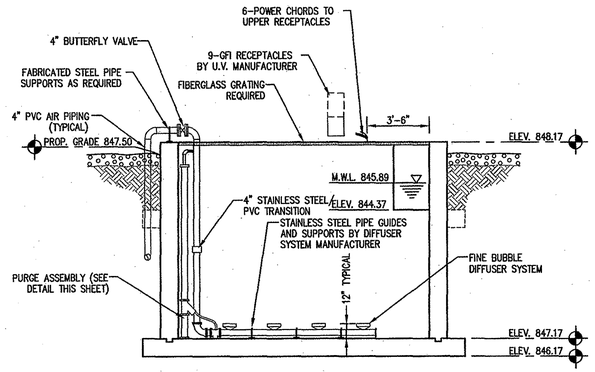


U.V./REAERATION STRUCTURE PLAN VIEW

SCALE: 1/4"= 1'-0"

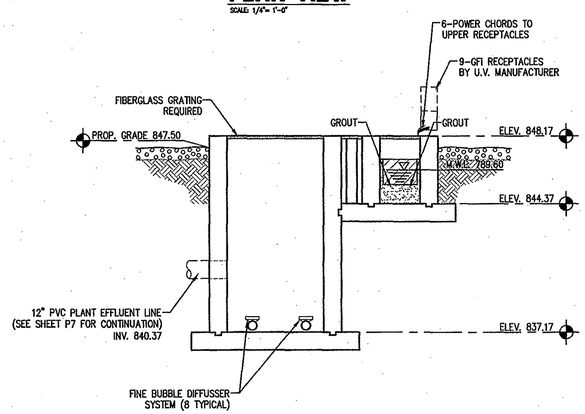
GENERAL NOTES:

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2. ALL FASTENERS, SUPPORTS, ETC. TO BE STAINLESS STEEL.
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5. SEE STRUCTURAL DETAIL SHEET S5 AND ELECTRICAL/MECHANICAL SHEETS FOR FURTHER DETAIL.
6. SEE DETAIL SHEET P9 FOR TYPICAL WALL PENETRATION DETAILS.
7. ALL FERROUS METAL SURFACES TO BE PREPARED AND PAINTED IN ACCORDANCE WITH THE SPECIFICATIONS.
8. SEE DETAIL SHEET P10 FOR GRATING DETAILS.
9. CONTRACTOR TO COORDINATE WITH ALL OTHER APPLICABLE PLAN SHEETS AND SPECIFICATIONS.
10. CONTRACTOR RESPONSIBLE FOR TRANSFERRING ALL SUITABLE TREATMENT MATERIAL FROM EXISTING TANKS TO THE PROPOSED TANKS.
11. CONTRACTOR TO VERIFY EQUIPMENT MOUNTING ELEVATIONS AND DIMENSIONS PRIOR TO CONSTRUCTION.
12. CONTRACTOR SHALL CHAMFER ALL UPPER EDGES OF TANK FOR DETAIL SEE SHEET S5.



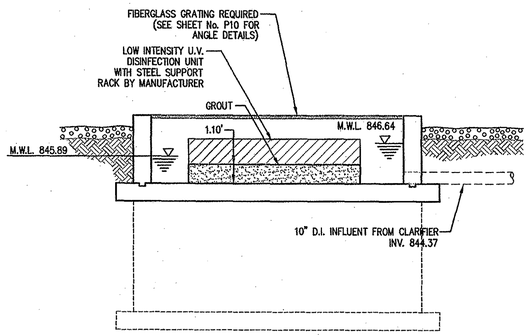
SECTION A-A

SCALE: 1/4"= 1'-0"



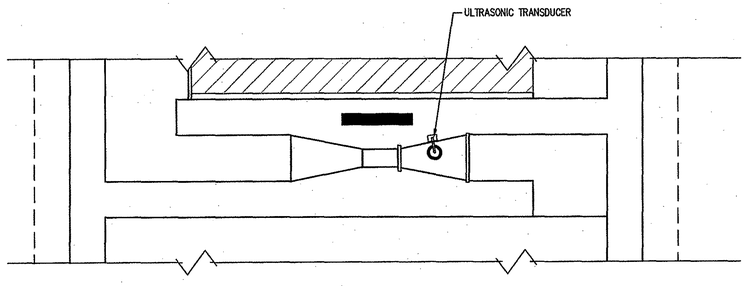
SECTION B-B

SCALE: 1/4"= 1'-0"



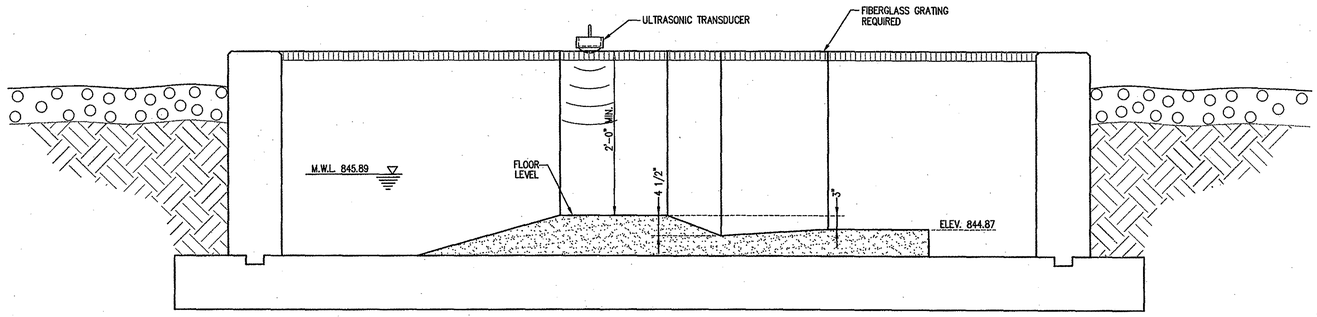
SECTION D-D

SCALE: 1/4"= 1'-0"



PLAN VIEW

SCALE: 1/2"= 1'-0"



SECTION C-C

SCALE: 3/4"= 1'-0"

PARSHALL FLUME DETAILS

RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	JRN

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER 5/17/13

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PHONE: 317-377-5230 FAX: 317-377-5241

DESIGNED FOR:

THE TOWN OF SWEETSER
GRANT COUNTY, INDIANA

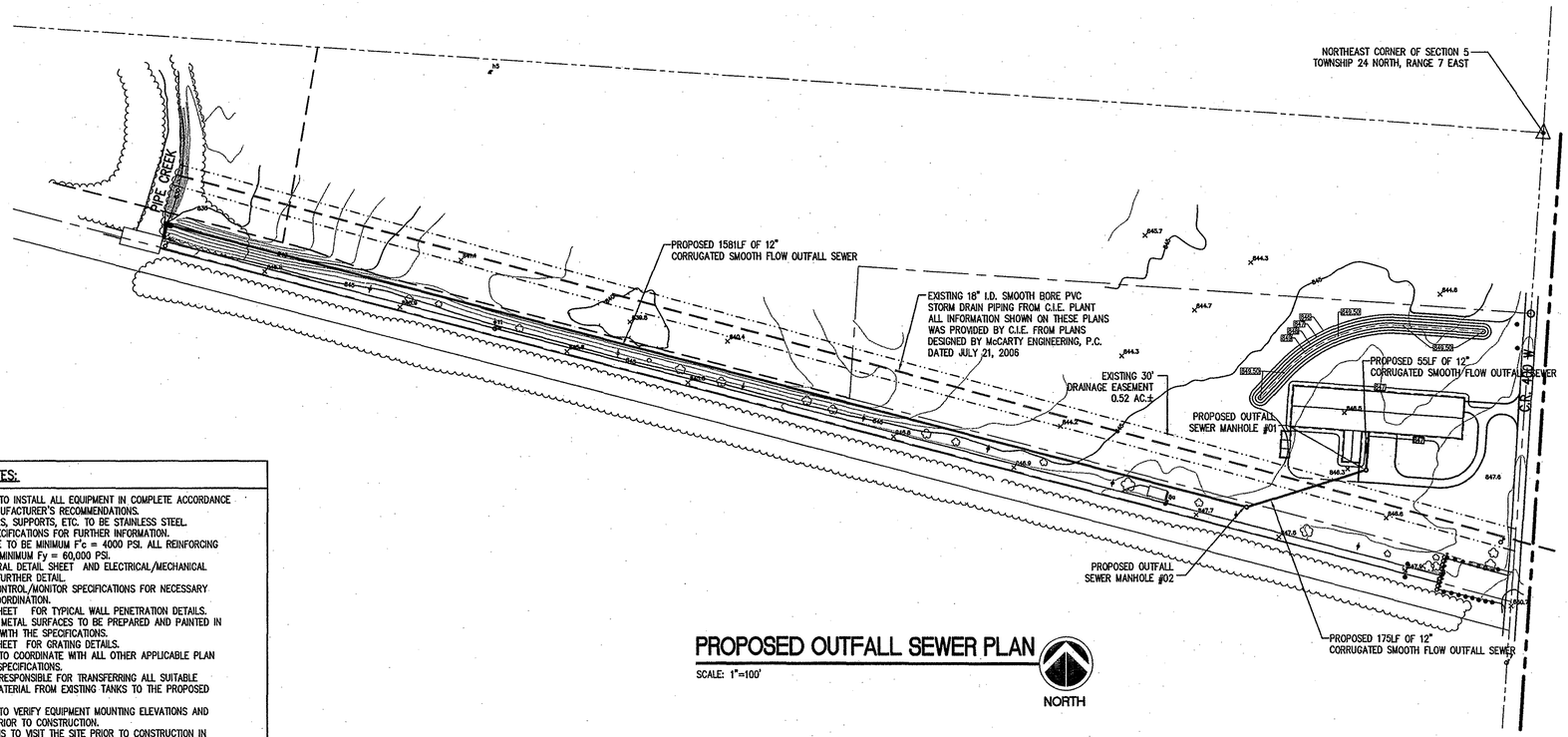
SHEET TITLE:

PROPOSED POST-AERATION, ULTRA VIOLET DISINFECTION AND METERING STRUCTURE PLAN AND SECTIONS

JOB NUMBER: 201115D	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1=48	PLOT DATE: 06/17/13
DRAWN BY: D.A.P.	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-UVPlanREV2	

SHEET No.

P6



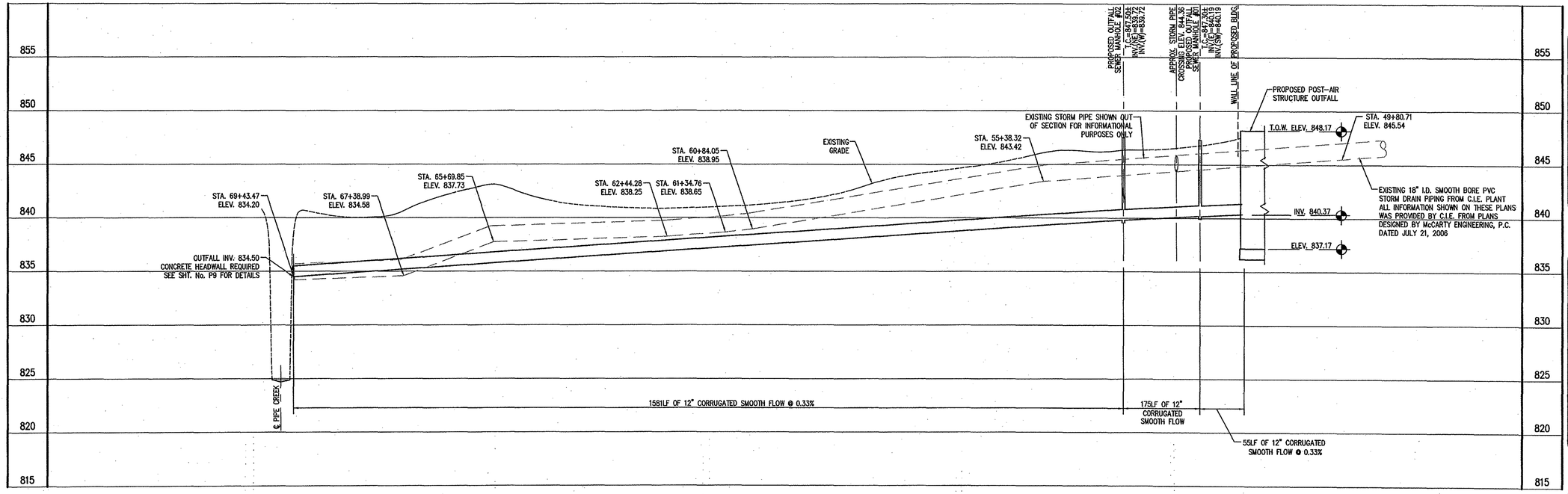
PROPOSED OUTFALL SEWER PLAN

SCALE: 1"=100'

NORTH

GENERAL NOTES:

1. CONTRACTOR TO INSTALL ALL EQUIPMENT IN COMPLETE ACCORDANCE WITH ALL MANUFACTURER'S RECOMMENDATIONS.
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3. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION.
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RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	JRN

APPROVED BY:

JAMES W. FRAZELL
REGISTERED
No. 17208
STATE OF INDIANA
PROFESSIONAL ENGINEER
6/17/13

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INDIANAPOLIS, INDIANA 46216
PHONE: 317-377-5230 FAX: 317-377-5241

DESIGNED FOR:

THE TOWN OF SWEETSER
GRANT COUNTY, INDIANA

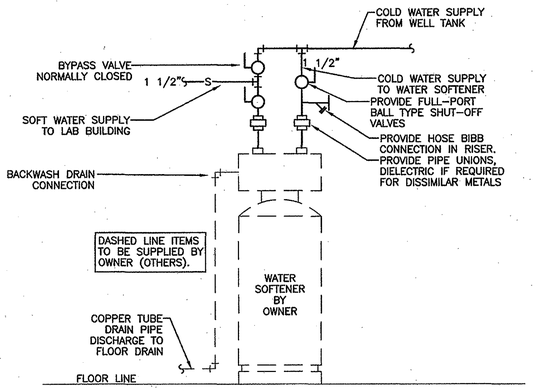
SHEET TITLE:

PROPOSED OUTFALL SEWER
PLAN AND PROFILE

JOB NUMBER: 201115D	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1=100	PLOT DATE: 06/17/13
DRAWN BY: D.A.P.	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-PropOverallSiteREV2	

SHEET No.

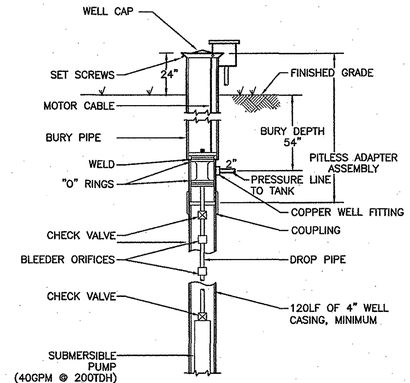
P7



PIPING ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS. REFER TO FLOOR PLANS FOR PIPE SIZES. PROVIDE SEISMIC STRAP IF REQUIRED BY LOCAL AUTHORITIES.

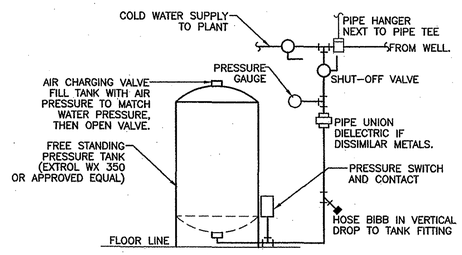
WATER SOFTENER CONNECTIONS

NOT TO SCALE



SUBMERSIBLE PITLESS WELL ADAPTER

NOT TO SCALE



UNIT SHALL BE FDA APPROVED FOR DOMESTIC WATER USE.
PIPING ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS.
FOLLOW MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION PROCEDURE. VERIFY PROPER OPERATION WHEN INSTALLED.

WELL PRESSURE TANK PIPING

NOT TO SCALE

GENERAL NOTES:

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RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	JRN

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER 6/17/13

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INDIANAPOLIS, INDIANA 46216
PHONE: 317-377-5230 FAX: 317-377-5241

DESIGNED FOR:

THE TOWN OF SWEETSER
GRANT COUNTY, INDIANA

SHEET TITLE:

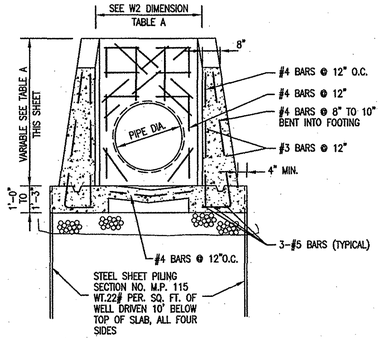
PROPOSED WELL DETAILS

JOB NUMBER: 201115D	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1=24	PLOT DATE: 06/17/13
DRAWN BY: D.A.P.	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-WellDetREV2	

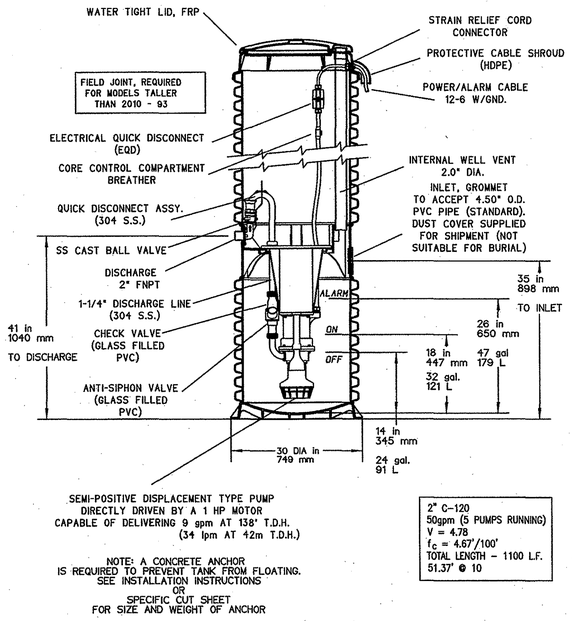
SHEET No.

P8

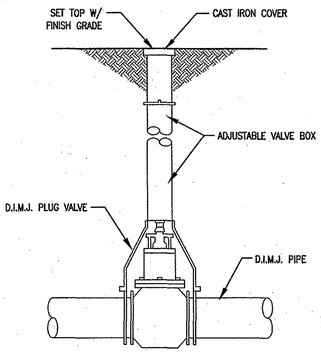
TABLE A							
LOCATION DESCRIPTION	DIMENSIONS					INFLUENT PIPE	NOTES
	L1	L2	W1	W2	H	DESCRIPTION	
PLANT EFFLUENT STRUCTURE	6'-0"	5'-4"	6'-0"	4'-6"	4'-6"	30" D.I. FROM POST AERATION STRUCTURE INV. = 480.80	NONE



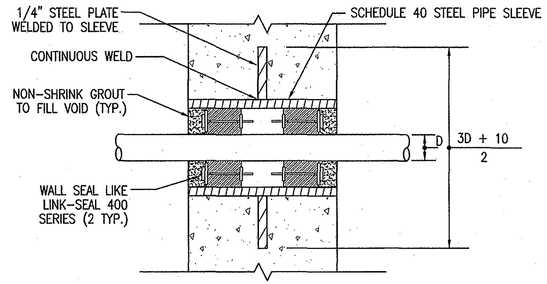
SECTION B-B
NOT TO SCALE



GRINDER STATION DETAIL
SCALE: NTS

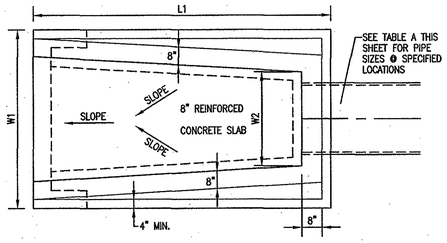


YARD VALVE AND BOX DETAIL
NOT TO SCALE

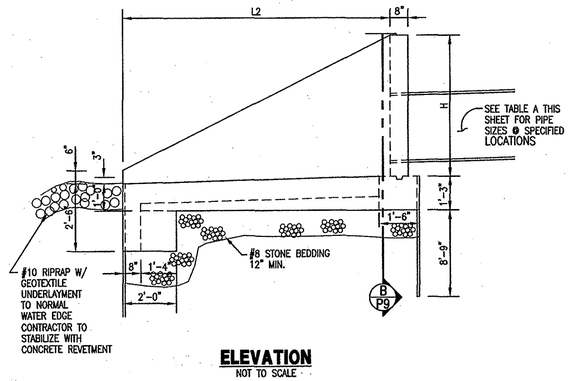


PIPE I.D.	SLEEVE I.D.
3" (7.62 cm.)	4.06" (10.31 cm.)
4" (10.16 cm.)	4.80" (12.45 cm.)
6" (15.24 cm.)	7.00" (17.78 cm.)
8" (20.32 cm.)	9.15" (23.24 cm.)
10" (25.40 cm.)	11.20" (28.45 cm.)
12" (30.48 cm.)	13.30" (33.78 cm.)
14" (35.56 cm.)	15.44" (39.22 cm.)
16" (40.64 cm.)	17.54" (44.55 cm.)

PIPE THRU WALL DETAIL
NOT TO SCALE

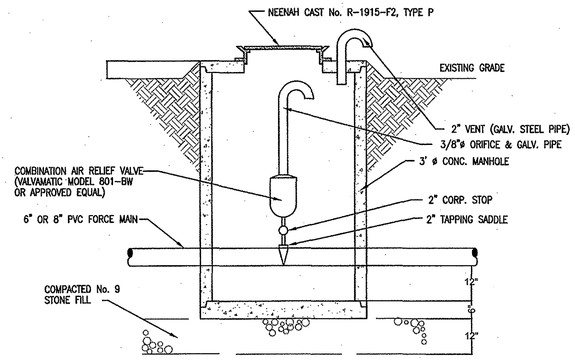


PLAN VIEW
NOT TO SCALE



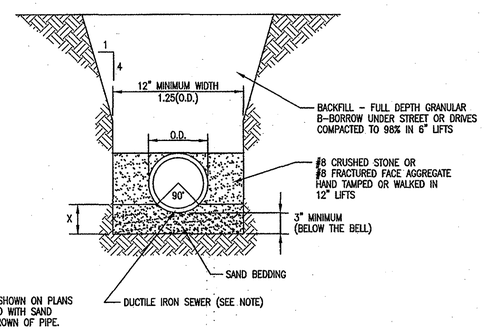
ELEVATION
NOT TO SCALE

PLANT DISCHARGE STRUCTURES
NOT TO SCALE



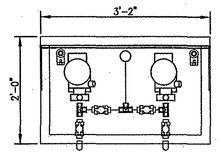
AIR/VAC RELIEF STRUCTURE
NOT TO SCALE

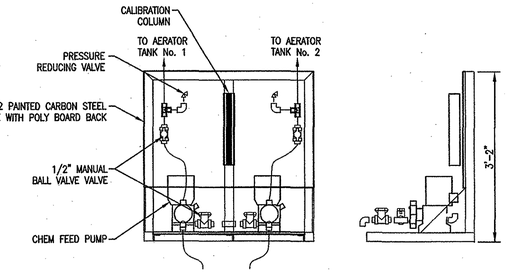
PIPE SIZE	BELOW 8"	8" TO 15"	18" & OVER
BEDDING BELOW THE PIPE BARREL - 'X'	O.D./8 4" MIN.	O.D./8 4" MIN.	O.D./8 4" MAX.

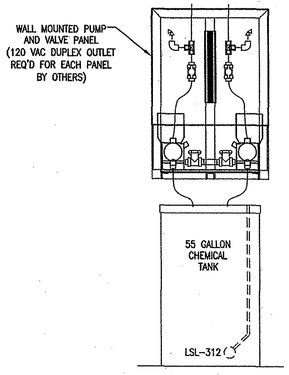


NOTE:
ANY PVC PIPING SHOWN ON PLANS TO BE BACKFILLED WITH SAND TO 12" ABOVE CROWN OF PIPE.

TYPICAL FORCEMAIN TRENCH BEDDING DETAIL
NOT TO SCALE







NOTES:
1. ALL CHEMICAL FEED PIPING TO BE 1/8" POLY-FLO CHEMICAL LINE HOUSED IN 3/4" SCH. 80 PVC LINE ATTACHED TO PROPOSED TANK WALL.
2. ALUM FEED REQUIREMENT WILL BE 6.54 GPD.

PROPOSED ALUM FEED TANK AND PUMP DETAIL
NOT TO SCALE

RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	JRN

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER 6/17/13

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DESIGNED FOR:

THE TOWN OF SWEETSER
GRANT COUNTY, INDIANA

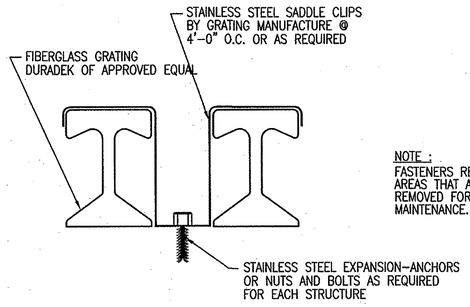
SHEET TITLE:

MISCELLANEOUS SITE DETAILS

JOB NUMBER: 201115D	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1=32	PLOT DATE: 06/17/13
DRAWN BY: D.A.P.	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-Det01REV2	

SHEET No.

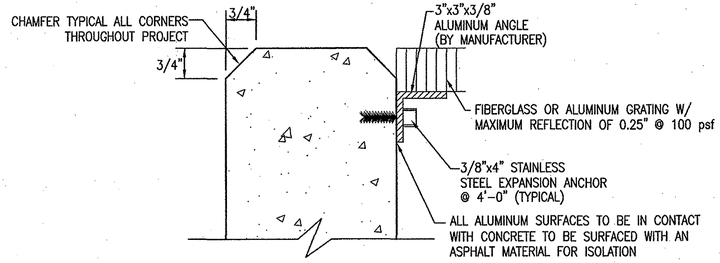
P9



NOTE :
FASTENERS REQUIRED AT ALL AREAS THAT ARE NOT REMOVED FOR PERIODIC MAINTENANCE.

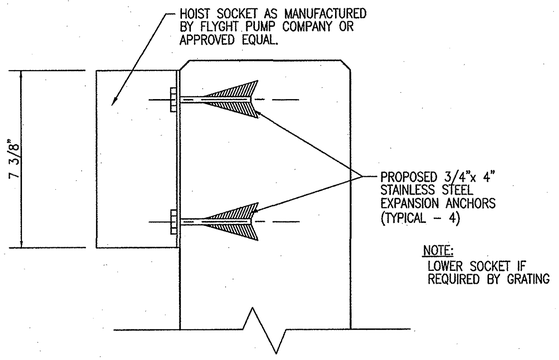
FIBERGLASS OR ALUMINUM GRATING HOLD-DOWN DETAIL

NOT TO SCALE



GRATING ANGLE DETAIL

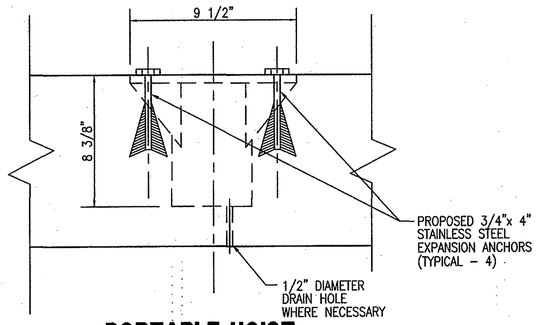
NOT TO SCALE



NOTE:
LOWER SOCKET IF REQUIRED BY GRATING

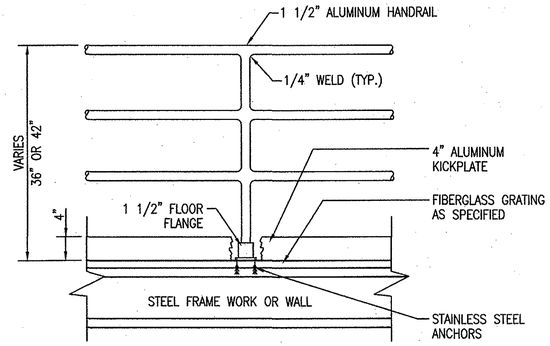
PORTABLE HOIST WALL SOCKET DETAIL

NOT TO SCALE



PORTABLE HOIST SLAB SOCKET DETAIL

NOT TO SCALE

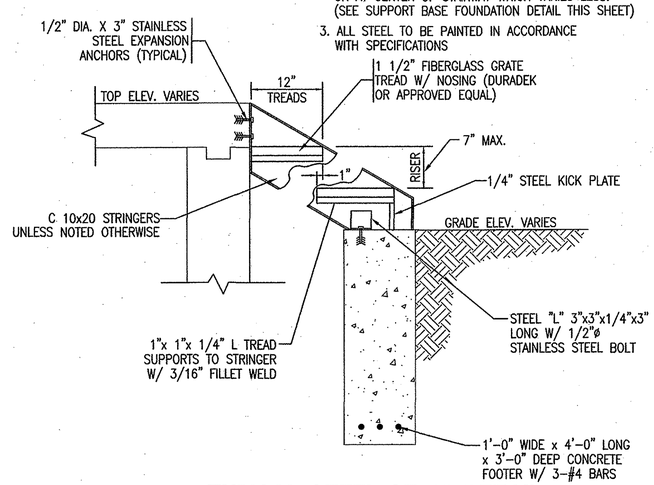


TYPICAL HANDRAIL ELEVATION

NOT TO SCALE

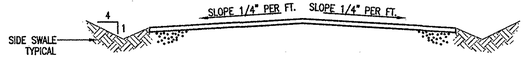
NOTE:

1. ALL STAIRWAYS W/ RISE GREATER THAN 4'-0" TO BE SUPPLIED WITH 34" HIGH (TOP OF NOSING TO TOP OF RAIL) ALUMINUM HANDRAIL BOTH SIDES (SEE TYPICAL HANDRAIL DETAIL - THIS SHEET)
2. ALL STAIRWAYS EXCEEDING 6' IN HORIZONTAL LENGTH TO BE INSTALLED WITH 4"ø STEEL SUPPORTS UNDER BOTH STRINGERS TO GRADE @ 8'-0" O.C. OR AT CENTER OF STAIRWAY WHICH VARIES LESS. (SEE SUPPORT BASE FOUNDATION DETAIL THIS SHEET)
3. ALL STEEL TO BE PAINTED IN ACCORDANCE WITH SPECIFICATIONS



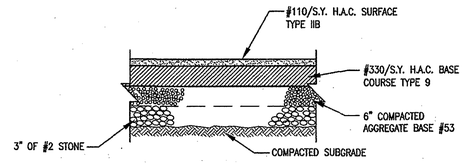
TYPICAL STEEL STAIR DETAIL

NOT TO SCALE



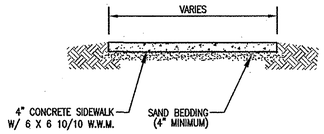
TYPICAL DRIVE CROSS SECTION

NOT TO SCALE



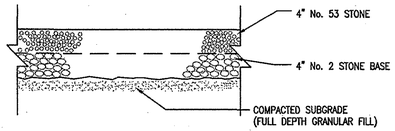
TYPICAL ASPHALT DRIVE DETAIL

NOT TO SCALE



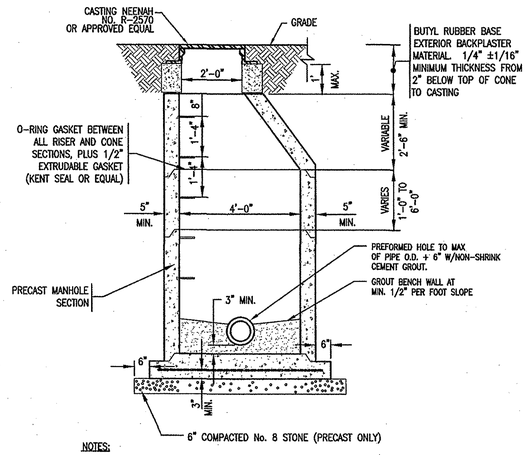
TYPICAL SIDEWALK DETAIL

NOT TO SCALE



TYPICAL STONE DRIVE DETAIL

NOT TO SCALE



NOTES:

1. MANHOLE STEPS SHALL BE POLYPROPYLENE, POLYPROPYLENE COATED STEEL REINFORCING OR APPROVED NON-CORROSIVE FIBERGLASS MATERIAL. COPOLYMER POLYPROPYLENE SHALL MEET ASTM D-4101 REINFORCED WITH DEFORMED 3/8" STEEL MEETING ASTM A-615, GRADE 60.
2. MANHOLE CONFORMS TO ASTM C-478
   JOINT CONFORMS TO ASTM C-443

STORM MANHOLE DETAIL

SCALE: NONE

RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER 4/17/13

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TRIAD ASSOCIATES INC.
5835 LAWTON LOOP EAST DRIVE
INDIANAPOLIS, INDIANA 46216
PHONE: 317-377-5230 FAX: 317-377-5241

DESIGNED FOR:

THE TOWN OF SWEETSER
GRANT COUNTY, INDIANA

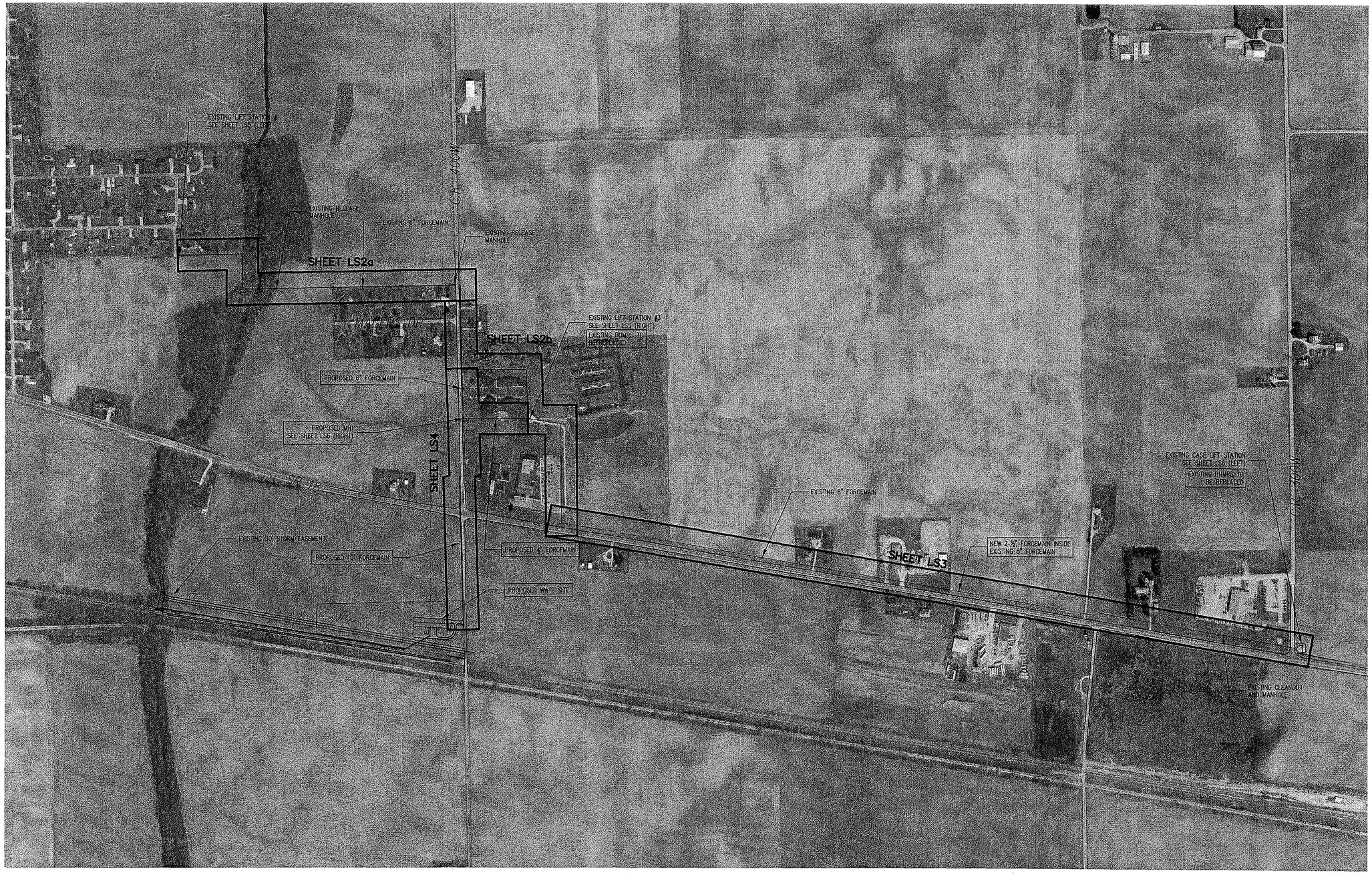
SHEET TITLE:

MISCELLANEOUS SITE DETAILS

JOB NUMBER: 201115D	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1=32	PLOT DATE: 06/17/13
DRAWN BY: D.A.P.	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-Det02REV2	

SHEET No.

P10



SWEETSER

SCALE: 1"=300'

NORTH

GENERAL NOTES:

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7. CONTRACTOR SHALL RESTORE ALL DISTURBED LAWN AREAS, STREETS, WALKS, DRIVES, ETC. AS SHOWN ON DRAWINGS, IN THE SPECIFICATIONS, OR TO AT LEAST PRE-EXISTING CONDITIONS.
8. ALL UTILITY CROSSINGS SHALL BE PROTECTED AND SUPPORTED WITH GRANULAR FILL OR CONCRETE AS REQUIRED PER THE DETAIL SHEET.

LEGEND:

- TREE
- EXISTING FIRE HYDRANT
- PROPOSED FIRE HYDRANT
- MAILBOX (MB)
- SIGN
- 1085.2 SPOT SHOT
- 1085 CONTOUR
- FENCE
- EXIST. COMBINATION SEWER w/ MANHOLE (MH)
- POWER POLE
- MISCELLANEOUS POSTS
- LIGHT POLE
- INLET (C)
- ASPHALT SURFACE (A)
- CONCRETE SURFACE
- STONE SURFACE (S)
- NEW GRAVITY SERVICE CONNECTION (SC)
- PROPOSED SANITARY GRAVITY
- PROPOSED GRINDER PUMP (GP)
- PROPOSED SANITARY FORCEMAIN
- PROPOSED WATER
- EXISTING WATER LINE (6")
- EXISTING ROAD DRAIN (10")
- GAS LINE (2")
- UNDERGROUND TELEPHONE LINE
- EXISTING FIBER OPTIC LINE
- APPROX. RIGHT-OF-WAY
- EXISTING COMBINATION MANHOLE
- EXISTING SANITARY MANHOLE
- EXISTING STORM MANHOLE
- EXISTING TELEPHONE/FIBER OPTIC MANHOLE
- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- APPROX. PROPERTY LINE
- PROPOSED UTILITY EASEMENT
- EXISTING UTILITY EASEMENT

RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	JRN

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER 6/17/13

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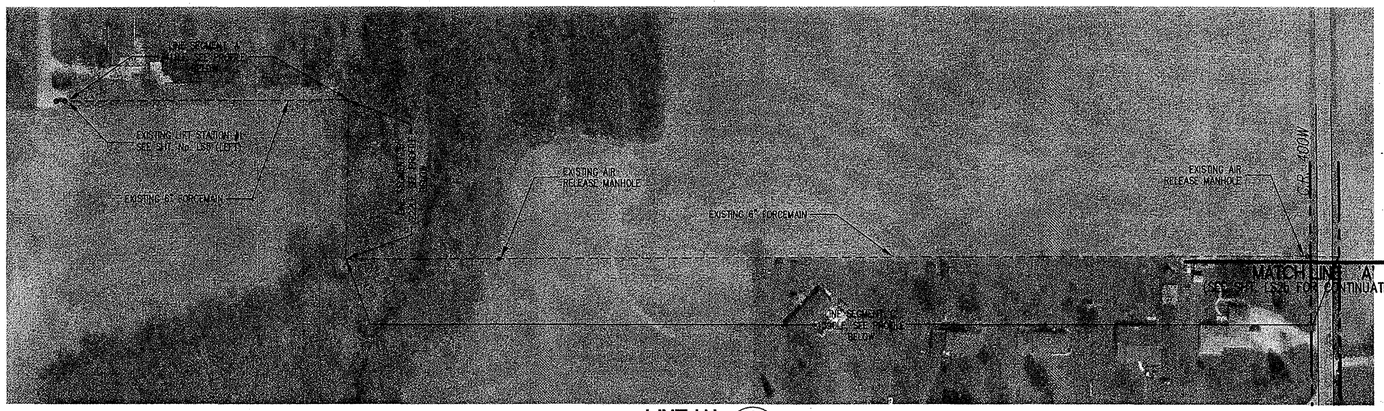
SHEET TITLE:

PROPOSED FORCEMAIN/LIFT STATION
SITE PLAN

JOB NUMBER: 201115D	
SCALE: 1" = 300'	CHECKED BY:
PLOT SCALE: 1 = 1	PLOT DATE: 6/17/13
DRAWN BY: JRN	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-LIFTSTATIONSITEREV2	

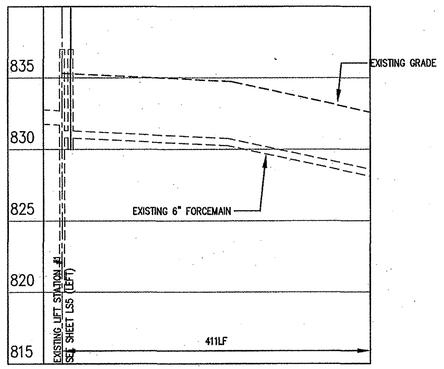
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LS1

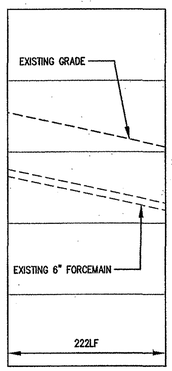


LINE 'A'
SCALE: 1"=100'

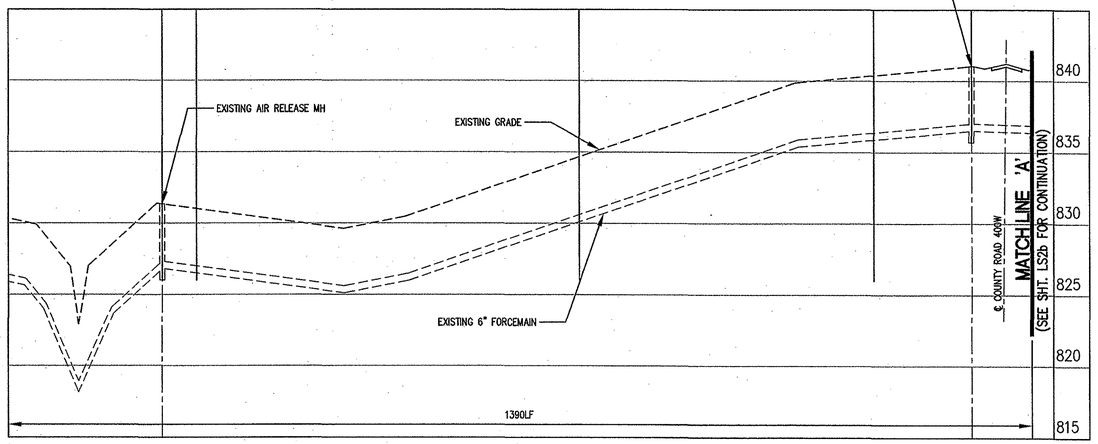
NORTH



SEGMENT 'A'
SCALE: 1"=100'



SEGMENT 'B'
SCALE: 1"=100'



SEGMENT 'C'
SCALE: 1"=100'

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LEGEND:

TREE	POWER POLE	PROPOSED GRINDER PUMP	EXISTING COMBINATION MANHOLE
EXISTING FIRE HYDRANT	MISCELLANEOUS POSTS	PROPOSED SANITARY FORCEMAIN	EXISTING SANITARY MANHOLE
PROPOSED FIRE HYDRANT	LIGHT POLE	PROPOSED WATER	EXISTING STORM MANHOLE
MAILBOX	INLET	EXISTING WATER LINE	EXISTING TELEPHONE/FIBER OPTIC MANHOLE
SIGN	ASPHALT SURFACE	EXISTING ROAD DRAIN	EXISTING SANITARY SEWER
SPOT SHOT	CONCRETE SURFACE	GAS LINE	EXISTING STORM SEWER
CONTOUR	STONE SURFACE	UNDERGROUND TELEPHONE LINE	APPROX. PROPERTY LINE
FENCE	NEW GRAVITY SERVICE CONNECTION	EXISTING FIBER OPTIC LINE	PROPOSED UTILITY EASEMENT
EXIST. COMBINATION SEWER w/ MANHOLE	PROPOSED SANITARY GRAVITY	APPROX. RIGHT-OF-WAY	EXISTING UTILITY EASEMENT

RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	JRN

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER 6/17/13

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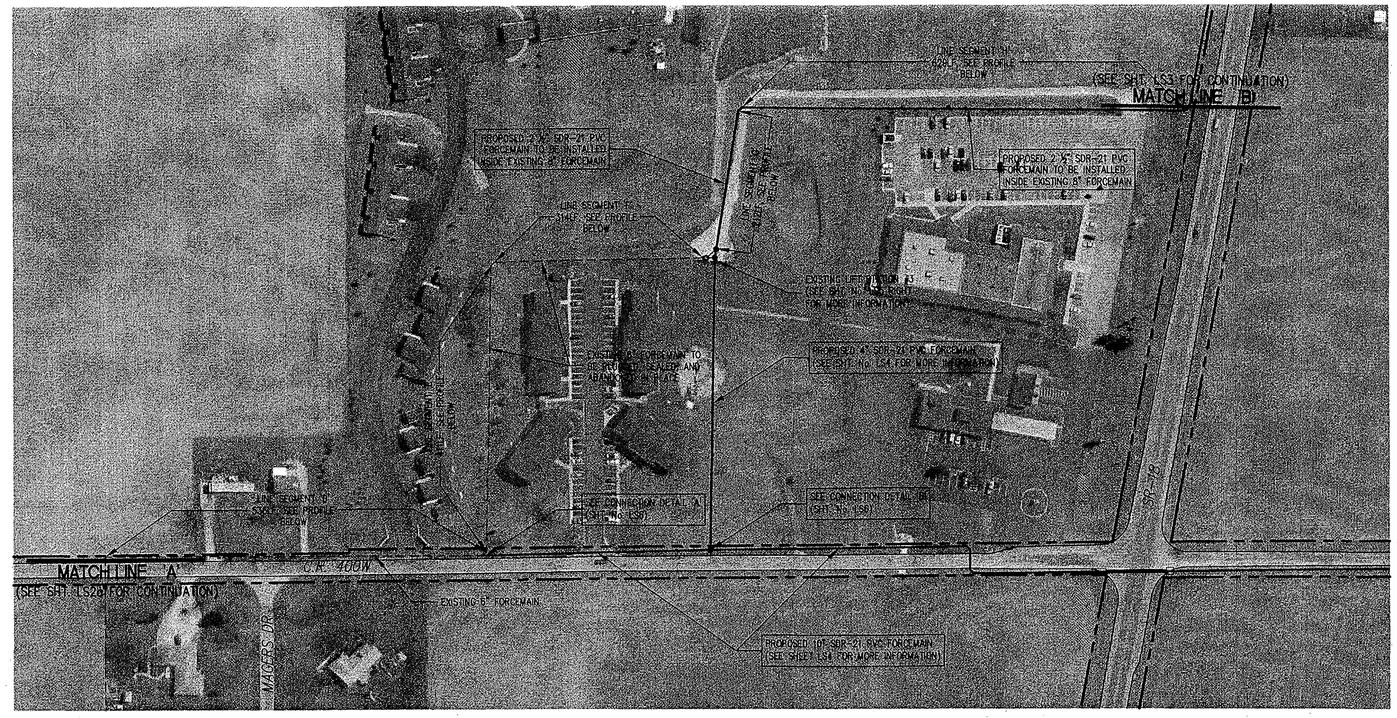
SHEET TITLE:

EXISTING FORCEMAIN
PLAN AND PROFILE

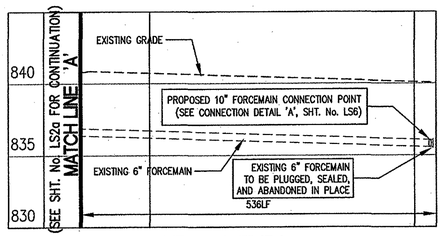
JOB NUMBER: 201115D	
SCALE: 1" = 100'	CHECKED BY:
PLOT SCALE: 1 = 1	PLOT DATE: 6/17/13
DRAWN BY: JRN	DATE: JUNE, 2012
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-LIFTSTATIONSITEREV2	

SHEET No.

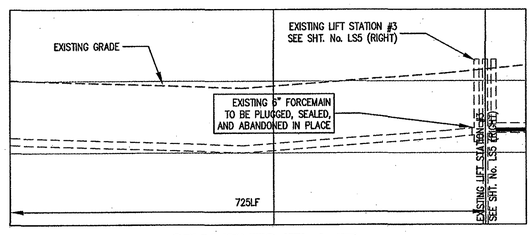
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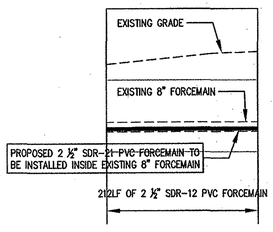
LINE 'B'
SCALE: 1"=100'
NORTH



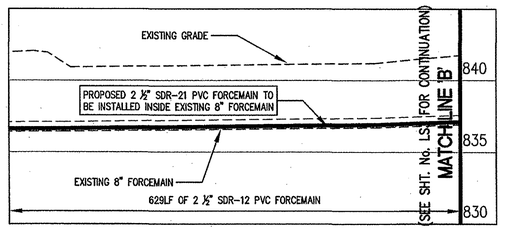
SEGMENT 'D'
SCALE: 1"=100'



SEGMENTS 'E' + 'F'
SCALE: 1"=100'



SEGMENT 'G'
SCALE: 1"=100'



SEGMENT 'H'
SCALE: 1"=100'

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PROPOSED FIRE HYDRANT	LIGHT POLE	PROPOSED WATER	EXISTING STORM MANHOLE
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RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	JRN

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER 4/9/13

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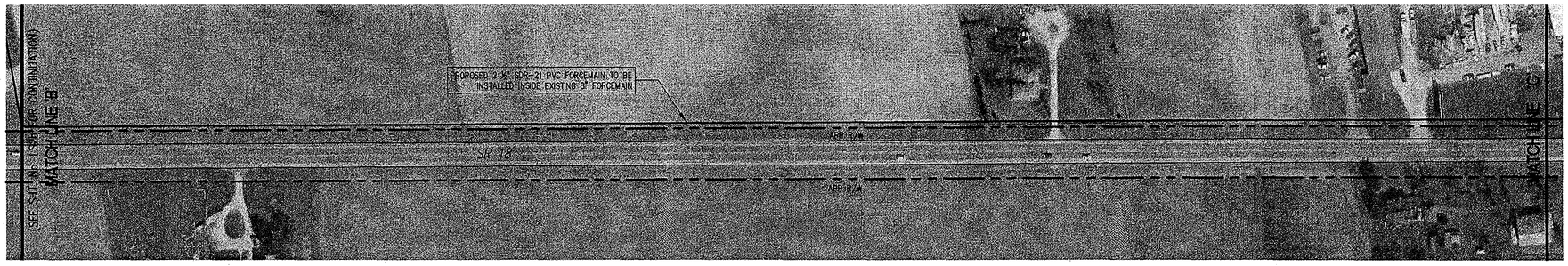
SHEET TITLE:

EXISTING FORCEMAIN PLAN AND PROFILE

JOB NUMBER: 201115D	
SCALE: 1" = 100'	CHECKED BY:
PLOT SCALE: 1 = 1	PLOT DATE: 6/17/13
DRAWN BY: JRN	DATE: JUNE, 2012
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DRAWING NAME: 201115D-LIFTSTATIONSITEREV2	

SHEET No.

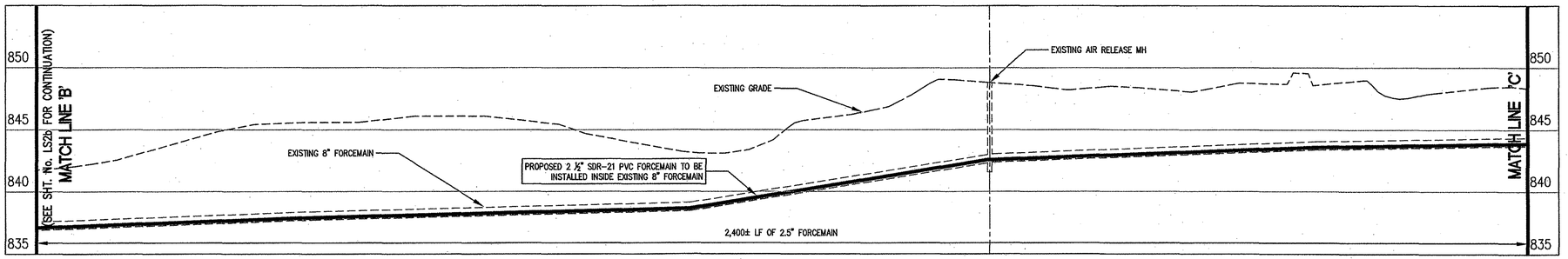
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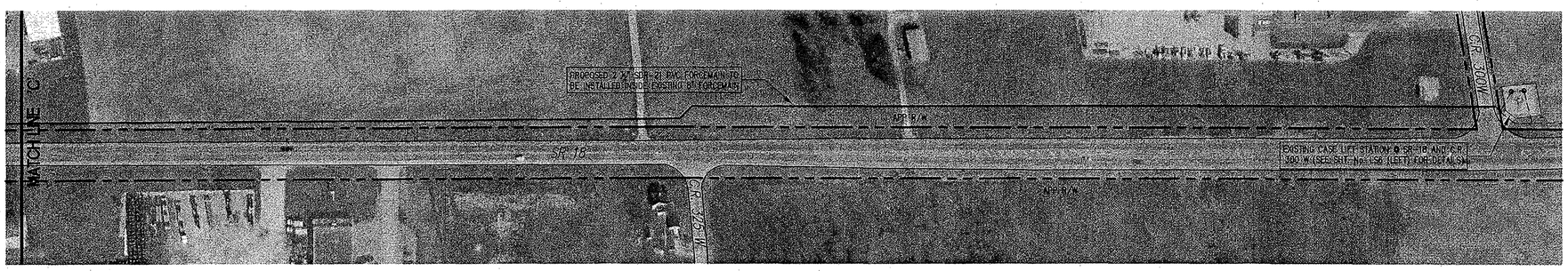


SEGMENT 'I'

SCALE: 1"=100'

NORTH

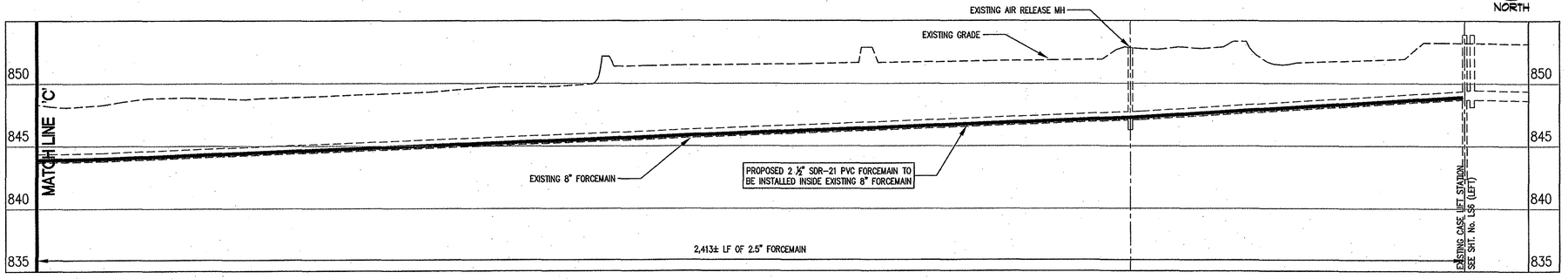




SEGMENT 'I' CONT'D

SCALE: 1"=100'

NORTH



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7. CONTRACTOR SHALL RESTORE ALL DISTURBED LAWN AREAS, STREETS, WALKS, DRIVES, ETC. AS SHOWN ON DRAWINGS, IN THE SPECIFICATIONS, OR TO AT LEAST PRE-EXISTING CONDITIONS.
8. ALL UTILITY CROSSINGS SHALL BE PROTECTED AND SUPPORTED WITH GRANULAR FILL OR CONCRETE AS REQUIRED PER THE DETAIL SHEET.

LEGEND:

TREE	POWER POLE	PROPOSED GRINDER PUMP	EXISTING COMBINATION MANHOLE
EXISTING FIRE HYDRANT	MISCELLANEOUS POSTS	PROPOSED SANITARY FORCEMAIN	EXISTING SANITARY MANHOLE
PROPOSED FIRE HYDRANT	LIGHT POLE	PROPOSED WATER	EXISTING STORM MANHOLE
MAILBOX	INLET	EXISTING WATER LINE	EXISTING TELEPHONE/FIBER OPTIC MANHOLE
SIGN	ASPHALT SURFACE	EXISTING ROAD DRAIN	EXISTING SANITARY SEWER
SPOT SHOT	CONCRETE SURFACE	GAS LINE	EXISTING STORM SEWER
CONTOUR	STONE SURFACE	UNDERGROUND TELEPHONE LINE	APPROX. PROPERTY LINE
FENCE	NEW GRAVITY SERVICE CONNECTION	EXISTING FIBER OPTIC LINE	PROPOSED UTILITY EASEMENT
EXIST. COMBINATION SEWER w/ MANHOLE	PROPOSED SANITARY GRAVITY	APPROX. RIGHT-OF-WAY	EXISTING UTILITY EASEMENT

RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	JRN

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER

4/17/13

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TRIAD ASSOCIATES INC.
5835 LAWTON LOOP EAST DRIVE
INDIANAPOLIS, INDIANA 46216
PHONE: 317-377-5230 FAX: 317-377-5241

DESIGNED FOR:

THE TOWN OF SWEETSER
GRANT COUNTY, INDIANA

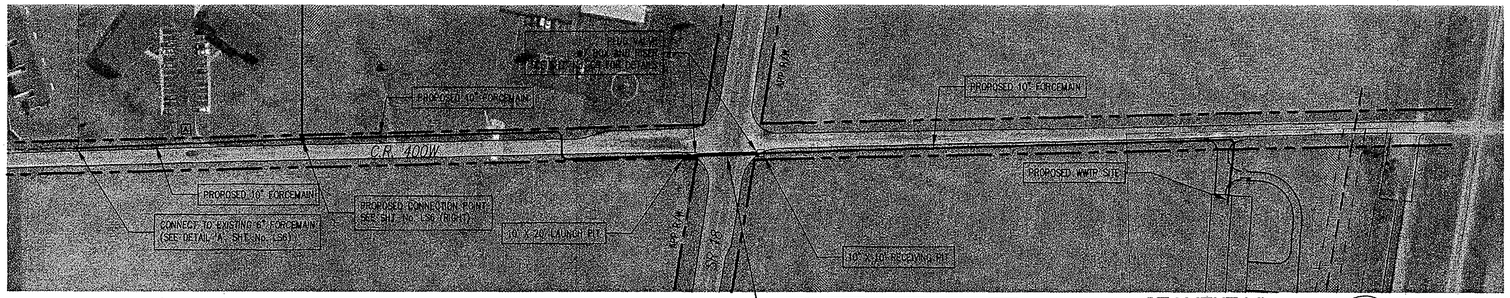
SHEET TITLE:

EXISTING FORCEMAIN PLAN AND PROFILE

JOB NUMBER: 201115D	
SCALE: 1" = 100'	CHECKED BY:
PLOT SCALE: 1 = 1	PLOT DATE: 6/17/13
DRAWN BY: JRN	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-LIFTSTATIONSITEREV2	

SHEET No.

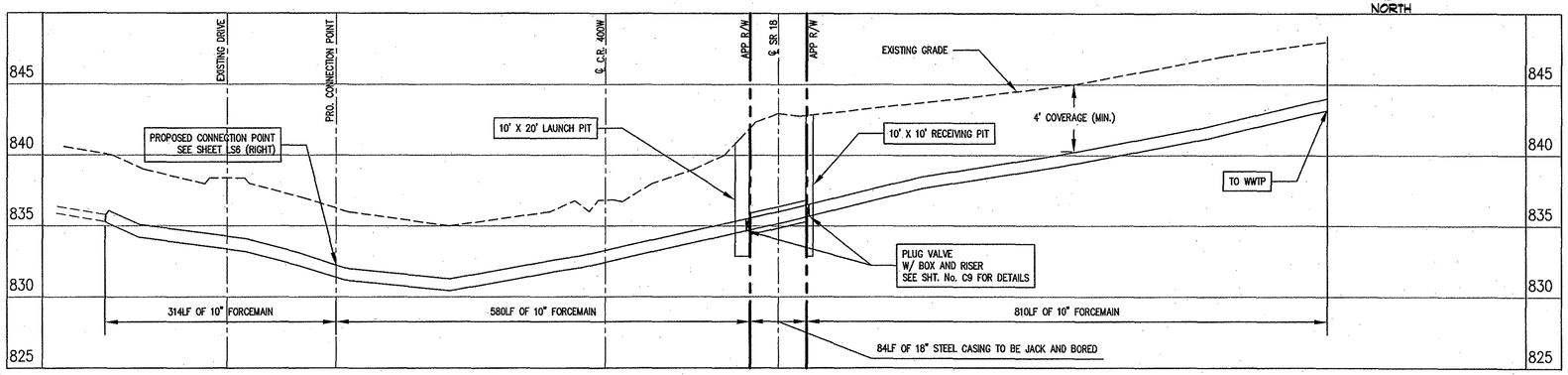
LS3

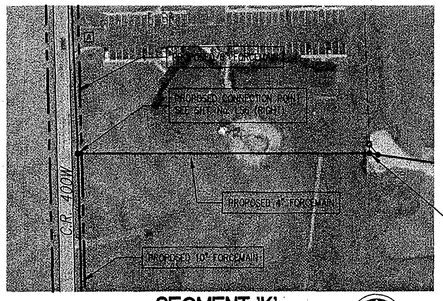


SEGMENT 'J'

SCALE: 1"=100'

NORTH



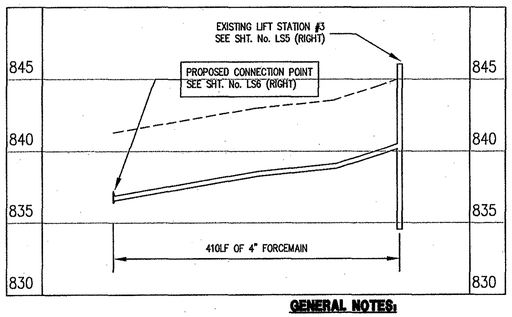


EXISTING LIFT STATION #3 SEE SHT. No. LS5 (RIGHT)

SEGMENT 'K'

SCALE: 1"=100'

NORTH



GENERAL NOTES:

1. ALL UTILITY LOCATIONS AND DEPTHS ARE APPROXIMATE. THE CONTRACTOR SHALL HAVE ALL UTILITIES AND DEPTHS OF INVERTS OF EXISTING SEWERS FIELD VERIFIED AND MARKED PRIOR TO CONSTRUCTION.
2. CONTRACTOR SHALL MAINTAIN A MINIMUM 10'-0" HORIZONTAL AND 18" VERTICAL SEPARATION BETWEEN SEWER AND WATER MAINS.
3. ALL PROPOSED TOP OF CASTING ELEVATIONS ARE APPROXIMATE. THE CONTRACTOR SHALL ADJUST FINAL ELEVATIONS AS REQUIRED TO BE FLUSH WITH PAVEMENT.
4. ALL SEWER TRENCHES SHALL BE BACKFILLED WITH FULL DEPTH COMPACTED GRANULAR BACKFILL ("B" BORROW) UNDER OR WITHIN 5' OF EDGE OF PAVEMENT.
5. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO BID TO BECOME FAMILIAR WITH ALL SITE CONDITIONS.
6. THE CONTRACTOR SHALL PROVIDE THE REQUIRED MEANS FOR MAINTAINING SAFE TRAFFIC AT ALL TIMES.
7. CONTRACTOR SHALL RESTORE ALL DISTURBED LAWN AREAS, STREETS, WALKS, DRIVES, ETC. AS SHOWN ON DRAWINGS, IN THE SPECIFICATIONS, OR TO AT LEAST PRE-EXISTING CONDITIONS.
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LEGEND:

TREE	POWER POLE	PROPOSED GRINDER PUMP	EXISTING COMBINATION MANHOLE
EXISTING FIRE HYDRANT	MISCELLANEOUS POSTS	PROPOSED SANITARY FORCEMAIN	EXISTING SANITARY MANHOLE
PROPOSED FIRE HYDRANT	LIGHT POLE	PROPOSED WATER	EXISTING STORM MANHOLE
MAILBOX	INLET	EXISTING WATER LINE	EXISTING TELEPHONE/FIBER OPTIC MANHOLE
SIGN	ASPHALT SURFACE	EXISTING ROAD DRAIN	EXISTING SANITARY SEWER
SPOT SHOT	CONCRETE SURFACE	GAS LINE	EXISTING STORM SEWER
CONTOUR	STONE SURFACE	UNDERGROUND TELEPHONE LINE	APPROX. PROPERTY LINE
FENCE	NEW GRAVITY SERVICE CONNECTION	EXISTING FIBER OPTIC LINE	PROPOSED UTILITY EASEMENT
EXIST. COMBINATION SEWER w/ MANHOLE	PROPOSED SANITARY GRAVITY	APPROX. RIGHT-OF-WAY	EXISTING UTILITY EASEMENT

RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	JRN

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER 6/17/13

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TRIAD ASSOCIATES INC.
5835 LAWTON LOOP EAST DRIVE
INDIANAPOLIS, INDIANA 46216
PHONE: 317-377-5230 FAX: 317-377-5241

DESIGNED FOR:

THE TOWN OF SWEETSER
GRANT COUNTY, INDIANA

SHEET TITLE:

PROPOSED FORCEMAIN
PLAN AND PROFILE

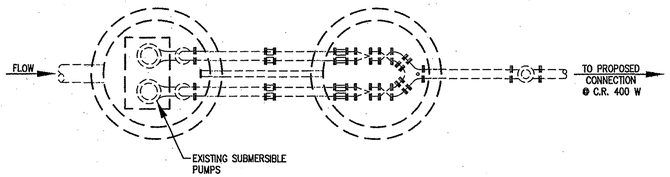
JOB NUMBER: 201115D	
SCALE: 1" = 100'	CHECKED BY:
PLOT SCALE: 1 = 1	PLOT DATE: 6/17/13
DRAWN BY: JRN	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-LIFTSTATIONSITEREV2	

SHEET No.

LS4

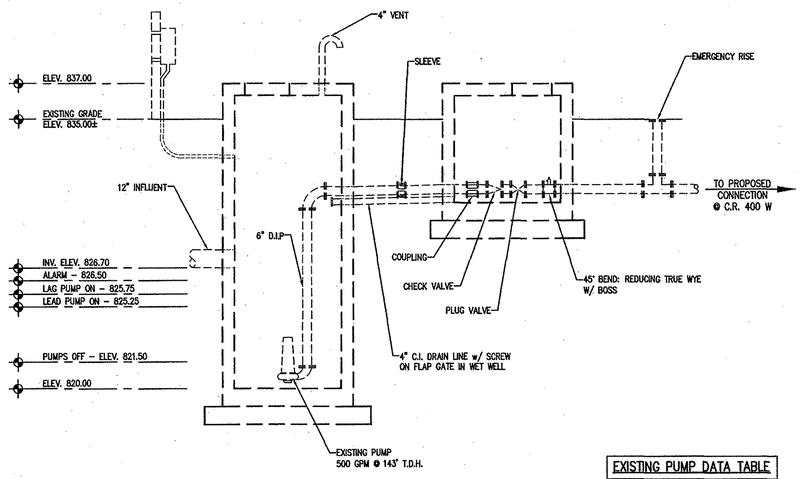
GENERAL NOTES:

1. CONTRACTOR TO INSTALL ALL EQUIPMENT IN COMPLETE ACCORDANCE WITH ALL MANUFACTURER'S RECOMMENDATIONS.
2. ALL FASTENERS, SUPPORTS, ETC. TO BE STAINLESS STEEL.
3. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION.
4. ALL CONCRETE TO BE MINIMUM F'c = 4000 PSI. ALL REINFORCING STEEL TO BE MINIMUM Fy = 60,000 PSI.
5. SEE STRUCTURAL DETAIL SHEET AND ELECTRICAL/MECHANICAL SHEETS FOR FURTHER DETAIL.
6. SEE PLANT CONTROL/MONITOR SPECIFICATIONS FOR NECESSARY EQUIPMENT COORDINATION.
7. SEE DETAIL SHEET FOR TYPICAL WALL PENETRATION DETAILS.
8. ALL FERROUS METAL SURFACES TO BE PREPARED AND PAINTED IN ACCORDANCE WITH THE SPECIFICATIONS.
9. SEE DETAIL SHEET FOR GRATING DETAILS.
10. CONTRACTOR TO COORDINATE WITH ALL OTHER APPLICABLE PLAN SHEETS AND SPECIFICATIONS.
11. CONTRACTOR RESPONSIBLE FOR TRANSFERRING ALL SUITABLE TREATMENT MATERIAL FROM EXISTING TANKS TO THE PROPOSED TANKS.
12. CONTRACTOR TO VERIFY EQUIPMENT MOUNTING ELEVATIONS AND DIMENSIONS PRIOR TO CONSTRUCTION.
13. CONTRACTOR IS TO VISIT THE SITE PRIOR TO CONSTRUCTION IN ORDER TO IDENTIFY ANY EXISTING CONFLICTS TO BE ADDRESSED.



PLAN VIEW

NORTH



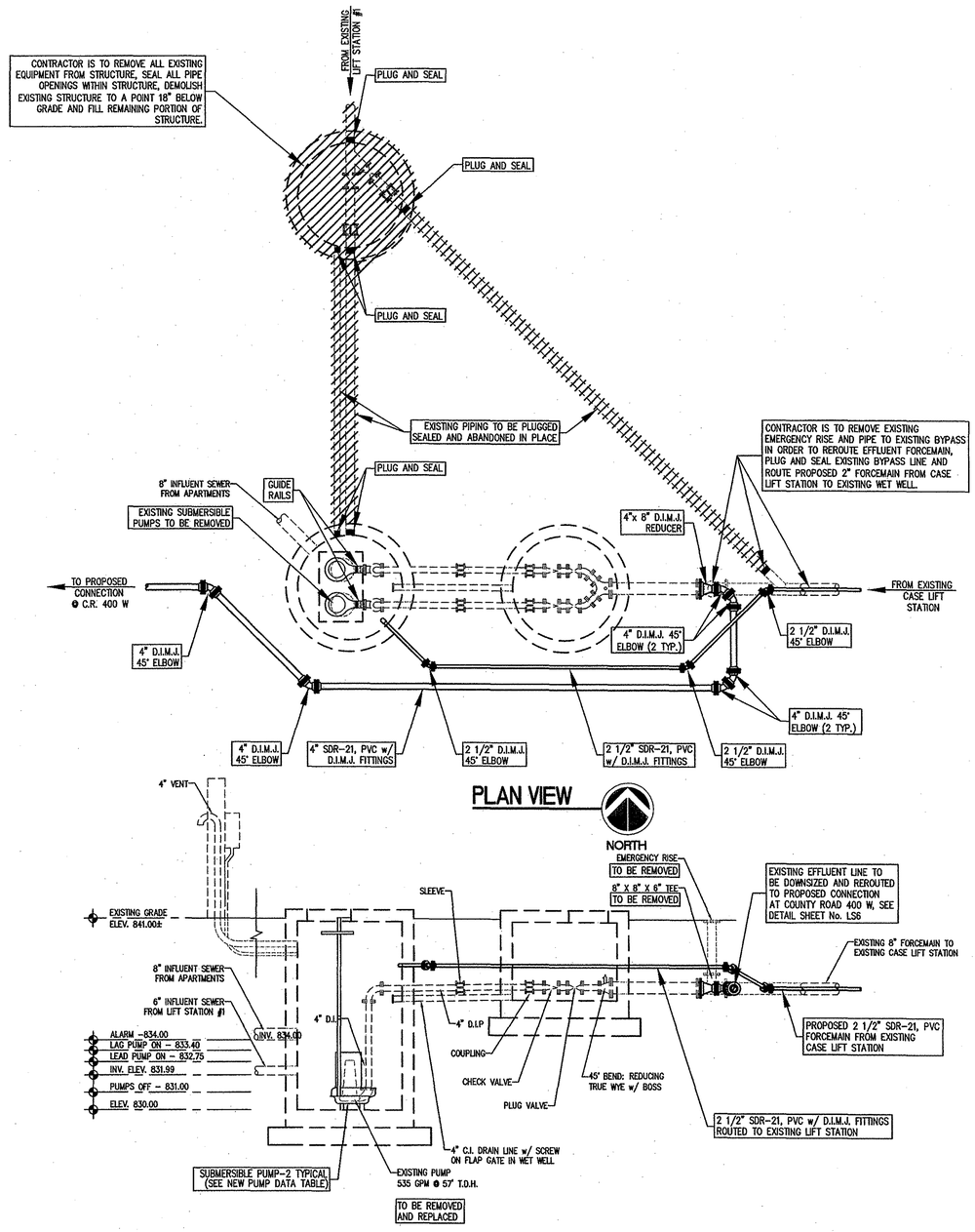
SECTION

EXISTING PUMP DATA TABLE	
CAPACITY	500
TDH	143
HP(min.)	60
RPM	VARIABLE
VOLTAGE	230/460
PHASE	3
TYPE	NON-CLOG
DISCHARGE	6"

NOTE:
CONTRACTOR IS TO FIELD VERIFY ALL LIFT STATION INFORMATION PRIOR TO CONSTRUCTION.

LIFT STATION #1

NOT TO SCALE



PLAN VIEW

NORTH

SECTION

NEW PUMP DATA TABLE	
CAPACITY	100
TDH	35
HP(min.)	5
RPM	1750
VOLTAGE	230/460
PHASE	3
TYPE	NON-CLOG
DISCHARGE	4"

LEGEND

DENOTES EQUIPMENT TO BE REMOVED

NOTE:
CONTRACTOR IS TO FIELD VERIFY ALL LIFT STATION INFORMATION PRIOR TO CONSTRUCTION.

LIFT STATION #3

NOT TO SCALE

RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	JRN

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER 6/17/13

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INDIANAPOLIS, INDIANA 46216
PHONE: 317-377-5230 FAX: 317-377-5241

DESIGNED FOR:

THE TOWN OF SWEETSER
GRANT COUNTY, INDIANA

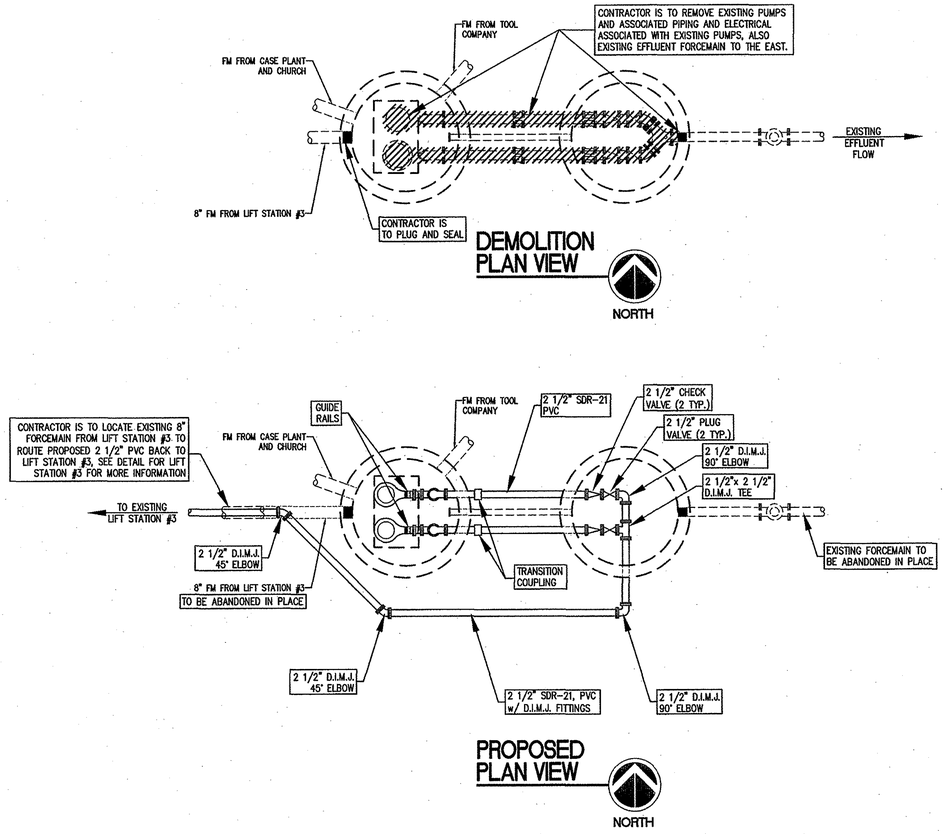
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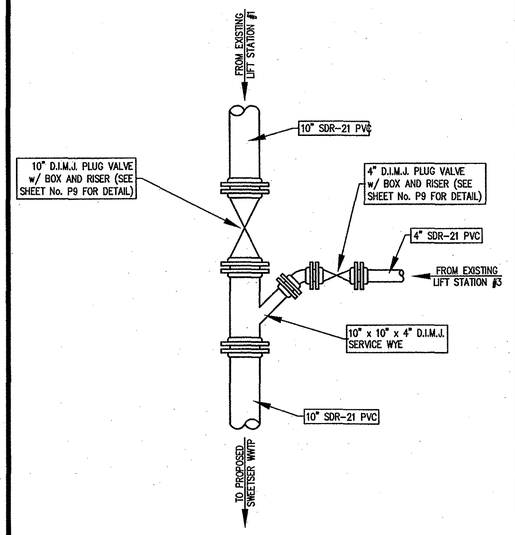
PROPOSED LIFT STATION SITE AND DETAILS

JOB NUMBER:	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1=48	PLOT DATE: 06/17/13
DRAWN BY: J.R.N.	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-LiftStationStrucREV2	

SHEET No.

LS5

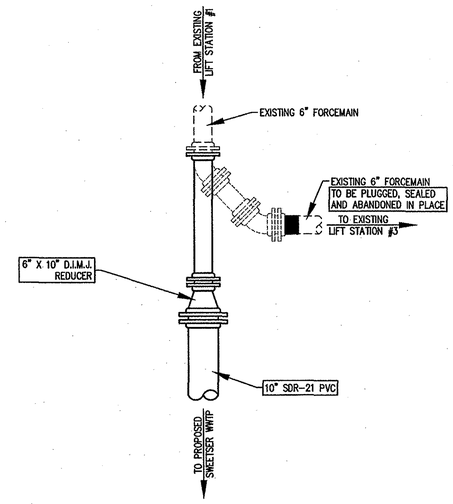




PROPOSED CONNECTION DETAIL 'A' AT COUNTY ROAD 400 W

NOT TO SCALE

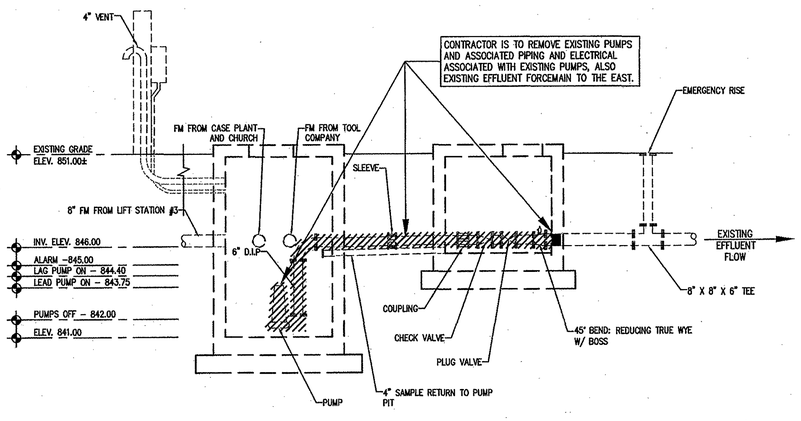
NORTH



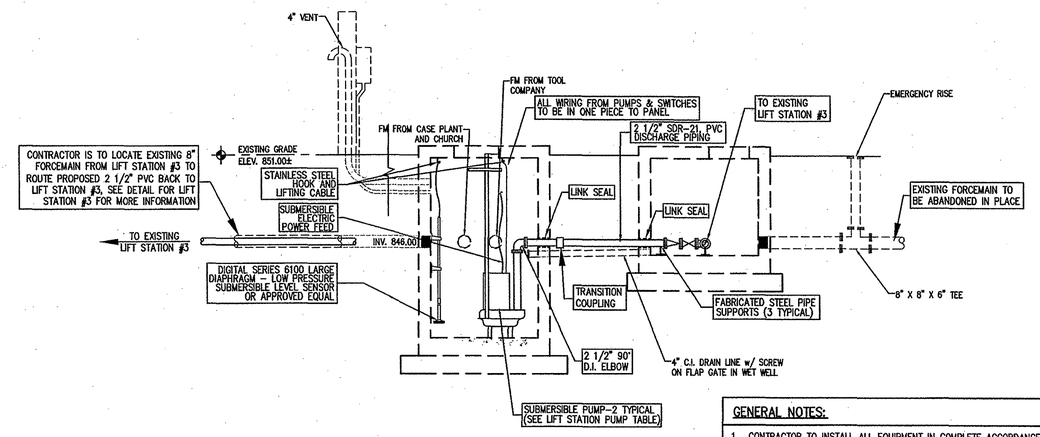
PROPOSED CONNECTION DETAIL 'B' AT COUNTY ROAD 400 W

NOT TO SCALE

NORTH



DEMOLITION SECTION



PROPOSED SECTION

LEGEND

DENOTES EQUIPMENT TO BE REMOVED

NOTE:
CONTRACTOR IS TO FIELD VERIFY ALL LIFT STATION INFORMATION PRIOR TO CONSTRUCTION.

CASE LIFT STATION

NOT TO SCALE

NEW PUMP DATA TABLE

CAPACITY	35
TDH	81
HP(min.)	5
RPM	3475
VOLTAGE	230/460
PHASE	3
TYPE	GRINDER
DISCHARGE	2 1/2"

GENERAL NOTES:

1. CONTRACTOR TO INSTALL ALL EQUIPMENT IN COMPLETE ACCORDANCE WITH ALL MANUFACTURER'S RECOMMENDATIONS.
2. ALL FASTENERS, SUPPORTS, ETC. TO BE STAINLESS STEEL.
3. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION.
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13. CONTRACTOR IS TO VISIT THE SITE PRIOR TO CONSTRUCTION IN ORDER TO IDENTIFY ANY EXISTING CONFLICTS TO BE ADDRESSED.

RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	JRN

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER

6/17/13

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PHONE: 317-377-5230 FAX: 317-377-5241

DESIGNED FOR:

THE TOWN OF SWEETSER
GRANT COUNTY, INDIANA

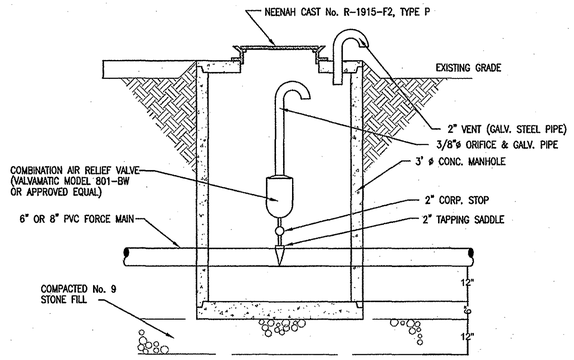
SHEET TITLE:

PROPOSED LIFT STATION SITE AND DETAILS

JOB NUMBER:	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1=48	PLOT DATE: 06/17/13
DRAWN BY: J.R.N.	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-LiftStationStrucREV2	

SHEET No.

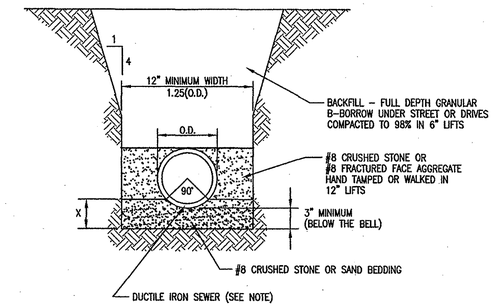
LS6



AIR/VAC RELIEF STRUCTURE

NOT TO SCALE

PIPE SIZE	BELOW 8"	8" TO 15"	18" & OVER
BEDDING BELOW THE PIPE BARREL - 'X'	O.D./8 4" MIN.	O.D./8 4" MIN.	O.D./8 4" MAX.



NOTE:

ANY PVC PIPING SHOWN ON PLANS ARE TO BE BACKFILLED WITH GRANULAR MATERIAL TO 12" ABOVE CROWN OF PIPE.

TYPICAL TRENCH AND PIPE BEDDING DETAIL

NOT TO SCALE

GENERAL NOTES:

1. CONTRACTOR TO INSTALL ALL EQUIPMENT IN COMPLETE ACCORDANCE WITH ALL MANUFACTURER'S RECOMMENDATIONS.
2. ALL FASTENERS, SUPPORTS, ETC. TO BE STAINLESS STEEL.
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DESIGN SET 05-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	JRN

APPROVED BY:

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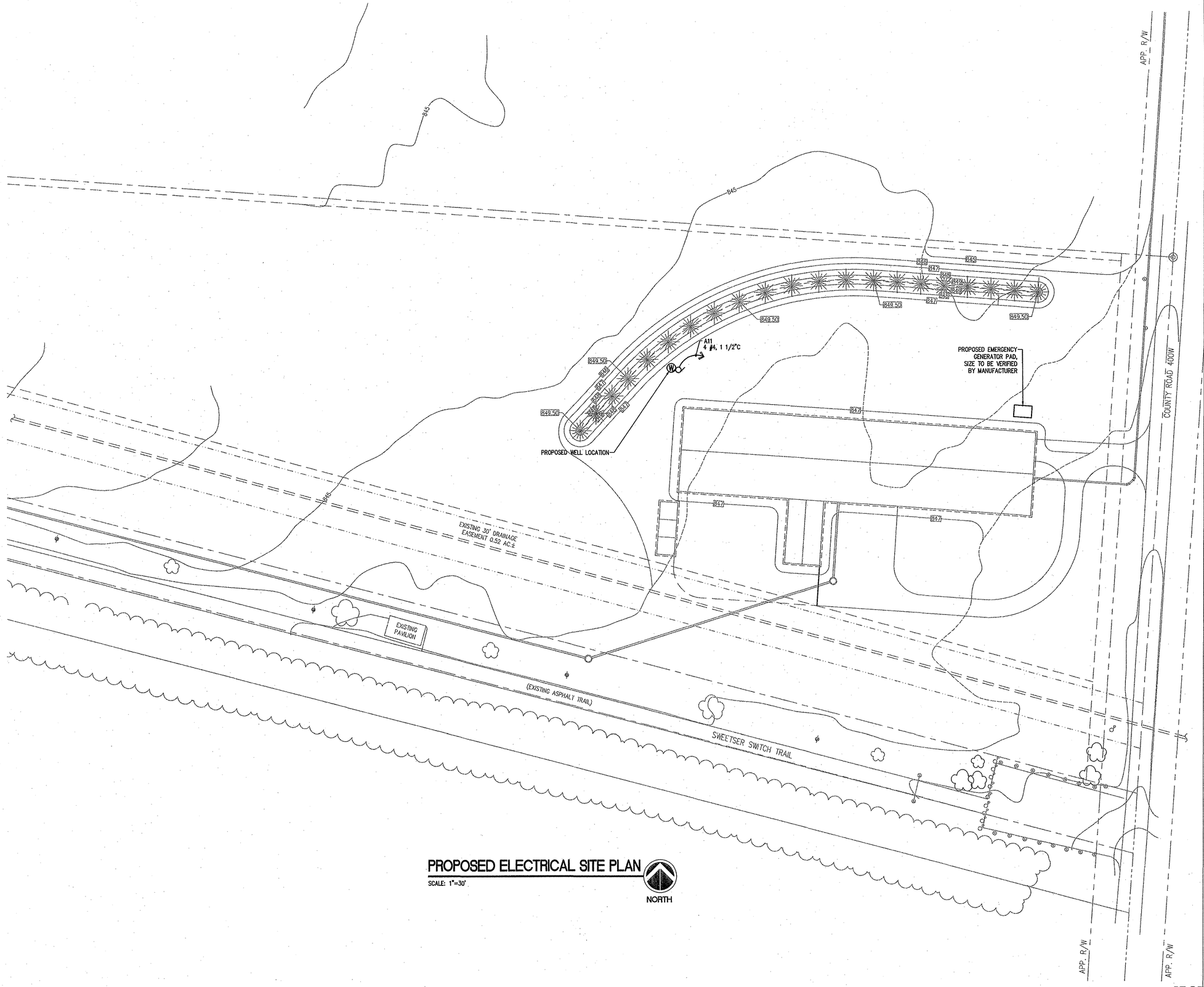
SHEET TITLE:

LIFT STATION
MISCELLANEOUS DETAILS

JOB NUMBER: 201115D	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1=32	PLOT DATE: 06/17/13
DRAWN BY: J.R.N.	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-LiftStationmMiscDetailsREV2	

SHEET No.

LS7



PROPOSED ELECTRICAL SITE PLAN

SCALE: 1"=30'

NORTH

RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	JRN

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER

6/17/13

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DESIGNED FOR:

THE TOWN OF SWEETSER
GRANT COUNTY, INDIANA

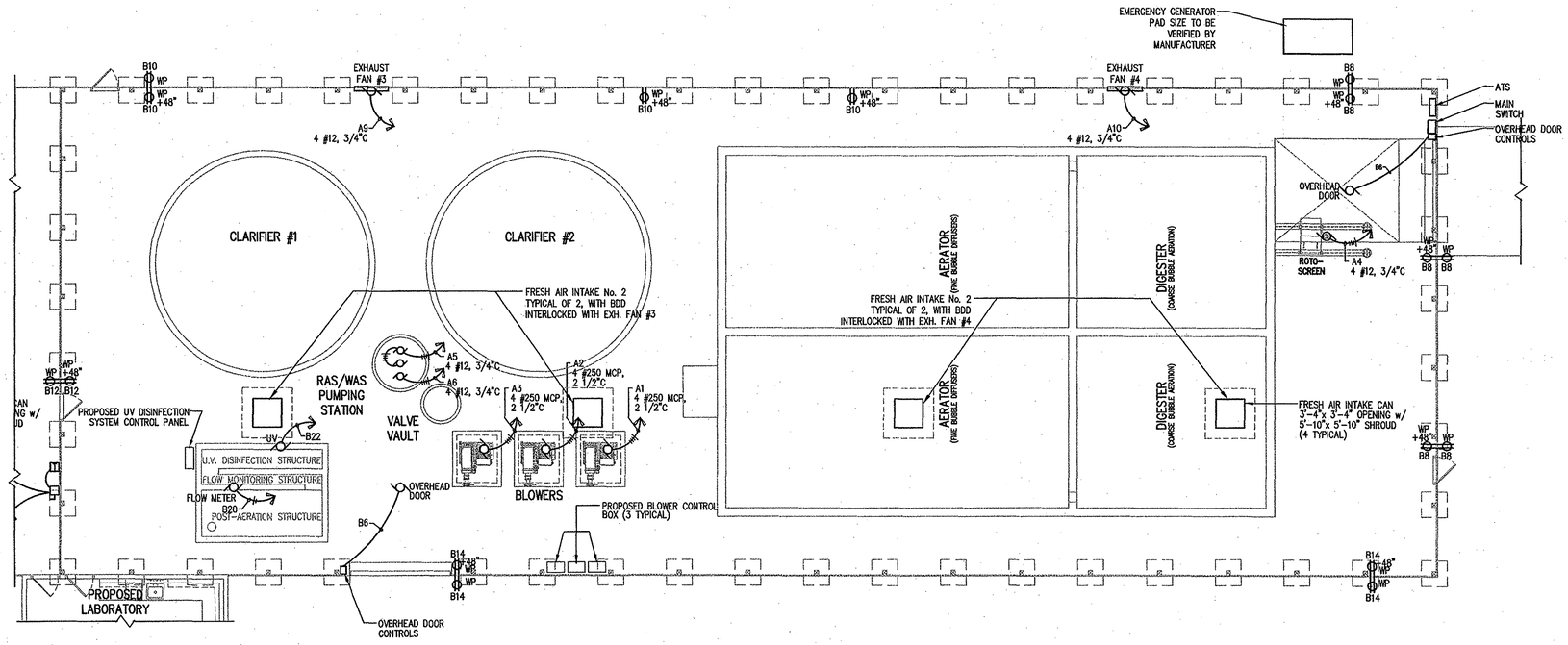
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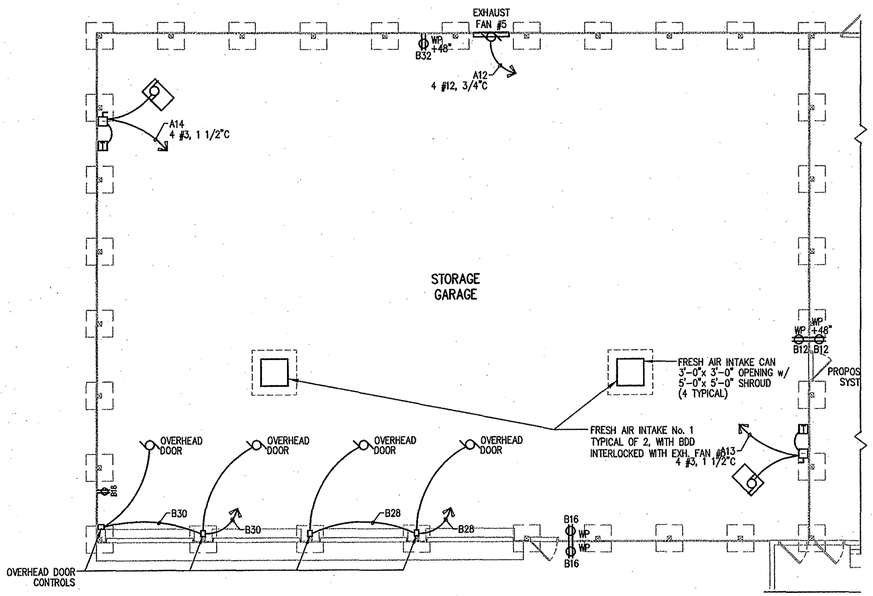
PROPOSED ELECTRICAL SITE PLAN

JOB NUMBER: 201115D	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1=30	PLOT DATE: 06/17/13
DRAWN BY: D.A.P.	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-PropSiteElecREV2	

SHEET No.

E1





PROPOSED PLANT ELECTRICAL PLAN

SCALE: 1/8" = 1'-0"

NORTH

NOTE:
CONTRACTOR IS TO INSTALL A MINIMUM OF 20% TRANSLUCENT PANELS TO THE PROPOSED ROOF SYSTEM IN BOTH THE PLANT AREA AND THE STORAGE GARAGE AREA.

RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
3/17/13	PROJECT REVISIONS	DAP

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER 6/17/13

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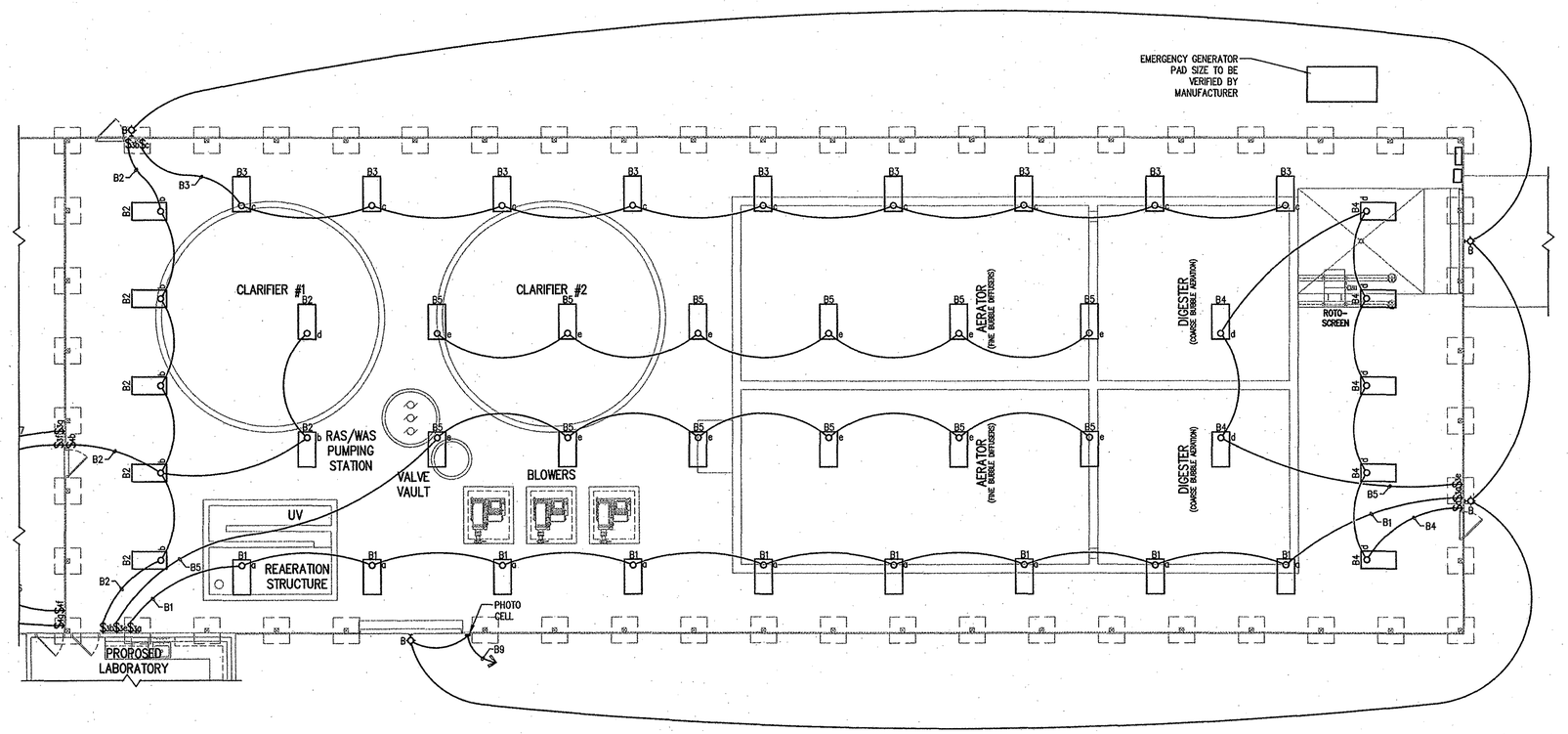
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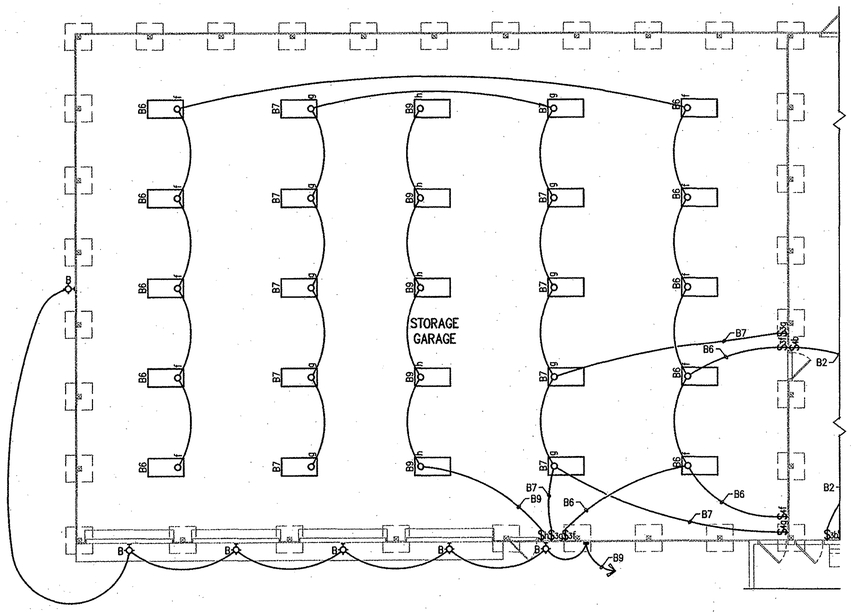
PROPOSED PLANT AND GARAGE ELECTRICAL PLAN

JOB NUMBER: 201115D	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1:1	PLOT DATE: 06/17/13
DRAWN BY: JET/DAP	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-PropElecLayout1REV2	

SHEET No.

E2





PROPOSED PLANT LIGHTING PLAN

SCALE: 1/8" = 1'-0"

NORTH

NOTE:
CONTRACTOR IS TO INSTALL A MINIMUM OF 20% TRANSLUCENT PANELS TO THE PROPOSED ROOF SYSTEM IN BOTH THE PLANT AREA AND THE STORAGE GARAGE AREA.

RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
3/17/13	PROJECT REVISIONS	DAP

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER

6/17/13

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TRIAD ASSOCIATES INC.
5835 LAWTON LOOP EAST DRIVE
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PHONE: 317-377-5230 FAX: 317-377-5241

DESIGNED FOR:

THE TOWN OF SWEETSER
GRANT COUNTY, INDIANA

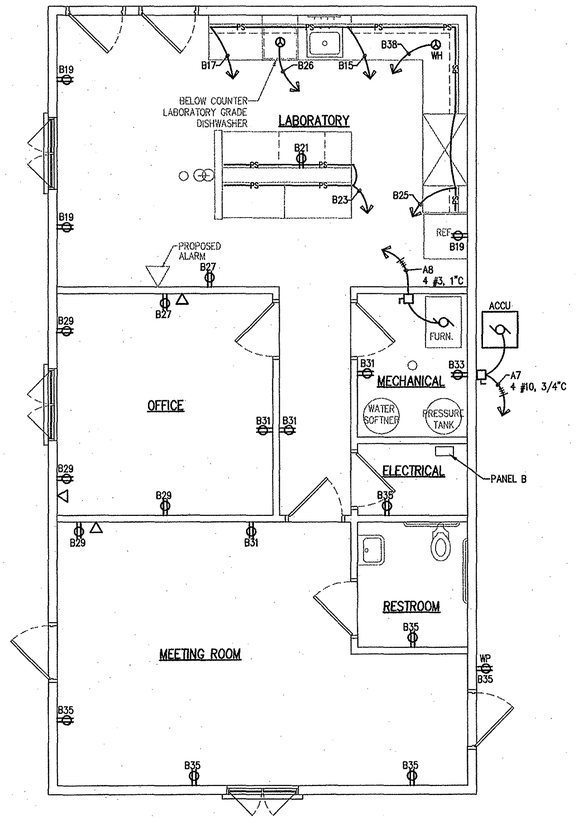
SHEET TITLE:

PROPOSED PLANT AND GARAGE LIGHTING PLAN

JOB NUMBER: 201115D	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1:1	PLOT DATE: 06/17/13
DRAWN BY: JET/DAP	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-PropElecLayout2REV2	

SHEET No.

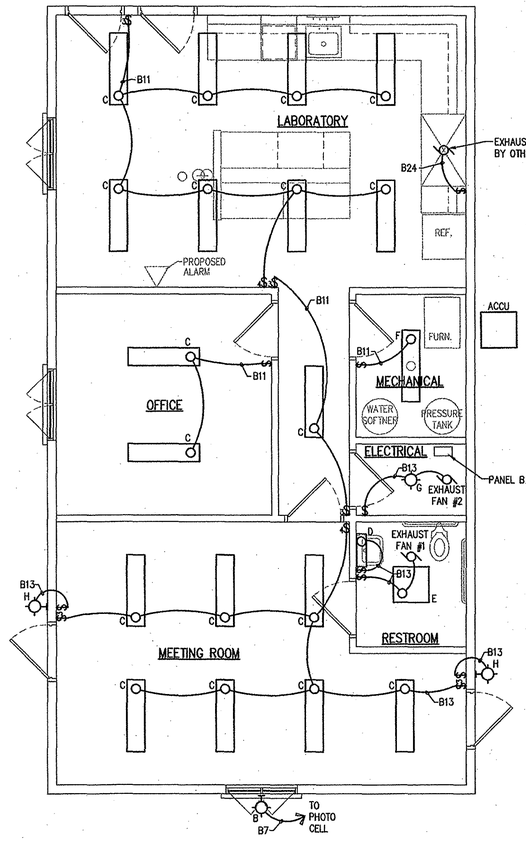
E3



ELECTRICAL FLOOR PLAN

SCALE: 1/4"= 1'-0"

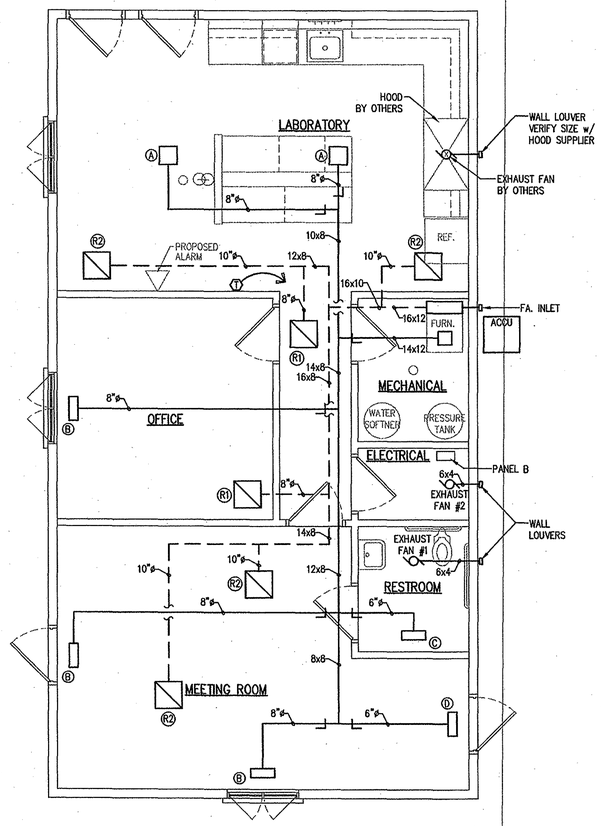
NORTH



LIGHTING FLOOR PLAN

SCALE: 1/4"= 1'-0"

NORTH



HVAC FLOOR PLAN

SCALE: 1/4"= 1'-0"

NORTH

RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	DAP

APPROVED BY:

JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER

6/17/13

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DESIGNED FOR:

THE TOWN OF SWEETSER
GRANT COUNTY, INDIANA

SHEET TITLE:

PROPOSED LABORATORY
ELECTRICAL PLANS

JOB NUMBER: 201115D	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1=48	PLOT DATE: 06/17/13
DRAWN BY: D.A.P.	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-LabElec01REV2	

SHEET No.

E4

LIGHTING FIXTURE SCHEDULE

Type	DESCRIPTION	Lamp Data	Volt.	Manufactures Catalog Number	Notes
A	Pendant enclosed	4 - T8 32W	120	Columbia # LHV 4 4 32 GW ST EP 120	
B	Exterior Bracket	50W PSMH	120	Hubble NRG -315	
C	1 x 4 Surface Mount	2 - T8 32 W	120	Columbia # WCW 4 3 32 3E 120	
D	Over Mirror Light	2 - 18 T8	120	Columbia # W2 - 218 EPU	
E	Surface Square	2 - 17 T8	120	Columbia # WC 2 217 EPU	
F	Strip 2 Light	2 - T8 32 W	120	Columbia CSR - 4 2 32 ST EPU	
G	Utility Surface Mtd	2 - 42W CFL	120	Hubble R12 - 84F	
H	Exterior Bracket	50W PSMH	120	Hubble NRG -315	With Photocell Control

HVAC EQUIPMENT SCHEDULE

Unit	Heat	COOLING	REQ. MIN	FURNACE	FURNACE-208/3ph	AIR COOLED	CONDENSOR-240v	EVAPORATOR
No.	KW	(Nominal)	CFM CLG.	UNIT NO.	MIN.CKT AMPS	CONDENSER NO.	MIN.CKT AMPS	COIL
Furn. #1	10	30,000	1000	TXC035A	35	2TTB30	21.0	TXC Series
Unit Heaters	30				100			

NOTES:

1. EQUIPMENT NUMBERS ARE TRANE, EQUALS BY: BRYANT OR CARRIER OR OTHER PRIOR APPROVED MANUFACTURER ARE ACCEPTABLE.
2. ELECTRIC UNIT HEATERS ARE TO BE 30KW, 208V, 3 PHASE, DAYTON #2YU77, 102,000/77,000 BTU/HR. 72.3/63 FLA.

EXHAUST FAN SCHEDULE

FAN #	ROOMS	CFM	SP	MODEL NO.	HP	NOTES
1	RR	230	0.25	Penn # 28S	1.8 Amps	
2	Mech.	196	0.125	Penn # 26S	1.7amps	
3	WH	16500	0.125	Penn # BFM - 42	2	2 Speed
4	WH	16500	0.125	Penn # BFM - 42	2	2 Speed
5	Garage	12000	0.125	Penn # BFM - 42	1 1/2	2 Speed

Roof Mounted Fresh Air Intakes

FAN #	ROOMS	CFM	SP	MODEL NO.	NOTES
1	Garage	6000	0.125	Penn # FAI - 24B	
2	Equip. Room	8000	0.125	Penn # FAI - 30	

NOTE:
PROVIDE B.D.D. FOR ALL INTAKES, INTERLOCK WITH EXHAUST FAN DESIGNATED ON PLANS

DIFFUSERS

MARK	CFM	FACE	NECK	BLOW	MFG. CATALOG SERIES
A	200	12 X 12	8"	4 Way	TITUS Series TMS
B	150	9 X 15	8"	3 Way	TITUS Series TDC
C	50	6 X 12	6"	3 Way	TITUS Series TDC
D	100	9 X 12	6"	3 Way	TITUS Series TDC

GRILLES & REGISTERS

MARK		SIZE	LOCATION	MFG. CATALOG NUMBER
R1		12 X 12	Ceiling	TITUS Series 50
R2		15 X 15	Ceiling	TITUS Series 50

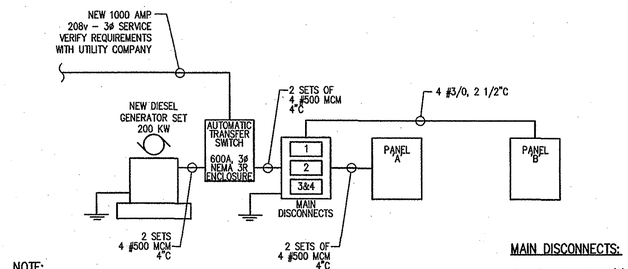
NOTE:
ALL SUPPLY DIFFUSERS SHALL HAVE AG-35 OR EQUAL VOLUME DAMPERS INCLUDED.

PANEL DESIGNATION: Panel A — PROJECT. Sweetser Waste Water Plant
VOLTAGE:120/208 Volt 3 Phase — MAIN AMPACITY: 800 Amp MLO. 208 Volt / 3 Phase
BRANCH CIRCUITS: Breakers

CKT	DESCRIPTION	WATTS	TRIP		CKT	DESCRIPTION	WATTS	TRIP
1	60 HP Blower	55,440	3P - 250	A	2	60 HP Blower	55,440	3P - 250
				B				
				C				
3	60 HP Blower	55,440	3P - 250	A	4	Screen 3/4 HP	1,500	3P - 20
				B				
				C				
5	2 (RAS/WAS) Pumps	3,000	3P - 20	A	6	RAS/WAS Pump	1,500	3P - 20
				B				
				C				
7	ACCU	8,750	3P - 30	A	8	Furnace (Elect. Heat)	12,000	3P - 90
				B				
				C				
9	Wall Exhaust Fan	2,000	3P - 20	A	10	Wall Exhaust Fan	2,000	3P - 20
				B				
				C				
11	Well Pump	7,500	3P - 30	A	12	Wall Exhaust Fan	2,000	3P - 20
				B				
				C				
13	Garage Heater	30,000	3P - 100	A	14	Garage Heater	30,000	3P - 100
				B				
				C				
	TOTALS	162,130					104,440	

PANEL DESIGNATION: Panel B — PROJECT. Sweetser Waste Water Plant
VOLTAGE:120/208 Volt 3 Phase — MAIN AMPACITY: 200 Amp MLO. 208 Volt / 3 Phase
BRANCH CIRCUITS: Breakers

CKT	DESCRIPTION	WATTS	TRIP		CKT	DESCRIPTION	WATTS	TRIP
1	Lighting	1,420	1P - 20	A	2	Lighting	1,050	1P - 20
3	Lighting	1,350	1P - 20	B	4	Lighting	1,050	1P - 20
5	Lighting	1,200	1P - 20	C	6	Lighting	1,540	1P - 20
7	Lighting	1,200	1P - 20	A	8	Duplex Conv Outlets	1,000	1P - 20
9	Lighting	1,120	1P - 20	B	10	Duplex Conv Outlets	1,000	1P - 20
11	Lighting	1,200	1P - 20	C	12	Duplex Conv Outlets	1,000	1P - 20
13	Lighting	1,300	1P - 20	A	14	Duplex Conv Outlets	1,000	1P - 20
15	Plug Strip	1,000	1P - 20	B	16	Duplex Conv Outlets	1,000	1P - 20
17	Plug Strip	1,000	1P - 20	C	18	Duplex Conv Outlets	1,000	1P - 20
19	Duplex Conv Outlets	1,000	1P - 20	A	20	Flow Meter	1,000	1P - 20
21	Plug Strip	1,000	1P - 20	B	22	U.V.	1,500	1P - 20
23	Plug Strip	1,000	1P - 20	C	24	Hood by others	750	1P - 20
25	Plug Strip	1,000	1P - 20	A	26	Dishwasher	1,500	1P - 20
27	Duplex Conv Outlets	1,000	1P - 20	B	28	O. H. Doors	1,200	1P - 20
29	Duplex Conv Outlets	1,000	1P - 20	C	30	O. H. Doors	1,200	1P - 20
31	Duplex Conv Outlets	1,000	1P - 20	A	32	Duplex Conv & EX. Fan	1,500	1P - 20
33	Duplex Conv Outlets	1,000	1P - 20	B	34	Spare		1P - 20
35	Duplex Conv Outlets	1,000	1P - 20	C	36	Spare		1P - 20
37	Spare		1P - 20	A	38	Water Heater	2,500	2P - 20
39	Spare		1P - 20	B				
41	Spare		1P - 20	C	40	Spare		1P - 20
	TOTALS	19,790					20,790	



NOTE:
SEE SPECIFICATIONS FOR EMERGENCY GENERATOR DETAILS

MAIN DISCONNECTS:
#1 – 3P–800A, PANEL 'A'
#2 – 3P–200A, PANEL 'B'
#3 – 3P–100A, SPACE
#4 – 3P–100A, SPACE

PROPOSED ELECTRICAL RISER DIAGRAM

SCALE: N.T.S.

RE-DESIGN SET 06-17-13

CONSULTANT:

REVISIONS:

DATE	DESCRIPTION	BY
5/17/13	PROJECT REVISIONS	DAP

APPROVED BY:
JAMES W. FRAZELL REGISTERED No. 17208 STATE OF INDIANA PROFESSIONAL ENGINEER
6/17/13

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DESIGNED FOR:
THE TOWN OF SWEETSER
GRANT COUNTY, INDIANA

SHEET TITLE:
PROPOSED ELECTRICAL RISER DIAGRAM AND PROPOSED ELECTRICAL SCHEDULES

JOB NUMBER: 201115D	
SCALE: AS NOTED	CHECKED BY: M.P.H.
PLOT SCALE: 1=1	PLOT DATE: 06/17/13
DRAWN BY: D.A.P.	DATE: MAY, 2013
DESIGNED BY: James W. Frazell, P.E.	
DRAWING NAME: 201115D-ElecDet01REV2	

SHEET No.
E5

ATTACHMENT G

Preliminary Engineering Report
Wastewater System Improvements Project
(by Triad Associates Inc.)
March 2023

PROSPECTIVE BIDDERS:

PLEASE USE THIS DOCUMENT AS A REFERENCE ONLY.

NOTE THAT THIS PRELIMINARY ENGINEERING REPORT, PREPARED BY TRIAD ENGINEERING INC., DATED MARCH 2023, AND DCCM IS NOT RESPONSIBLE FOR ANY DEVIATION AND/OR DISCREPANCIES BETWEEN THE INFORMATION PROVIDED IN THE REPORT AND EXISTING CONDITIONS.

IT IS THE RESPONSABILITY OF THE BIDDERS TO UNDERSTAND EXISTING CONDITIONS.



PRELIMINARY ENGINEERING REPORT

WASTEWATER SYSTEM IMPROVEMENTS PROJECT

TOWN OF SWEETSER, INDIANA

TRIAD ASSOCIATES, INC.
ENGINEERING • ARCHITECTURE

5835 Lawton Loop East Drive

Indianapolis, IN 46216

Phone: 317-377-5230

202242A

MARCH 2023

TOWN OF SWEETSER, INDIANA

PRELIMINARY ENGINEERING REPORT
WASTEWATER SYSTEM IMPROVEMENTS PROJECT

MARCH 2023

Owner:

Town of Sweetser, Indiana
113 N. Main Street
Sweetser, IN 46987
(765) 384-5333
Contact: Kyle Taylor, Town Council President

Engineer:

5835 Lawton Loop East Drive
Indianapolis, IN 46216
Phone: 317-377-5230
triadassoc.net

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CHAPTER 1 PROJECT LOCATION

A. Description of Existing and Future/Project Area

The Town of Sweetser is located in Franklin, Pleasant and Richland townships, Grant County, Indiana in Sections 31, 32 and 5, 6 of Township 25 North, Range 7 East, 24 North, Range 7 East and can be found on the Sweetser Quadrangle map. The wastewater plant is located in Section 5, Township 24 North, Range 7 East. A general location map is provided as **Exhibit 1**. The existing service area is shown on **Exhibit 2**. Activities related to the proposed improvements will occur within the service area and to the Oak Hill High School to the West of the Town, Shown in Exhibit 3.

CHAPTER 2 CURRENT SITUATION

A. Location Maps

The Town of Sweetser owned and operated wastewater system consists of a treatment plant, five (5) lift stations, and collection sewers. **Exhibit 3** shows the overall collection system. The plant site is shown on **Exhibit 4**.

B. History and Condition of Existing Facilities

1. Wastewater Collection System

The collection system consists of 100% separate sewers by design with no overflow or bypass points. The Town's collection system was originally installed in the late 1970s. The sewers range in size from 8 to 12 inches in diameter and most are constructed of VCP.

Prior to 2014 the Town's collection system conveyed wastewater and discharge into the collection system of City of Marion via an 8" force main at SR 18. In 2014 the Town built its own treatment plant and all wastewater flow within the Town limit is sent to the new plant.

2. Lift Stations

The Town's collection system currently contains 5 lift stations as listed below.

a. Lift Station #1 (Kelly Dr)

Location:	614 Kelly Dr
Pumps:	2 @ 500 gpm (VFDs), 143' TDH
Manufacturer/Model:	
Phase/Hertz/Volts; hp:	3/60 Hz/230 V/460 V; 60 hp
Discharge:	6" force main

b. Lift Station #2 (Short St)

Location:	Short St Between Main St and Greenberry St
Pumps:	2 @ 200 gpm, 59' TDH
Manufacturer/Model:	

	Phase/Hertz/Volts; hp:	3/60 Hz/230 V; 11.3 hp
	Discharge:	6” force main
c.	**Lift Station #3 (Bank)**	
	Location:	250 ft north of Auto-Owners Insurance Marion Claims
	Pumps:	2 @ 100 gpm, 35' TDH
	Manufacturer/Model:	
	Phase/Hertz/Volts; hp:	3/60 Hz/480 V; 5 hp
	Discharge:	4” force main
d.	**Lift Station #4 (Case Lift Station)**	
	Location:	SR 18 & CR 300 W
	Pumps:	2 @ 35 gpm, 59' TDH
	Manufacturer/Model:	
	Phase/Hertz/Volts; hp:	3/60 Hz/230 V; 3 hp
	Discharge:	2 ½ ” force main
e.	**Lift Station #5 (Eagle Dr)**	
	Location:	306 Eagle Dr
	Pumps:	2 @ 35 gpm, 59' TDH
	Manufacturer/Model:	
	Phase/Hertz/Volts; hp:	3/60 Hz/230 V; 3 hp
	Discharge:	3” force main

3. Wastewater Treatment Plant

The wastewater treatment plant installed in 2014 (WWTP) is a Class I, 0.150 MGD extended aeration activated sludge treatment facility consisting of an influent screen, two (2) aeration tanks, two (2) final clarifiers, two (2) digesters, UV disinfection post aeration, and an effluent flow meter. Sludge is aerobically digested then dewatered. Final sludge is land applied. The plant operates under NPDES permit No IN0064165. The current permit expires on December 31, 2023. The plant is authorized to discharge to Pipe Creek via Outfall 001. The receiving water has a seven day, ten year low flow (Q7,10) of 1 cubic feet per second (0.65 MGD) at the outfall location. **Exhibit 4** shows the plant site layout. **Appendix F** contains photos of the plant components.

The Oak Hill Junior & Senior High School is located approximately 3 miles west of the Town. It has its own package plant for wastewater treatment. However, the Oak Hill package plant is aging and operation & maintenance continue to cost the school system resources that could otherwise be put toward educational priorities. The school system also has an administration building to the south of the school campus that is presently on an individual septic system. They are hopeful of being able to connect to the Sweetser system for treatment. A Letter of Intent between both parties has been executed and is included in **Appendix H**.

C. Needs of the Wastewater System

1. Health, Sanitation, Security

Clear water flows are classified as either infiltration or inflow (I/I). Infiltration enters the system from the surrounding soil through cracks, breaks and separated joints in the sanitary sewer lines and manholes. Inflow enters the sewer system through direct connections such as roof downspouts, storm sewer cross-connections, drainage inlets, sump pumps etc. The existing collection system experiences a significant amount of infiltration and inflow (I/I) in the lines during wet weather. This causes wide fluctuations in volume at the WWTP which has resulted in violations of the NPDES permit and increased operational costs due to treating clear water.

Residents in a community are adversely affected by I/I because it adds clear water to the sewers which increases the load on the system. Once clear water enters the sewers it must be transported and treated at the plant like regular sanitary waste. I/I can overload the sewer system resulting in sewage overflows through manholes or backups in service lines which can flood basements or households. Overflow occurrences put public health at risk and is a violation of local, state and federal environmental regulations. Overflows could release wastewater and potential pathogens into streets, waterways and homes which increase potential health risks. Wastewater overflows into ditches and drainageways can contaminate water bodies. In addition, large volumes of clear water I/I disrupts the wastewater treatment process and poorly treated wastewater could be discharged to the environment which is a health and sanitation risk.

There are various costs associated with I/I. Overflow costs are associated with road and waterway cleanup and possible fines from regulatory agencies. Sewer backups into basements or households can result in litigation and liabilities for the responsible municipality. If the I/I is not reduced, eventually new homes or businesses may not be permitted to connect to the system which increases costs to the present users. Home values could be adversely affected as well. I/I cost consumers large amounts of money for the unnecessary treatment of clear water flows. I/I also puts additional wear on treatment equipment which lowers the life expectancy. The costs for processing additional clear flows from I/I are passed directly back to the residents and businesses in Town in the form of rate increases. This reduces the amount of money that users have to spend on other necessary life expenditures.

The Town has made a few system improvements in an effort to reduce I/I. **Table I** shows the historical influent volume averages 0.168 MGD between 2021 and 2022 which is over the plant capacity of 0.150 MGD. A graph comparing influent flows to rain events is provided on **Table V** from 2019 to 2020. **Table V** shows some relationship between rainfall events and increasing wastewater flows.

The Town has a long history of IDEM issued non-compliance, violations, and poor ratings in inspection reports as a direct result of the operation issues. In addition, several inspection reports contained issues with malfunctioning or inoperable equipment.

2. Systems Operations and Maintenance

a. Collection System O&M

The original sewer system that contains clay pipe was installed in 1970s. I/I into the system has increased annually.

The Town invested ARPA money to have the collection system cleaned & televised in 2022. A review of the tapes indicated that the clay pipes had leaky joints and defects that need to be repaired. Some sewer main segments have developed cracks and deposits that requires cleaning and lining. Many of the existing manholes have leaking joints, chimneys, and have open pick hole lids, which increase the amount of I&I into the collection system and need to be replaced. Many manholes were found to have high water marks and evidence of I/I at the joints. These manholes need to be grouted and lined.

It is suspected that many downspouts and sump pumps are improperly discharging to the sanitary system as well. This is a violation of the Town's Sewer Use Ordinance (SUO) and the Town will be policing and enforcing disconnection of these.

b. Treatment Plant O&M

The plant has been having non compliance issues of NPDES permit from IDEM inspection for the last few years. An inspection of the plant and review of the design parameters of the existing components indicates the following:

- The influent drum screen gets easily clogged and consequently overflows without proper notification.
- One of the aeration tanks was not operated properly at one time causing anaerobic conditions within the tank.
- The clarifiers were not operated properly at one time resulting in excessive solids in effluent.
- There are some accessibility issues at the aeration tanks.
- Sludge waste and return pump station improvements are necessary to improve return & wasting.
- Solids Handling improvements are needed in order to make processing easier and timely.
- The plant building has high humidity and mold issue on walls and ceilings.
- Moisture buildup in electric control panels that causes rust and potential system failure.

3. Oak Hill High School

The Oak Hill High School is located at the intersection of US 18 (Delphi Pike) and N 800 W 27, approximately 3 miles west of the Town. The school currently collects and treats its own wastewater via a small onsite package plant with daily average flow of 6,800 gpd. The school would like to have wastewater treatment by Sweetser. This will eliminate the need of operating and maintaining the school's WWTP. The Town and the school have executed an MOU to tie high

school and its administration building to the Town's system. This would also allow properties in the vicinity of the school to connect to the Sweetser system and eliminate potentially failing septic systems.

4. Summary of Wastewater System Project Needs

Based on the results of the system evaluation the following are recommended.

a. Collection System

- Grout & line manholes
- Replace manhole lids and castings, repair manhole chimneys
- Line sewers with poor conditions
- Sewer point repairs

b. Lift Station

- Replace Lift Station #1 Lids
- Lift Station #3 site improvements
- Line Lift Station #1-#5 wet wells

c. Oak Hill High School Regionalization

- New Lift Station located at the school
- Administration building grinder pump and force main
- Transmission force main to the Town's collection system

d. Treatment Plant

- Replace the influent screen with a better system
- Add catwalk between two aeration tanks for better access
- Add aeration tank influent baffles
- Add level control & actuators on sludge telescoping valves for RAS/WAS
- Add electrical control panel enclosure & repairs
- Solids handling improvements including an enclosure for the dumpsters
- Miscellaneous lab improvements
- Building moisture control & ventilation
- Air line improvements for digester air
- Re-locate sampler, potable well re-wiring, lighting improvements

CHAPTER 3 FUTURE SITUATION

A. Existing and Future Population

The 2020 U.S. Census records the Sweetser population as 1,066 which is a decrease of nearly 13% from the previous decade. The Indiana Business Research Center does not have projections for the Town but predicts the population in Grant County will decrease. Wastewater records indicate there are 538 wastewater users. The non-residential users are domestic in nature and mostly serve the local community.

Past census records show there are wide fluctuations in population. Development records indicate an average of only one building permit issued annually. There are no known significant commercial or industrial users who are locating to the area. The surrounding area is agricultural. There is one school located within Town, Sweetser Elementary School. The population growth over the past 50 years averages 1.0%. For purposes of this report a modest 1% population increase will be assumed, resulting in a population of 1,097 by 2040. The growth rate for non-residential users will mirror residential growth since they mostly provide service to the local community.

Economic growth within the service area is expected to parallel population trends. Heavy commercial and industrial users in the planning area are currently non-existent. This is not expected to change within the 20 year planning period. It is projected that the Town's population will remain stable with minor increases in the near future.

B. Existing and Future Flows

Average daily flows processed at the plant are 0.146 MGD based on 2019 to 2022 MROs, which is approximately 97.3% of the design average flow of 0.150 MGD. Moreover, wet weather flows average nearly 0.48 MGD and have reached as high as 0.93 MGD which exceeds the current peak design flow. These high flows are attributed to infiltration and inflow in the collection system. The design waste strength for BOD and Ammonia are 215 mg/L and 35 mg/L, the MRO data showed a dry weather average of 131 mg/L and 22 mg/L which means the plant still have treatment capacity in terms of loadings. **Table I** and **Table II** shows historical flows and loadings. **Table V** charts the flows as compared to rainfall.

The future flow increase due to the population growth will not exceed the current plant capacity. However, the increasing peak flow due to I/I during wet weather are likely to worsen if no action is taken to the collection system or the plant. **Table III** and **Table IV** shows future flows and loadings. Triad has done a thorough investigation of the Town's collection system in terms of I/I. Numerous manholes were found not properly sealed between cone sections and the majority of the manholes have pick holes that allow for extra inflow during wet weather. The four main lift stations all show signs of I/I in the wet well, with Lift Station #4 (Case Lift Station) showing the most severe leaking with multiple cracks and pipe seals contributing I/I. These can be found in **Appendix G**. The total combined I/I in current system is estimated to be above 0.5 MGD which is over 30% of the average daily flow to the plant.

CHAPTER 4 EVALUATION OF ALTERNATIVES

A. Wastewater System Improvements Alternatives

Alternatives were evaluated based on reliability, practicality, technical feasibility, ease of implementation, environmental soundness and cost effectiveness. The following were evaluated:

1. No Action
2. Rehabilitate the Collection System and Treatment Plant
3. Replace the Collection System and Treatment Plant
4. Regionalization

1. No Action

The no action alternative consists of maintaining the current method for collection and treatment with no repairs or rehabilitation efforts, providing a status quo situation. This alternative is not considered to be practical or environmentally sound as it would do nothing to relieve problems in the system or upgrade the components to assure optimal operation. The collection system has a history of I/I which causes high flows at the plant and the unnecessary treatment of clear water. In addition, the plant that is currently in operation is aged and needs to be modified or replaced.

2. Option A - Rehabilitate Collection System and Wastewater Treatment Plant

Under this option, improvements would be made to selected portions of the collection system in order to optimize the removal and reduction of I/I. This would entail lining or replacing sewers and laterals that were identified through televising as contributing to clear water intrusion in the system. Lift Station #1 through #4 will need wet well lining. Lift Station #1 and #3 will need wet well additional improvements. Treatment facility work would include replacing existing influent screen with mechanical and manual bar screen. A new catwalk will be installed between two aeration tanks for easier access to the shutoff valves. The plant control panels will be improved to be more weather resistant and with an enclosed room to prevent future damage due to moisture buildup within the plant building. The existing RAS WAS pump station will be added with level controls. Some other miscellaneous improvements are also included in this alternative.

In order to connect Oak Hill Junior & Senior High School to the Town's system, a new lift station and force main will be installed from the Oak Hill High School to the Town's WWTP. The existing school package plant will be demolished. The septic system at the administration building will be decommissioned and a grinder station and force main will also be installed to connect the Administration building to the force main. Properties in the vicinity with failing septic systems will be able to connect to this system utilizing a grinder pump station. Although this will add 0.0068 MGD of daily flow to the Town's wastewater system, the potential I/I flow reduction could be over 15% with all proposed manhole/sewer lining and point repairs, which gives enough extra capacity for the existing WWTP to take the flow from the school. Cost estimates for Oak Hill High School sewer service are provided on **Table VI**.

Exhibits 6A, 6B, 6C and **7** show the proposed collection system and plant improvements. Cost estimates for Option A, rehabilitate the existing wastewater system, are provided on **Table VII**.

Rehabilitating collection lines and laterals would assure that the majority sources of I/I are removed in selected areas. Rehabilitating the current plant would allow the facility to be operated more efficiently and safely. The main disadvantage is that these improvements may not address all the I/I issue and plant operation issues.

3. Option B - Replace Collection System, Influent Lift Station and WWTP

The original collection system that is in poor condition would be replaced with new manholes and watertight PVC sewers to eliminate I/I. Treatment would be provided by a new extended aeration facility that is sized to treat wet weather peak flows. Lines will be replaced with the same size sewers. Included would be replacement of laterals located within the right of way. A new lift station and force main will be installed from the Oak Hill High School to the Town's WWTP. Treatment facility work would include all improvements in Option A and a new plant building with better ventilation and humidity control. **Exhibits 6C, 8A, 8B and 9** show the proposed collection system improvements and plant layout. Cost estimates for the Option B system replacement are provided on **Table VIII**.

Replacing collection lines and laterals would assure that most sources of I/I are removed in selected areas. Rehabilitating the current plant and constructing a new plant building would allow the facility to be operated more efficiently and safely. The main disadvantage is the higher cost and environmentally unfriendly choice of not using pipes and structures that are still in good shape. User rates would increase due to the capital costs of installing new lines and a plant.

4. Regionalization - Wastewater Treatment by Another Entity

Regionalization entails transporting to another plant for treatment which is dependent upon the proximity, operational circumstances and willingness of the entity to accept the sewage. The Town used to send all sewage to City of Marion before the WWTP was built in 2014.

The existing collection system would have to be rehabilitated or replaced in order to eliminate I/I and the high cost of outside treatment charges. Treatment could be provided by the Marion facility. The lift station pumping scheme would need to be modified so that a new main lift station could pump to Marion.

Advantages of this alternative include regionalized operation and maintenance while still providing a technically acceptable, environmentally sound choice for treatment. However, connection to Marion is not considered a feasible option due to the distance, the cost of new pumping, CSO and existing I/I issues at Marion, and the political difficulty of executing an agreement. This alternative would also require the rehabilitation of an old force main used to send wastewater to Marion that was abandoned. Therefore, this option was not evaluated further.

B. Selected Wastewater System Alternative

Option A, Rehabilitate Collection System and Wastewater Treatment Plant is the selected alternative after the alternatives were evaluated based on cost effectiveness, technical feasibility, practicality, reliability, ease of implementation, and environmental soundness.

A Cost and Effectiveness Analysis that meets the minimum requirements of the Water Resources Reform and Development Act of 2014 was conducted for feasible options. The analysis and Life Cycle Present Worth comparisons are provided on **Table IX**. **Appendix E** contains the Cost and Effectiveness Certification Form.

CHAPTER 5 EVALUATION OF ENVIRONMENTAL IMPACTS

A. Disturbed and Undisturbed Land

Construction related to the plant will occur at the existing treatment plant site. Land disturbance around the new sewer force main installation will be approximately 12 feet wide. All sewer lines will be open cut and installed in and adjacent to the existing rights of way and utility easements. All work areas have previously been disturbed. No tree removal is necessary. Streets disturbed during construction will be patched and a surface asphalt layer placed. Disturbed areas will be restored to the existing land use. The adjacent areas that are grassed will be reseeded when complete.

B. Historic and Architectural Resources

There are scattered historic sites in the Town. Sites are primarily located along Main Street. There are no known historic, architectural or archaeological sites which would be impacted by this project as construction activities will be limited to alleys, disturbed areas, and rights of way. No curbs, streets, gutters, sidewalks, or curbside plantings in a historic district will be affected. **Exhibit 10** shows the SHAARD Map.

C. Wetlands

There are a few wetlands within the Town limits and they are classified as a freshwater ponds used for detention. **Exhibit 11** shows the wetlands in the region. Wetlands will not be adversely impacted by the construction or operation of the project. Mitigation measures to lessen and compensate for wetland impacts cited in comment letters about the project from the Indiana Department of Natural Resources and the U.S. Fish and Wildlife Service will be implemented.

D. Hydrology

1. Surface Water

The surface water of the Town includes the Pipe Creek crossing east of the Town and some fresh water detention ponds. The project will not adversely affect waters of high quality listed in 327 IAC 2-1-2(3), exceptional use streams listed in 327 IAC 2-1-11(b), Natural, Scenic and Recreational Rivers and Streams listed in 312 IAC 7-(2), Salmonid Streams listed in 327 IAC 2-1.5-5(a)(3), or waters on the Outstanding Rivers list as shown on the Natural Resources Commission Non-rule Policy Document.

2. Floodplains and Floodways

The area adjacent to Pipe Creek is considered a floodway and is located on the east and south sides of Town. A flood map is provided as **Exhibit 12**. The project will not affect the Lake Michigan Coastal Zone.

3. Groundwater

Sand and gravel deposits in the area yield no greater than 100 gpm, and range in thickness from one hundred to five hundred feet. If necessary, dewatering will be employed during construction with the flow directed to a sedimentation basin prior to being discharged to surrounding surface waters. The project will not impact a drinking water supply or sole source aquifer. The area does not contain a significant water supply or sole source aquifer. The area is not contained within the St. Joseph Aquifer basin.

E. Plants and Animals

The construction and operation of the project will not negatively impact state or federal-listed endangered species or their habitat. The project will be implemented to minimize impact to non-endangered species and their habitat. Mitigation measures cited in comment letters from the Department of Natural Resources and the U.S. Fish and Wildlife Service will be implemented.

F. Prime Farmland and Geology

The Town is mostly developed and does not contain prime farm ground. The surrounding area is primarily agricultural. The Farmland Conversion Impact Rating Form from the Natural Resources Conservation Service is provided in **Appendix B.** The major soil types in the region are Crosby and Brookston which can both be hydric. There are also small pockets of Miami Silt Loams. A soils map is provided as **Exhibit 13**. Soil types do not include karst or bedrock.

G. Air Quality

Construction activities may generate some noise, fumes, and dust normally resulting from such activity. The dust, fumes and noise are short term impacts, lasting only during the construction phase. Construction activities should not impact ozone, airborne pollutants or other current or future air quality concerns.

H. Open Space and Recreational Opportunities

The project's construction and operation will neither create nor destroy open space and recreational opportunities.

I. Lake Michigan Coastal Program

The project will not affect the Lake Michigan Coastal Zone.

J. Natural National Landmarks

The project will not affect the Lake Michigan Coastal Zone.

K. Secondary Impacts

The Town, through the authority of its Council, planning commission, or other means will ensure that future development, as well as future projects connecting to SRF-funded facilities, will not adversely impact archaeological/historical/structural resources, wetlands, wooded areas, or other sensitive environmental resources. The Town will require new development and treatment works projects to be constructed within the guidelines of the U.S. Fish and Wildlife Service, IDNR, IDEM, and other environmental review authorities.

L. Mitigation Measures

1. Siltation and Erosion

Siltation and erosion will be kept to a minimum. Any mitigation measures mandated by authorized reviewing agencies to reduce or eliminate waterway contamination will be implemented. Mitigative measures to limit erosion and siltation will include the following:

a) Erosion and sediment control measures required by the project specifications will require that the contractor provide a schedule for clearing, grading, excavating and restoring disturbed areas, along with a description of measures to be used during construction to ensure erosion/ sediment control. The program shall meet all applicable federal, state, and local requirements.
b) Natural vegetation will be retained wherever feasible.
c) Excavations will be limited to right of ways where possible.
d) Appropriate agronomic practices (sediment basins, seeding, mulching) will be provided to control runoff, including shoreline and stream crossings, if applicable.
e) Drainage systems, including surface and subsurface drainage, will be returned to their natural state as soon as possible, if disturbed.
f) Roadways and parking lots will remain stabilized during construction to the extent possible.
g) Construction activities will be scheduled to avoid excessively wet conditions when possible.
h) No more than 100 feet of open trench will be allowed. Excavated material will be kept to the upland side of the trench. Excess material will be used elsewhere on the project.
i) The existing topsoil will be reused during the restoration process.
j) If necessary, discharge from dewatering will be directed to sedimentation basins prior to discharging into surrounding surface waters.

2. Air Quality Impacts

The adverse impacts caused by dust may be alleviated by periodically wetting the exposed soil and unpaved roadways to reduce the suspension of particles. To reduce noise impacts, work activities can be limited to normal daytime hours. Proper precautions will be taken to assure that

construction activities do not impact ozone, airborne pollutants or other current or future air quality concerns.

CHAPTER 6 SELECTED PLAN

The selected plan for the Wastewater System, Option A, would make improvements to selected portions of the collection system in order to optimize the removal and reduction of I/I. This would entail lining sewers that were identified through televising as contributing to clear water intrusion in the system. The lift stations would be rehabbed to reduce the amount of I/I getting into the wet wells. Treatment facility work would include new influent screen, solids handling improvements, aeration tank catwalk, influent baffles, RAS WAS improvements, lab improvements, etc. **Exhibits 6A, 6B, 6C** and **7** show the proposed collection system and plant improvements. **Appendix A** contains the Design Summary for existing units and proposed improvements.

A. Project Components

Description	Unit	Quantity
Wastewater System Improvements		
8" Clay Sewer	LF	14,449
10” Clay Sewer	LF	14,524
12” Clay Sewer	LF	6,589
8” PVC Sewer	LF	641
10” PVC Sewer	LF	560
Manhole	EA	70
Lift Station	EA	4
Influent Screen	LS	1
Aeration Tanks	EA	2
Electrical	LS	1
RAS/WAS wet well	LS	1
Lab	LS	1
Sampler	EA	1
Digester	EA	2

B. Cost Summary

Itemized cost estimates for the proposed system improvements are shown on **Table VI and VII**. The Selected Plan Cost Summary is provided on **Table X**. The financial summary of the selected project is listed in **Table XI**.

C. Project Schedule

Submit PER to SRF	April 2023
SRF Approval of PER	July 2023
Submit Plans & Specs to IDEM	November 2023
IDEM Approval of Plans & Specs	January 2024
Bid Authorization and Advertise for Bids	February 2024
Loan Closing	March 2024
Bid Award	March 2024
Initiation of Construction	April 2024
Substantial Completion	April 2025
Complete Construction, Initiation of Operation	May 2025

D. Sustainable Infrastructure/Green Initiatives

The Green Project Reserve Sustainability Incentive cannot be cost effectively achieved through this project.

CHAPTER 7 LEGAL, FINANCIAL AND MANAGERIAL CAPABILITIES

A. Resolutions

Appendix C contains a resolution designating an authorized signatory with regards to project matters and a resolution approving the PER and authorizing submittal to IDEM.

B. SRF Finance Summary

An initial analysis of financial capabilities was completed using the best available records to determine costs to the community and is provided on **Table XI**, SRF Financial Summary. The Town will develop a Fiscal Sustainability Plan (FSP) that meets the minimum requirements listed in the Federal Water Pollution Control Act Section 603(d)(1)(E)(i) and will submit a completed FSP Certification Form prior to the final disbursement request related to the primary project.

C. Land Acquisition

No land acquisition is necessary for this project.

CHAPTER 8 PUBLIC PARTICIPATION

D. Public Hearings Requirements

In accordance with the requirements for SRF funding and Indiana Rule 327 IAC 13-8-13, a public hearing was held on March 28, 2023 at 7:00 p.m. at the Town Hall to discuss the PER and solicit citizens' views, questions and concerns regarding the proposed project. The PER was available for review along with a written summary of the project.

1. Legal Notice

A Publisher's Affidavit and Public Hearing Notice are included in **Appendix D1** to verify compliance with the minimum public notice requirement of ten (10) days. The Preliminary Engineering Report was made available for review during this time and at the public hearing.

2. Transcripts

Minutes of the Public Hearing are provided in **Appendix D2**.

3. Interested Parties

Appendix D3 contains a list of parties who have demonstrated an interest in receiving a copy of the Environmental Assessment (EA)/Finding of No Significant Environmental Impact (FNSEI).

4. Written Comments

A five-day period following the public hearing was reserved for receipt of written public comments concerning the project. See **Appendix D4.**

TABLE I
Existing Wastewater Flows
Town of Sweetser, Indiana

Average Design Flow 0.150 MGD

Domestic	[1]	146,406	gpd
Commercial/Indust/Inst		NA	gpd
Total DCI		146,406	gpd
TOTAL EXISTING FLOW		**146,406**	gpd
Peaking Factor	[2]	3.78	
Peak DCI	[3]	553,698	gal
Peak Flow		385	gpm

[1] Based on 2019-2022 MRO Data
[2] Derived from 10 State Standards & population of 1066
[3] Total DCI x Peaking Factor

Flow meter calibrated	Yes
Flows appear accurate	Yes

TABLE II
CURRENT TREATMENT PLANT WASTELOAD
Town of Sweetser, Indiana

		Concentration (mg/l)	Daily Load (lb)
Influent			
	CBOD	119.7	146.2
	TSS	136.6	166.7
	NH3-N	21.9	26.7
	P	4.3	5.3
Effluent			
	CBOD	4.1	5.0
	TSS	4.9	6.0
	NH3-N	0.6	0.7
	P	0.11	0.1

Dates of MRO's: January 2019 - December 2021
Average Flow: 0.146 MGD

TABLE III
DESIGN TREATMENT PLANT FLOWS
Town of Sweetser, Indiana

Existing Flows	146,406	gpd	
Future Flows	2,943	gpd	
Oak Hill School	6,200	gpd	
Estimated I/I Reduction	20000	gpd	
Total DCI	**135,549**	**gpd**	
AVERAGE DESIGN FLOW	**0.150**	**MGD**	[1]
Peak Flows	511,523	gpd	peaking factor 3.77
Wet Weather Infiltration/Inflow			[2]
PEAK DESIGN FLOW	**0.512**	**MGD**	

[1] Proposed Design Average Flow
[2] Included in Existing and Future flows

TABLE IV
DESIGN TREATMENT PLANT LOADINGS
Town of Sweetser, Indiana

Existing Flows	0.146 MGD
Future Flows	0.003 MGD
Total Design Flows	**0.150** MGD

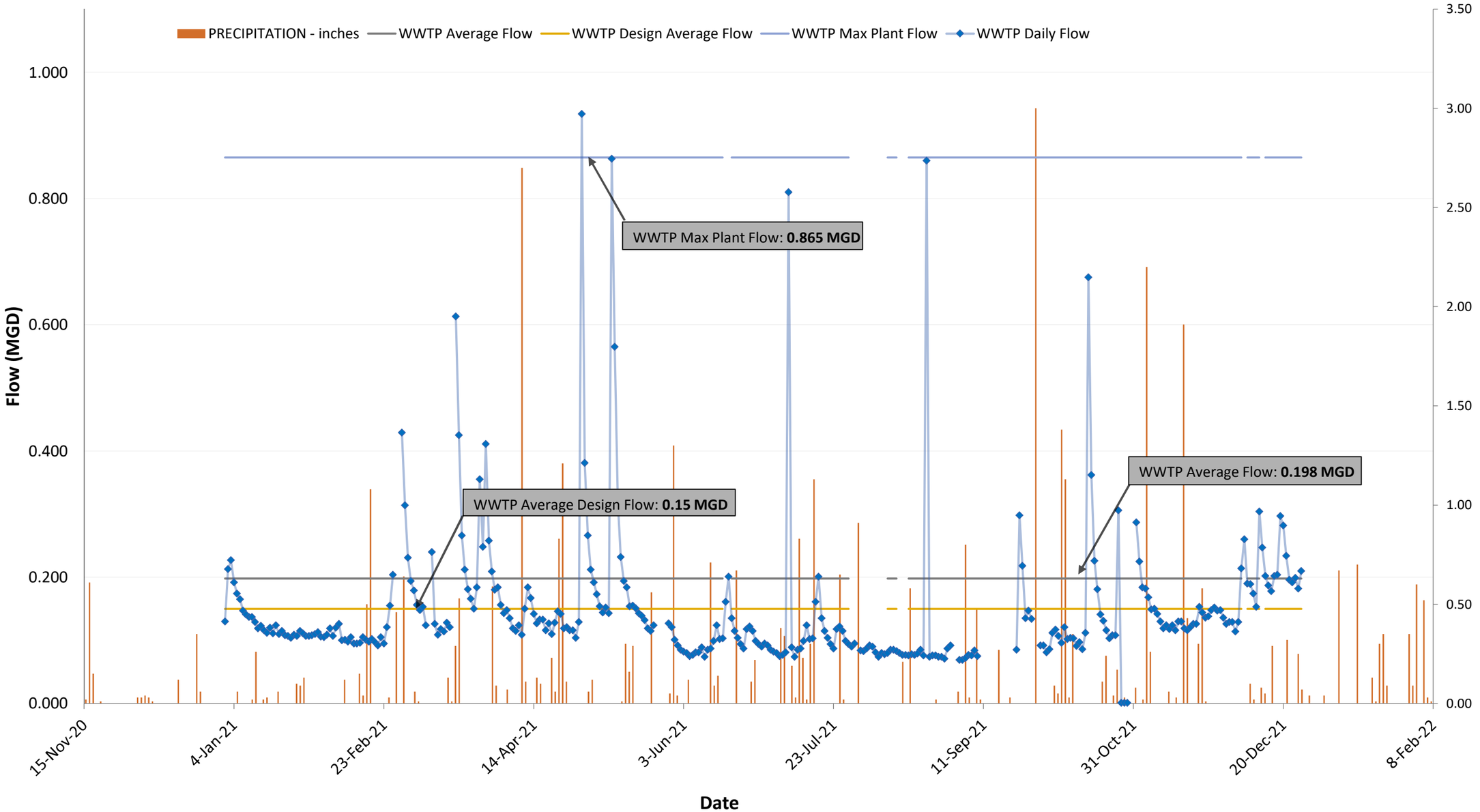
		Concentration (mg/l)	Design Concentration (mg/l)	Loadings [3] (lb/day)
Influent CBOD5	[1]	130.9	133	166
	[2]	220.0		
TSS	[1]	136.6	138	173
	[2]	220.0		
NH3-N	[1]	22.0	22	28
	[2]	35.0		
P	[1]	4.3	4	6
	[2]	10.0		
Dates of MRO's	[1]	2019-2021		

[1] Concentration derived using actual loadings for existing flows
[2] Future loadings based on 10 State Standards

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Mar 2023

Table V Sweetser Wastewater Treatment Plant
Daily Flows vs Rainfall
(Jan 2021 to Dec 2021)



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TABLE VI

Mar 2023

COST ESTIMATE - OPTION A
REHABILITATE EXISTING COLLECTION SYSTEM AND WWTP
Town of Sweetser, Indiana

Item	Unit	Quantity	Unit Cost	Extended	Life	Short Lived Asset Res.	20 Yr.Salvage Value
Collection System Rehab							
8" Clay Sewer Lining	lf	14,449	$43	$621,307	50	$0	$372,784
10" Clay Sewer Lining	lf	14,524	$47	$682,628	50	$0	$409,577
12" Clay Sewer Lining	lf	6,589	$51	$336,039	50	$0	$201,623
Service Connection Reinstatement	ea	420	$185	$77,700	50	$0	$46,620
Manhole Replacement	ea	5	$12,000	$60,000	50	$0	$36,000
Manhole Lining	ea	65	$3,400	$221,000	50	$0	$132,600
Raise Manhole & Replace Casting & Lid	ea	121	$2,400	$290,400	50	$0	$174,240
Lift Station #1 Wet Well Lining	ls	1	$11,000	$11,000	50	$0	$6,600
Lift Station #2 Wet Well Lining	ls	1	$14,000	$14,000	50	$0	$8,400
Lift Station #3 Wet Well Lining	ls	1	$8,000	$8,000	50	$0	$4,800
Lift Station #4 Wet Well Lining	ls	1	$11,000	$11,000	50	$0	$6,600
Lift Station #5 Wet Well Lining	ls	1	$10,000	$10,000	50	$0	$6,000
Manhole Chimney Work	ea	23	$1,200	$27,600	50	$0	$16,560
8" PVC Sewer Lining	lf	641	$43	$27,563	50	$0	$16,538
10" PVC Sewer Lining	lf	560	$47	$26,320	50	$0	$15,792
Point Repair in 10" PVC Gravity Sewer	ls	1	$10,000	$10,000	20	$0	$0
Lift Station #3 Improvements & Site Drainage	ls	1	$65,000	$65,000	20	$0	$0
Lift Station #1 Improvements	ls	1	$8,000	$8,000	20	$0	$0
Subtotal Collection System				**$2,507,557**			
Regionalization							
Oak Hill School Lift Station & Force Main	ls	1	$995,000	$995,000	50	$0	$597,000
Administration Complex Sewer Service	ls	1	$35,000	$35,000	50	$0	$21,000
Subtotal Regionalization				**$1,030,000**			
Treatment Plant Rehab							
New Influent Screen Complete	ls	1	$305,000	$305,000	20	$0	$0
Solids Handling Improvements [1]	ls	1	$65,000	$65,000	20	$0	$0
Electrical Enclosure Room + Panels	ea	1	$35,000	$35,000	20	$0	$0
Catwalk & Stairs for Aeration Tank & Digesters	ls	1	$70,000	$70,000	20	$0	$0
RAS/WAS Improvements	ls	1	$25,000	$25,000	20	$0	$0
Relocate Sampler	ls	1	$2,500	$2,500	N/A	N/A	N/A
Aeration Tank Inflluent Baffle	ea	2	$5,000	$10,000	20	$0	$0
Lab Improvments	ls	1	$7,500	$7,500	20	$0	$0
Air Line for Digesters	ls	1	$20,000	$20,000	20	$0	$0
Well Wiring Repair & Building Lighting	ls	1	$14,000	$14,000	20	$0	$0
Moisture Control	ls	1	$75,000	$75,000	20	$0	$0
Subtotal Treatment Plant				**$629,000**		$0	$2,072,734

[1] Polymer Feed, Pump & Piping, Shelter

		Total Construction	**$4,166,557**
		Preliminary Eng Rpt	$43,000
Additional, Operations, Maintenance		Asset Management Plan	$25,000
& Replacement		Inspection	$124,000
Operating Labor	$0	Grant Administration	$56,000
Repairs	$2,000	Bond, Rate, Legal	$175,000
Energy	$5,000	Engineering Design	$410,000
Administration	$0	Construction Engineering	$20,000
Materials & Supplies	$2,000	Railroad Permitting	$5,000
Contract (Sew clean, sludge)	$0	Labor Standards	$7,500
Billing	$0	Total Non-construction	**$865,500**
Replacement	$0	Contingencies (10%)	$416,656
Total Annual OM&R	**$9,000**	**TOTAL PROJECT**	**$5,448,713**

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TABLE VII
COST ESTIMATE
Oak Hill Sewer Service
Town of Swetser

Mar 2023

ITEM	Unit	Quantity	Unit Cost	Extended
Lift Station & Wet Well Structures	ls	1	$72,000	$72,000
Pump Package & Controls	ls	1	$70,000	$70,000
Piping, Valves, Fittings	ls	1	$10,000	$10,000
Electrical	ls	1	$15,000	$15,000
Sitework, Fence	ls	1	$20,000	$20,000
Demiltion of Existing WWTP	ls	1	$45,000	$45,000
Flow Metering	ls	1	$7,500	$7,500
3" Force Main	lf	18,500	$40	$740,000
Highway Crossing	ls	1	$5,250	$5,250
Connection to Sweetser	ls	1	$250	$250
Air Release Structure & Valve	ls	1	$5,000	$5,000
Restoration	ls	1	$5,000	$5,000
Administration Bldg E-One Grinder Pit	ls	1	$10,000	$10,000
1 1/2" Force Main	lf	560	$25	$14,000
Railroad Crossing	ls	1	$8,000	$8,000
Valves	ea	2	$800	$1,600
Close-out Existing Septice Tank	ls	1	$1,400	$1,400
Subtotal Treatment Plant				**$1,030,000**
			Total Construction	**$1,030,000**

TAI

TABLE VIII
COST ESTIMATE - OPTION B
REPLACE COLLECTION SYSTEM AND WWTP
Town of Sweetser, Indiana

Mar 2023

Item	Unit	Quantity	Unit Cost	Extended	Life	Short Lived Asset Res.	20 Yr.Salvage Value
Collection System Replacement							
8" Gravity Sewer	lf	15,090	$75	$1,131,750	50	$0	$679,050
10" Gravity Sewer	lf	15,084	$85	$1,282,140	50	$0	$769,284
12" Gravity Sewer	lf	6,589	$95	$625,955	50	$0	$375,573
Point Repair in 10" PVC Gravity Sewer	ls	1	$10,000	$10,000	20	$0	$0
Service Connection Reinstatement	ea	420	$185	$77,700	50	$0	$46,620
Manhole Replacement	ea	70	$12,000	$840,000	50	$0	$504,000
Lift Station #1 throuh #5 Wet Well Replacemer	ea	5	$60,000	$300,000	50	$0	$180,000
Lift Station #3 Improvements & Site Drainage	ls	1	$50,000	$50,000	20	$0	$0
Lift Station #1 Improvements	ls	1	$8,000	$8,000	20	$0	$0
Subtotal Collection System				**$4,325,545**			
Regionalization							
Oak Hill School Lift Station & Force Main	ls	1	$1,030,000	$1,030,000	50	$0	$618,000
Subtotal Regionaliztion				**$1,030,000**			
Treatment Plant							
Influent LS VFDs & Controls	ls	1	$24,000	$24,000	20	$0	$0
Influent Lift Station	ls	1	$120,000	$120,000	20	$0	$0
Aeration Tanks	ea	2	$360,000	$720,000	20	$0	$0
Mixers for Aeration Tanks	ea	2	$48,000	$96,000	20	$0	$0
Clarifiers (30' dia.)	ea	2	$270,000	$540,000	20	$0	$0
RAS/WAS Station	ls	1	$96,000	$96,000	20	$0	$0
Fine Bubble Diffusion	ls	1	$96,000	$96,000	20	$0	$0
Blowers with VFDs	ea	5	$48,000	$240,000	20	$0	$0
UV Disinfection, Post Aeration	ls	1	$360,000	$360,000	20	$0	$0
Digester	ea	2	$192,000	$384,000	20	$0	$0
Chemical Feed	ea	1	$18,000	$18,000	10	$1,800	$0
Geo-Tube pad, drain, poly feed	ls	1	$132,000	$132,000	20	$0	$0
Flow Splitter	ea	1	$72,000	$72,000	20	$0	$0
Sampler	ea	2	$18,000	$36,000	10	$3,600	$0
Flow Meters (influent & effluent)	ea	2	$6,000	$12,000	10	$1,200	$0
Controls, SCADA, DO Probes	ls	1	$288,000	$288,000	20	$0	$0
Site Piping	ls	1	$96,000	$96,000	20	$0	$0
Electrical	ls	1	$120,000	$120,000	20	$0	$0
Lab/Office, UV shelter	ls	1	$270,000	$270,000	20	$0	$0
Site Work	ls	1	$60,000	$60,000	N/A	N/A	N/A
Subtotal Treatment Plant				**$3,780,000**			
						$6,600	**$3,172,527**
			Total Construction	**$9,135,545**			

		Preliminary Eng Rpt	$43,000
Additional, Operations, Maintenance		Asset Management Plan	$45,678
& Replacement		Inspection	$730,844
Operating Labor	$0	Grant Administration	$15,000
Repairs	$2,000	Bond, Rate, Legal	$150,000
Energy	$7,000	Engineering Design	$913,555
Administration	$0	Construction Engineering	$182,711
Materials & Supplies	$2,000	Railroad Permitting	$5,000
Contract (Sew clean, sludge)	$0	Labor Standard	$30,000
Billing	$0	Total Non-construction	**$2,115,787**
Replacement	$6,600	Contingencies (10%)	$913,555
Total Annual OM&R	**$17,600**	**TOTAL PROJECT**	**$12,164,887**

TAI | **TABLE IX** | Mar 2023

Present Worth Cost Comparison
Proposed Project Alternatives
Town of Sweetser, Indiana

	Option A Rehab Existing System/Regionalization TABLE VI	**Option B** Replace Existing Systems/Regionalization TABLE VII
Collection System	$2,507,557	$4,325,545
Wastewater Treatment	$629,000	$3,780,000
Regionalization	$1,030,000	$1,030,000
Total Capital Costs	**$4,166,557**	**$9,135,545**
Non-construction Costs	$865,500	$2,115,787
Contingencies	$416,656	$913,555
Total Project Cost	**$5,448,713**	**$12,164,886**
Annual Additional OM&R	$9,000	$17,600
Present Worth OMR & Replace [1]	**$172,657**	**$337,640**
Salvage Value	$2,072,734	$3,172,527
Present Worth of Salvage Value [2][3]	**$1,913,680**	**$2,929,079**
Net Present Value (NPV) [4]	**$3,707,689**	**$9,573,447**

[1] Present worth of annuity based on interest rate of 0.3% and 20 years.
Uniform Series Present Worth (USPW)

[2] Present worth based on PW Factor = (1/(1 + i)t) using interest rate (i) of -0.4% and 20 yrs (t) as obtained from Appendix C - OMB, Circular A-94 (Rev Nov 2020).

[3] Salvage value determined based on life expectancy, converted to present day dollars and subtracted.

[4] NPV = Capital cost (C) - USPW (O&M) - SPPW (PW of salvage value)

TAI Mar 2023

TABLE X
SELECTED PLAN COST SUMMARY
Proposed Wastewater System Improvements
Sweetser, Indiana

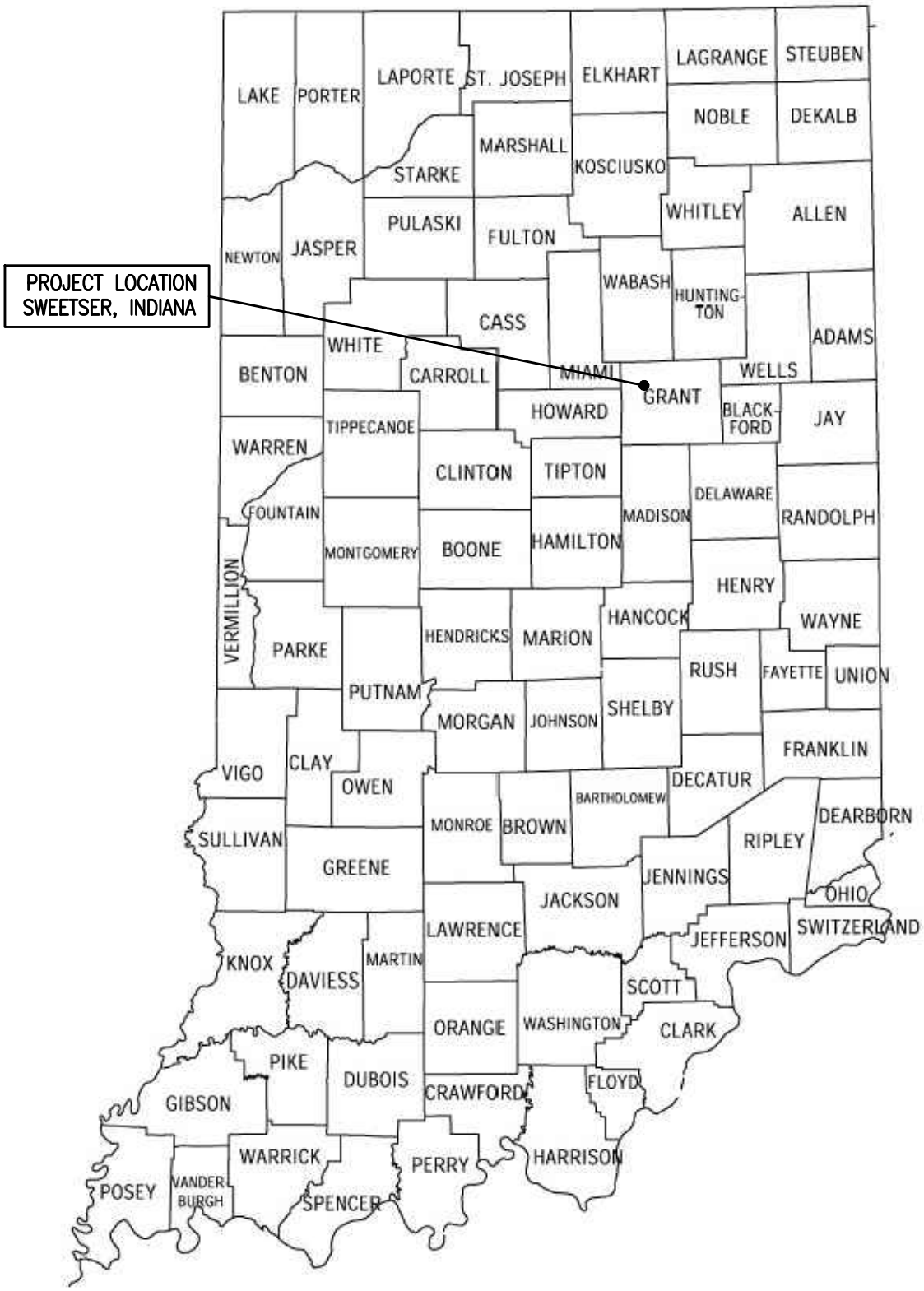
Construction and Equipment Subtotal	
Collection System Improvements	$2,507,557
Wastewater Treatment Plant Improvements	$629,000
Regionalization	$1,030,000
Subtotal Capital Costs	$4,166,557
Non-Construction Costs	**Total Cost**
Preliminary Eng Rpt	$43,000
Asset Management Plan	$25,000
Inspection	$124,000
Grant Administration	$56,000
Bond, Rate, Legal	$175,000
Engineering Design	$410,000
Construction Engineering	$20,000
Railroad Permitting	$5,000
Labor Standards	$7,500
NON-Construction Cost Subtotal	**$865,500**
Contingencies (10%)	$416,656
Construction Cost Subtotal	**$4,583,213**
Total Project Cost	**$5,448,713**

TABLE XI
Sweetser, Indiana
PROJECT FINANCING INFORMATION

1.	Project Cost Summary	
	a. Treatment System cost	$ 629,000
	b. Collection System cost	$ 2,507,557
	c. Regionalization cost	$ 1,030,000
	d. Water Supply/Wells	$
	e. Water Storage cost	$
	f. Other: Electrical, Controls	$
	Subtotal Construction Cost	**$ 4,166,557**
	g. Contingencies (should not exceed 10% of const cost)	$ 416,656
	h. Non-construction cost (Engineering, legal & financial services related to the project land costs, start-up costs, const inspection).	$ 865,500
	i. **Total Proposed Project Cost**	**$ 5,448,713**
	j. The following are not SRF Loan Program eligible:	
	Grant Applications &income surveys for other agencies	$ 700,000
	Previously funded SRF components that have not met useful life	$
	Materials and work done on private property	$
	Expenses incurred to form a utility RSD, RWD, Conservancy	$
	Total Ineligible Costs	**$**
	k. Other grant/loan funding sources	
	Other Grants	$
	Cash on hand	$
	Other Loans	$
	Hook-on Fees	$
	l. Total Other Funding Sources	**$**
2.	Requested **SRF Loan Amount (i-l)**	**$ 4,748,713**
3.	Estimated post-project user rate for 4,000 gallons	**$**
4.	Anticipated SRF interest rate	2%

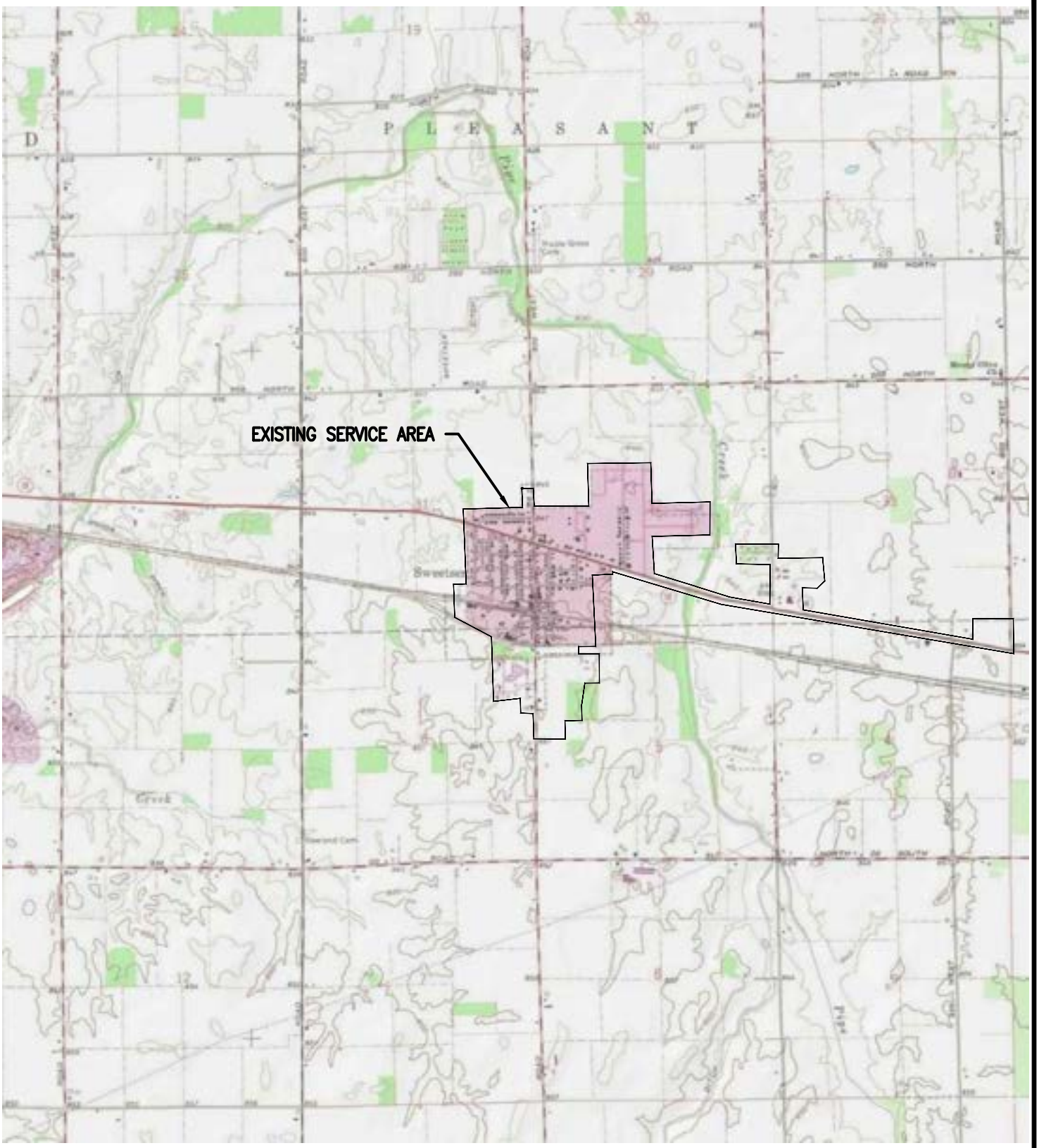
5. Financial Advisor
   a. Firm Contact Steven K Brock
   b. Name Therber Brock & Associates, LLC

6. Bond Counsel
   a. Firm Contact
   b. Name



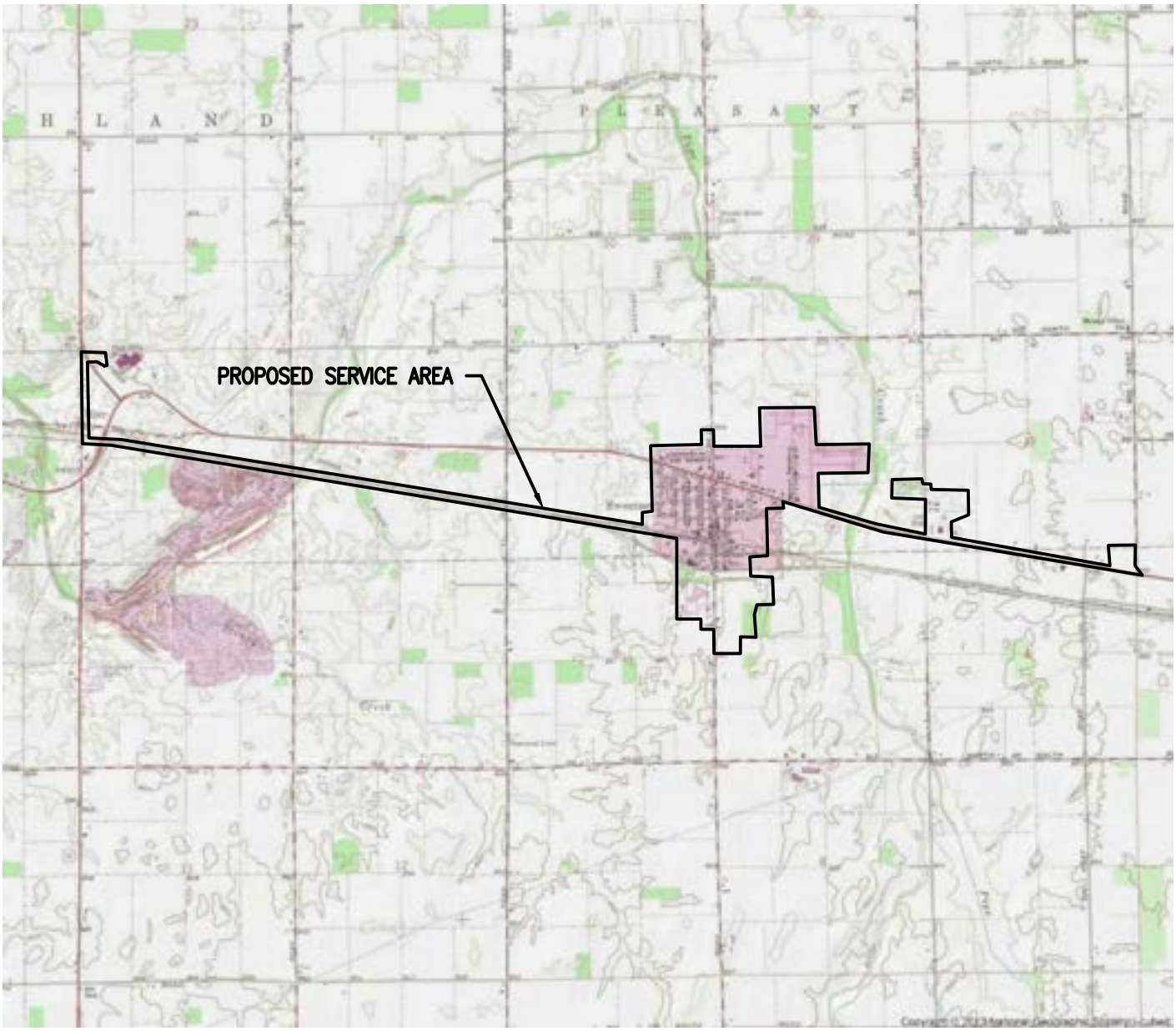
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SHEET TITLE: **PROJECT LOCATION MAP**	SCALE: **NONE**	TRIAD ASSOCIATES INC.	PROJECT #: **202242A**
			EXHIBIT #: **1**

02/23/2023 3:31pm S:\2022\SWEETSER\202242A - PER\EXHIBIT 1 - PROJECT LOCATION.DWG



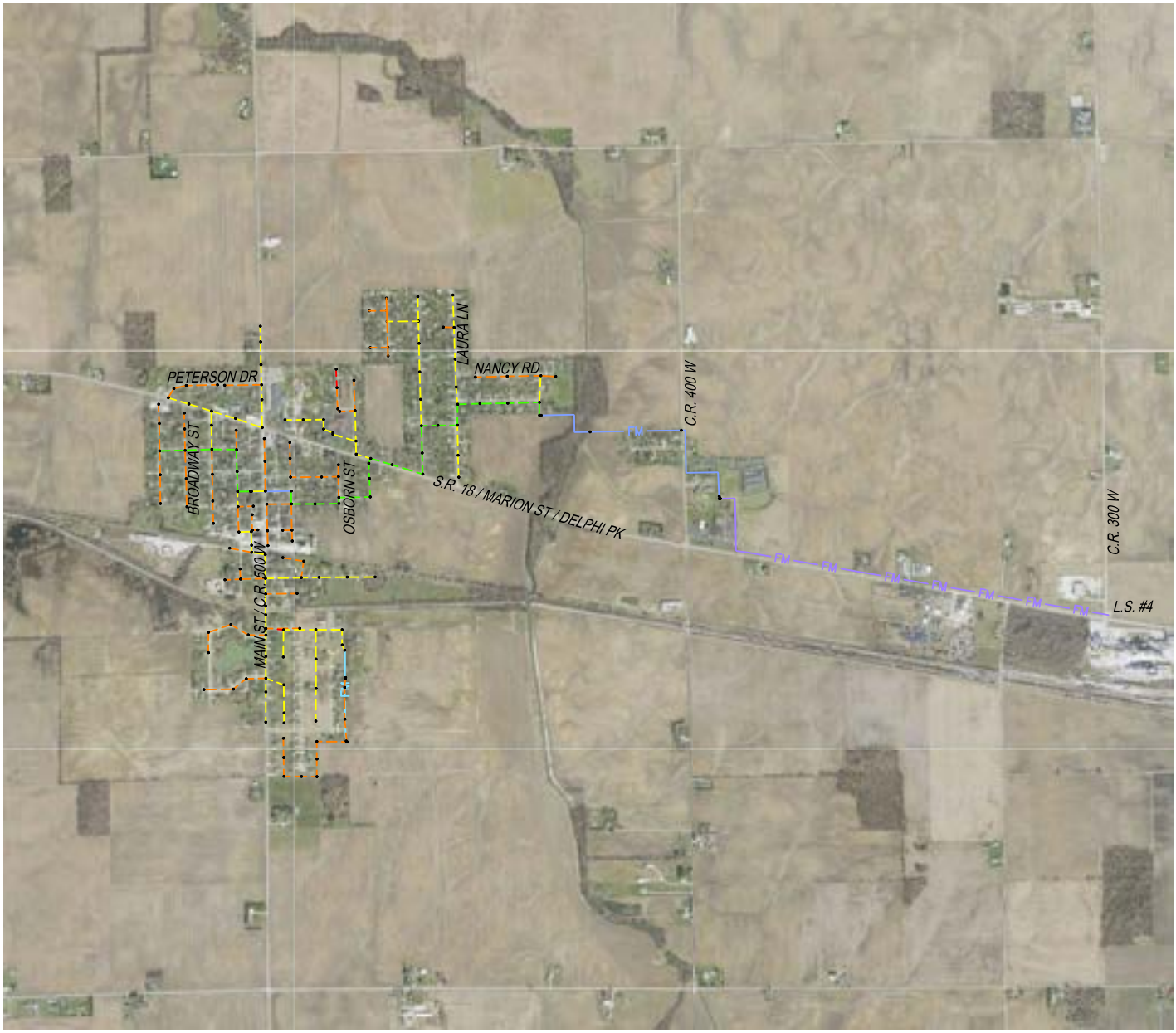
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SHEET TITLE: **EXISTING SERVICE AREA**	SCALE: **1"=3000'-0"**	TRIAD ASSOCIATES INC.	PROJECT #: **202242A**
			EXHIBIT #: **2**

03/23/2023 9:26am S:\2022\SWEETSER\202242A – PER\EXHIBIT 2 – EX SERVICE AREA.DWG



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SHEET TITLE: **PROPOSED SERVICE AREA**	SCALE: **1"=4000'-0"**	TRIAD ASSOCIATES INC.	PROJECT #: **202242A**
			EXHIBIT #: **3**

03/23/2023 9:27am S:\2022\SWEETSER\202242A - PER\EXHIBIT 3 - PRO SERVICE AREA.DWG



LEGEND:

- SANITARY LINE – 6"
- SANITARY LINE – 8"
- SANITARY LINE – 10"
- SANITARY LINE – 12"
- FORCEMAIN – 3"
- FORCEMAIN – 6"
- FORCEMAIN – 2.5"

CLIENT: **TOWN OF SWEETSER**

SHEET TITLE: **EXISTING WASTEWATER SYSTEM**

NORTH:

SCALE: 1"=2000'-0"

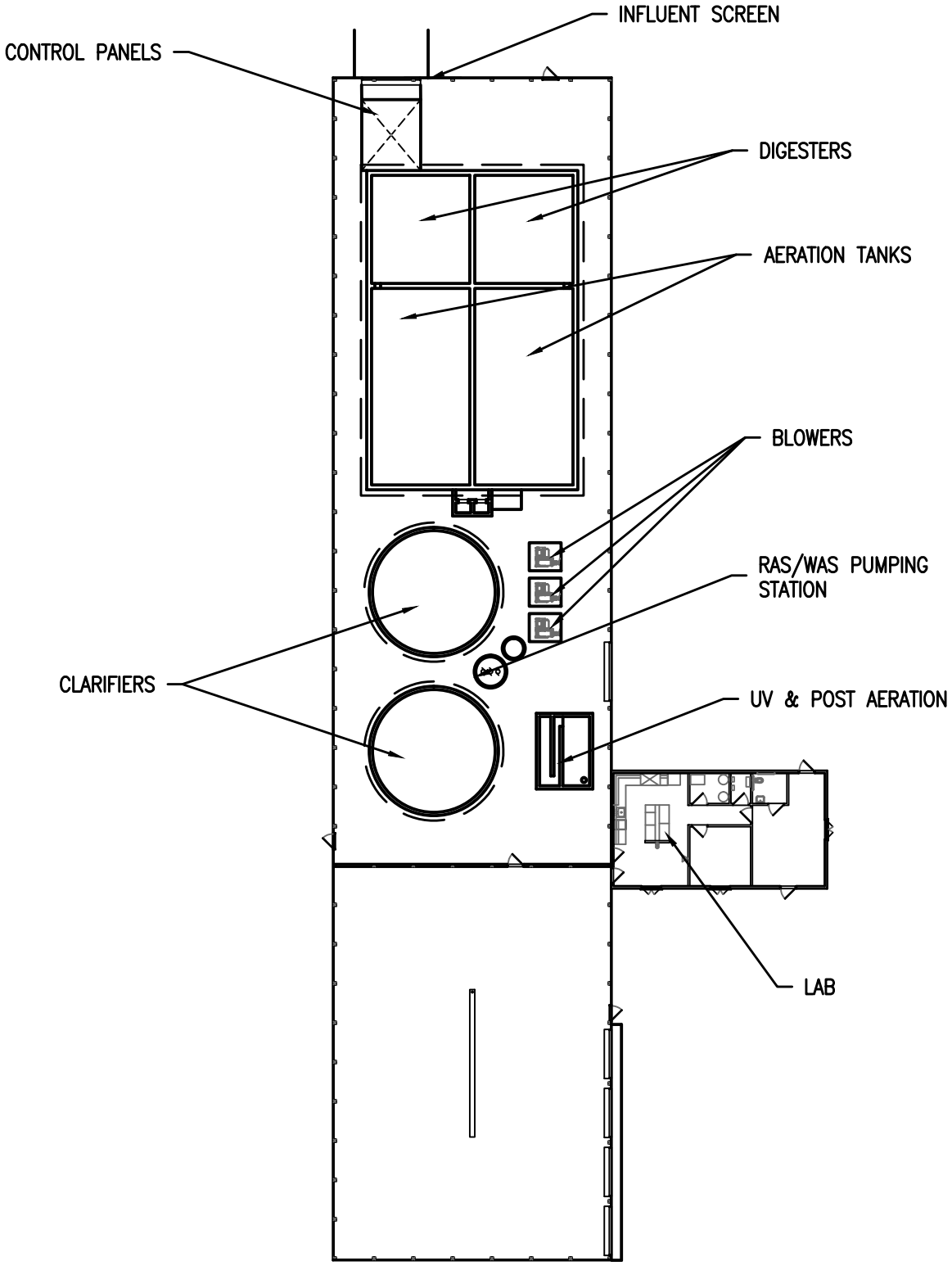
PREPARED BY: TRIAD ASSOCIATES INC.

PROJECT NAME: PER

PROJECT #: 202242A

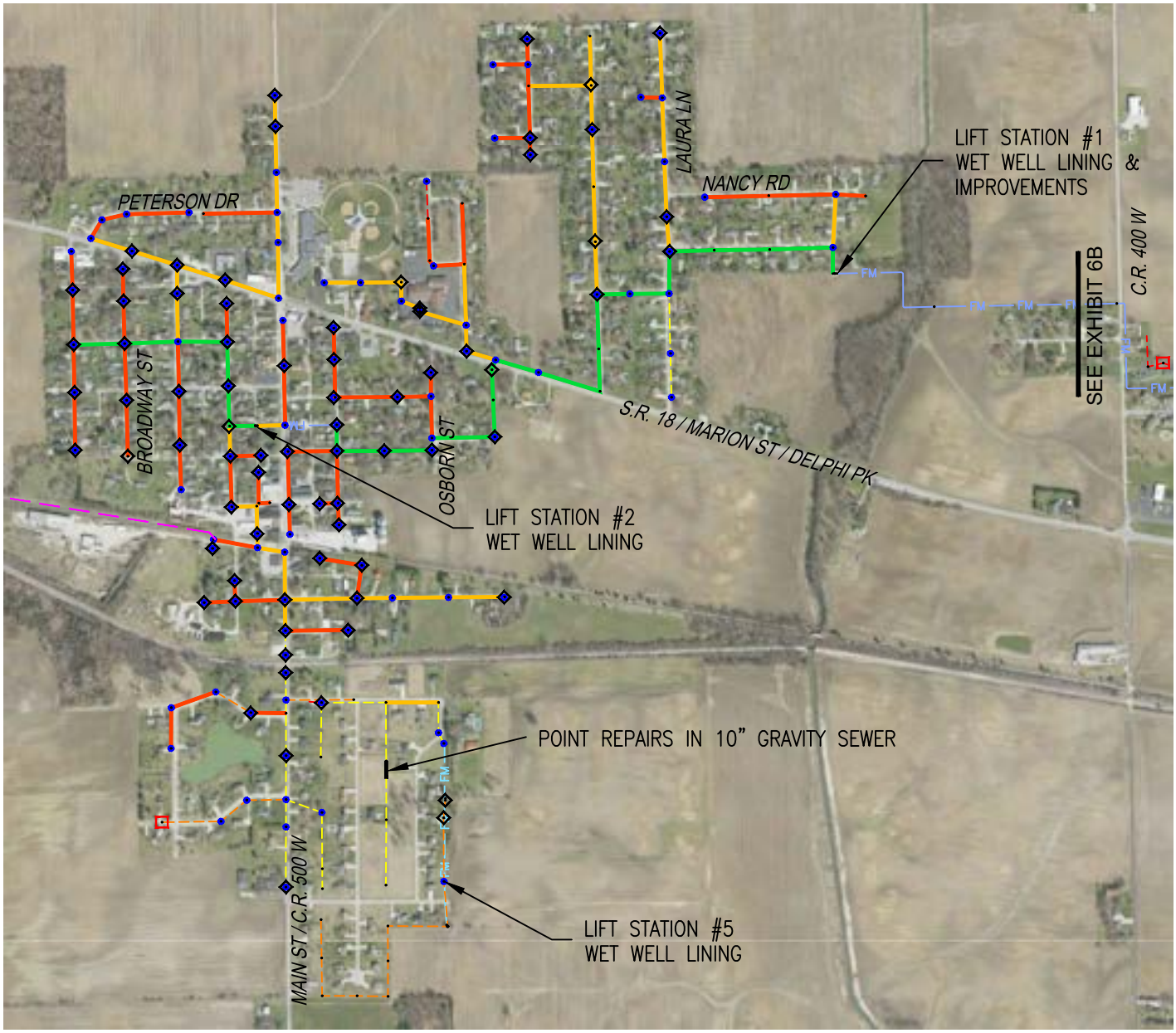
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CLIENT: **TOWN OF SWEETSER**	NORTH:	PREPARED BY:	PROJECT NAME: **PER**
SHEET TITLE: **EXISTING WWTP**	SCALE: **1/32"=1'-0"**	TRIAD ASSOCIATES INC.	PROJECT #: **202242A**
			EXHIBIT #: **5**

03/14/2023 11:13am S:\2022\SWEETSER\202242A - PER\EXHIBIT 5 - EXWWTP.DWG



LEGEND:

- SANITARY LINE – UNKNOWN SIZE
- SANITARY LINE – 8"
- SANITARY LINE – 10"
- SANITARY LINE – 12"
- FORCEMAIN – 3"
- FORCEMAIN – 6"
- FORCEMAIN – 2.5"
- NEW MANHOLE LID
- LINE MANHOLE
- REPLACE MANHOLE
- LINE EXISTING 8" SANITARY
- LINE EXISTING 10" SANITARY
- LINE EXISTING 12" SANITARY
- PROPOSED 3" FORCEMAIN

CLIENT: **TOWN OF SWEETSER**

SHEET TITLE: **PROPOSED WASTEWATER SYSTEM IMPROVEMENTS, OPTION A**

NORTH:

SCALE: 1"=1000'-0"

PREPARED BY: TRIAD ASSOCIATES INC.

PROJECT NAME: PER

PROJECT #: 202242A

EXHIBIT #: 6A

03/23/2023 1:27pm S:\2022\SWEETSER\202242A – PER\EXHIBIT 6 – PRO WW SYSTEM OPT A.DWG



LEGEND:

- SANITARY LINE – UNKNOWN SIZE
- SANITARY LINE – 8"
- SANITARY LINE – 10"
- SANITARY LINE – 12"
- FORCEMAIN – 3"
- FORCEMAIN – 6"
- FORCEMAIN – 2.5"
- NEW MANHOLE LID
- LINE MANHOLE
- REPLACE MANHOLE
- PROPOSED 3" FORCEMAIN

CLIENT: **TOWN OF SWEETSER**

SHEET TITLE: **PROPOSED WASTEWATER SYSTEM IMPROVEMENTS, OPTION A**

NORTH:

SCALE: 1"=1000'-0"

PREPARED BY: TRIAD ASSOCIATES INC.

PROJECT NAME: PER

PROJECT #: 202242A

EXHIBIT #: 6B

03/23/2023 1:28pm S:\2022\SWEETSER\202242A – PER\EXHIBIT 6 – PRO WW SYSTEM OPT A.DWG



LEGEND:

- SANITARY LINE – UNKNOWN SIZE
- SANITARY LINE – 8"
- SANITARY LINE – 10"
- SANITARY LINE – 12"
- FM FM FM — FORCEMAIN – 3"
- FM FM FM — FORCEMAIN – 6"
- FM FM FM — FORCEMAIN – 2.5"
- NEW MANHOLE LID
- LINE MANHOLE
- REPLACE MANHOLE
- PROPOSED 1.5" FORCEMAIN
- PROPOSED 3" FORCEMAIN

CLIENT: TOWN OF SWEETSER

SHEET TITLE: PROPOSED WASTEWATER SYSTEM IMPROVEMENTS, OPTION A

NORTH:

SCALE: 1"=1000'-0"

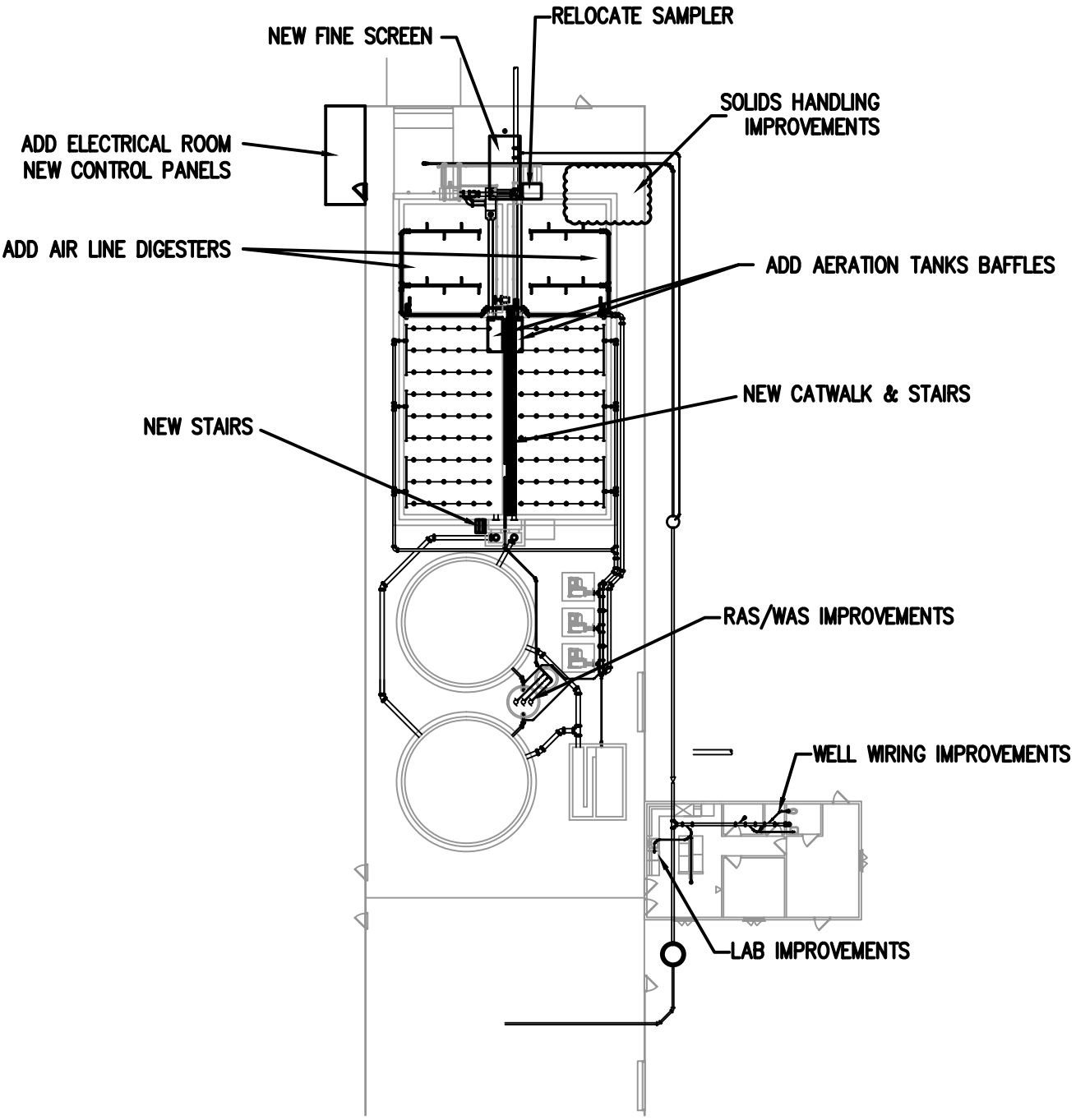
PREPARED BY: TRIAD ASSOCIATES INC.

PROJECT NAME: PER

PROJECT #: 202242A

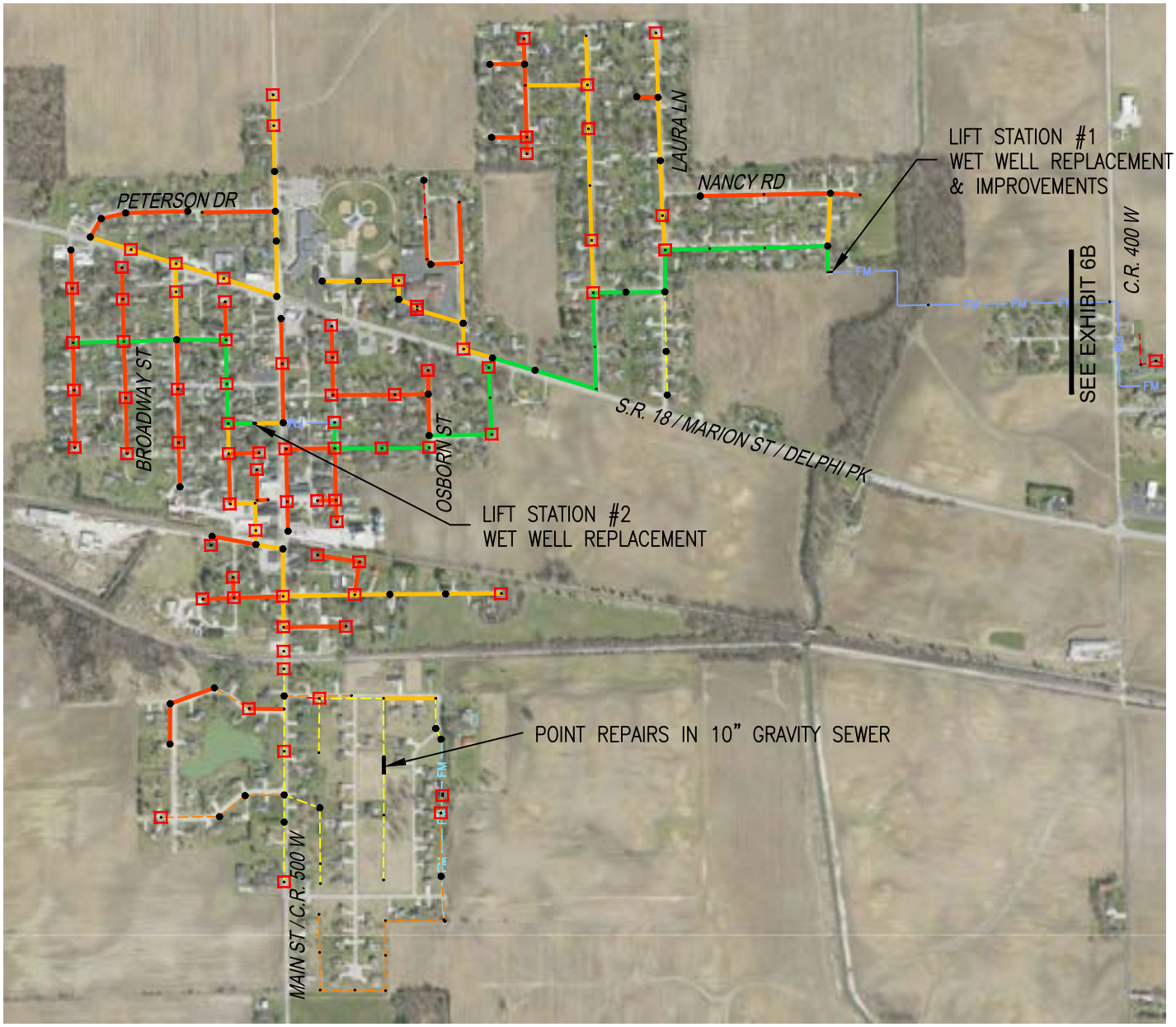
EXHIBIT #: 6C

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			EXHIBIT #: **7**

03/23/2023 9:25am S:\2022\SWEETSER\202242A - PER\EXHIBIT 7 - PROPOSED WWTP.DWG



LEGEND:

- SANITARY LINE – UNKNOWN SIZE
- SANITARY LINE – 8"
- SANITARY LINE – 10"
- SANITARY LINE – 12"
- FORCEMAIN – 3"
- FORCEMAIN – 6"
- FORCEMAIN – 2.5"
- NEW MANHOLE LID
- REPLACE MANHOLE
- REPLACE 8" SANITARY
- REPLACE 10" SANITARY
- REPLACE 12" SANITARY

CLIENT: TOWN OF SWEETSER

SHEET TITLE: PROPOSED WASTEWATER SYSTEM IMPROVEMENTS, OPTION B

NORTH:

SCALE: 1"=1000'-0"

PREPARED BY: TRIAD ASSOCIATES INC.

PROJECT NAME: PER

PROJECT #: 202242A

EXHIBIT #: 8A

03/23/2023 9:19am S:\2022\SWEETSER\202242A – PER\EXHIBIT 8 – PRO WW SYSTEM OPT B.DWG



LEGEND:

- SANITARY LINE – 6"
- SANITARY LINE – 8"
- SANITARY LINE – 10"
- SANITARY LINE – 12"
- FORCEMAIN – 3"
- FORCEMAIN – 6"
- FORCEMAIN – 2.5"
- NEW MANHOLE LID
- REPLACE MANHOLE
- REPLACE 8" SANITARY
- REPLACE 10" SANITARY
- REPLACE 12" SANITARY

CLIENT: TOWN OF SWEETSER

SHEET TITLE: PROPOSED WASTEWATER SYSTEM IMPROVEMENTS, OPTION B

NORTH:

SCALE: 1"=1000'-0"

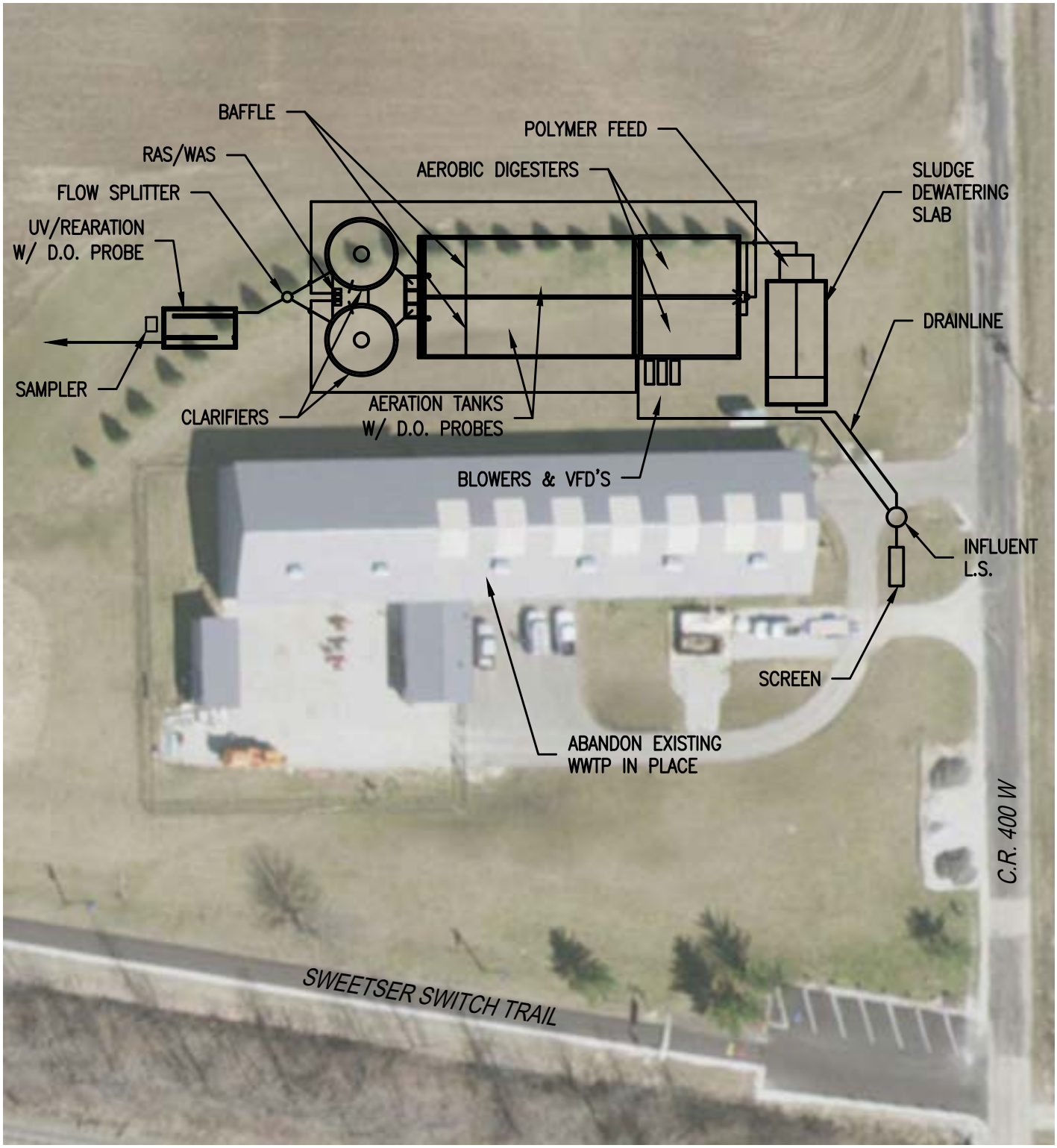
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PROJECT NAME: PER

PROJECT #: 202242A

EXHIBIT #: 8B

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CLIENT: **TOWN OF SWEETSER**

SHEET TITLE: **PROPOSED WWTP IMPROVEMENTS**

NORTH:

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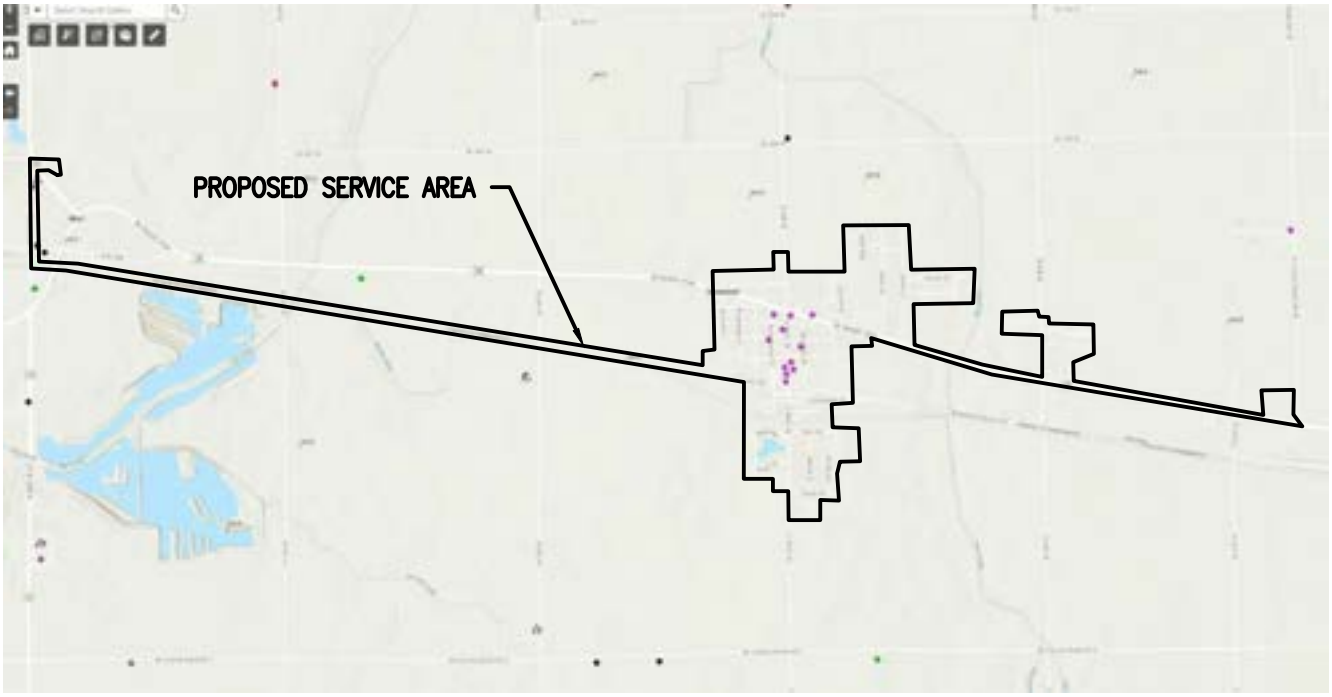
PREPARED BY: TRIAD ASSOCIATES INC.

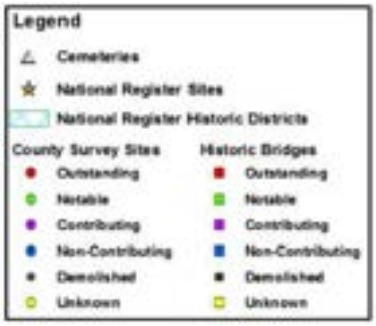
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PROJECT #: **202242A**

EXHIBIT #: **9**

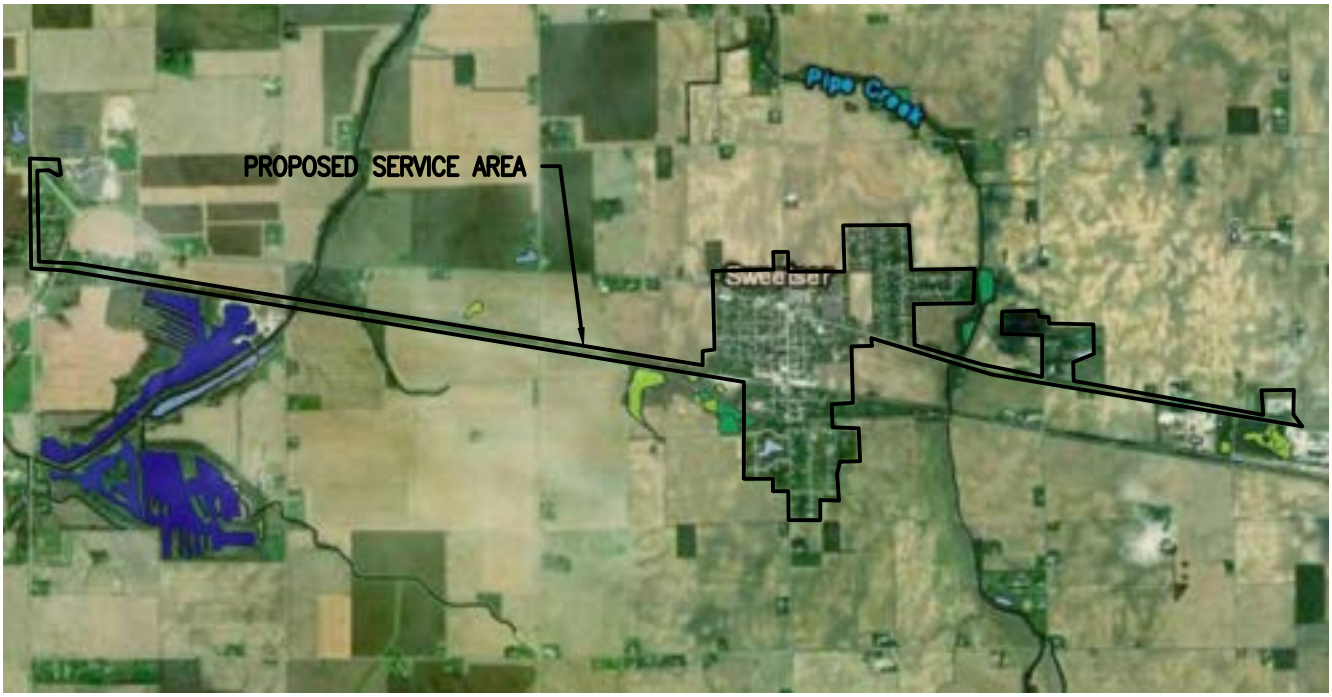
03/21/2023 1:38pm S:\2022\SWEETSER\202242A - PER\EXHIBIT 9 - PRO WWTP.DWG





CLIENT: TOWN OF SWEETSER	NORTH:	PREPARED BY:	PROJECT NAME: PER	
SHEET TITLE: SHAARD MAP	SCALE: 1"=4000'-0"	TRIAD ASSOCIATES INC.	PROJECT #: 202242A	EXHIBIT #: 10

03/28/2023 2:56pm S:\2022\SWEETSER\202242A – PER\EXHIBIT 10 – HISTORICSITES.DWG



March 3, 2023

Wetlands

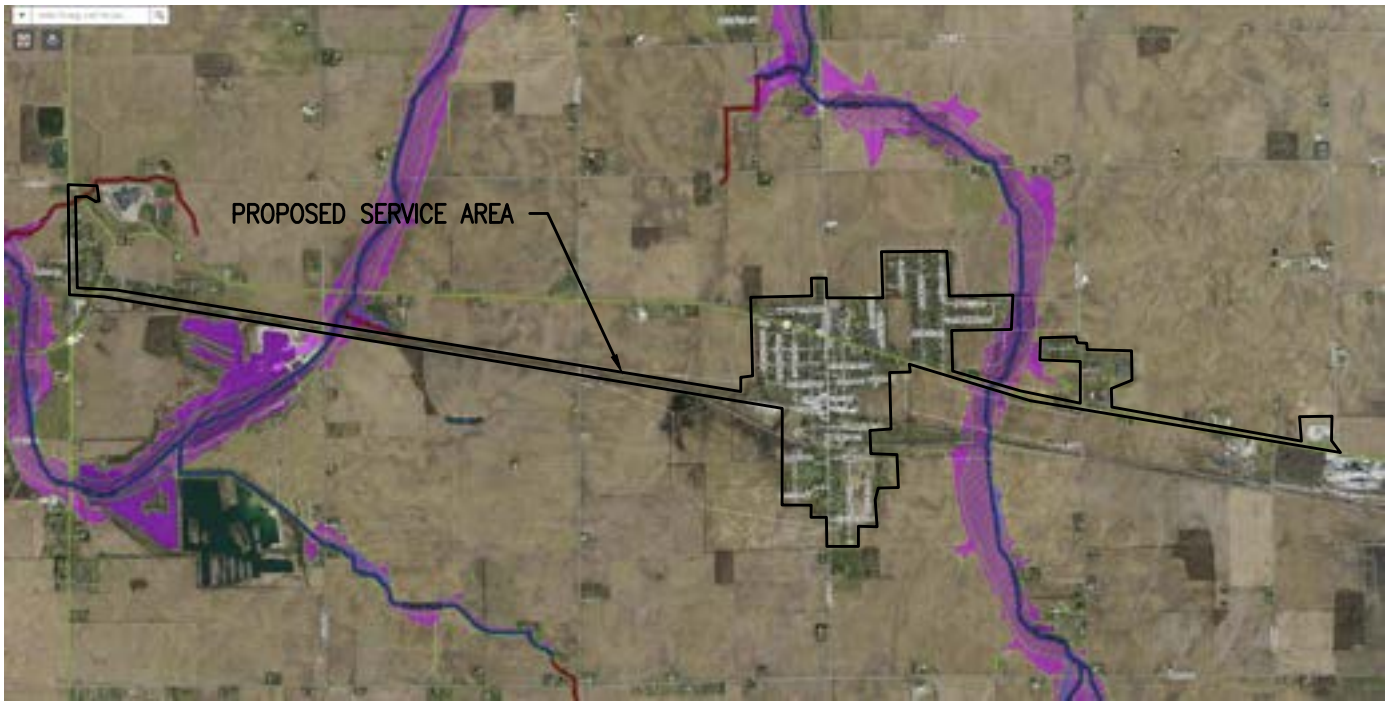
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

CLIENT: **TOWN OF SWEETSER**	NORTH:	PREPARED BY:	PROJECT NAME: **PER**
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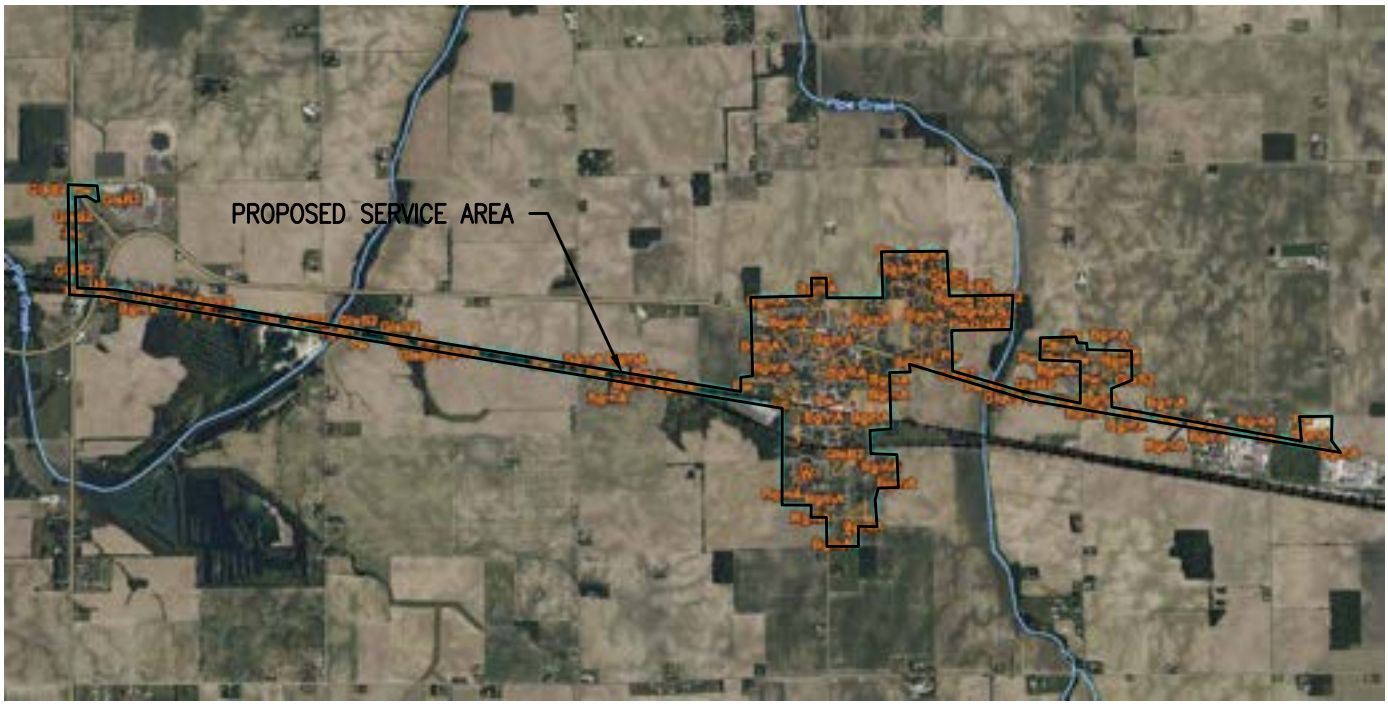
03/23/2023 10:39am S:\2022\SWEETSER\202242A – PER\EXHIBIT 11 – WETLANDS.DWG





CLIENT: **TOWN OF SWEETSER**	NORTH:	PREPARED BY:	PROJECT NAME:	**PER**
SHEET TITLE: **FLOODWAY MAP**	SCALE: **1"=4000'-0"**	TRIAD ASSOCIATES INC.	PROJECT #:	**202242A**
			EXHIBIT #:	**12**

03/14/2023 11:35am S:\2022\SWEETSER\202242A – PER\EXHIBIT 12 – FLOOD.DWG



Soil Map—Grant County, Indiana

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Grant County, Indiana
Survey Area Data: Version 30, Sep 3, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 16, 2022—Jun 21, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Natural Resources Conservation Service

Web Soil Survey
National Cooperative Soil Survey

3/3/2023
Page 2 of 3

CLIENT: **TOWN OF SWEETSER**	NORTH:	PREPARED BY:	PROJECT NAME:	**PER**
SHEET TITLE: **SOILS MAP**	SCALE: **1"=4000'-0"**	TRIAD ASSOCIATES INC.	PROJECT #:	**202242A**
			EXHIBIT #:	**13**

03/14/2023 11:41am S:\2022\SWEETSER\202242A – PER\EXHIBIT 13 – SOILS.DWG

APPENDIX A – DESIGN SUMMARY

Preliminary Design Summary

Town of Sweetser, Indiana

I. General

1. Applicant: Town of Sweetser WWTP, Indiana
2. Project Name: Wastewater System Improvements
3. Location: Sweetser, Indiana; Grant County
4. Engineer: Triad Associates, Inc.
5. NPDES Permit Number: IN0064165
   A. Date of final Permit Issuance: January 1, 2019
   B. Expiration Date: December 31, 2023
6. Remarks:
   A. Description of Present Situation:

   The existing WWTP is a 150,000 gpd single stage nitrification activated sludge plant that receives I/I flows that exceed the plant design capacity.

   B. Description of Proposed Facilities:

   The project will include replacing plant influent screen, solids handling improvements, electrical room, RAS/WAS improvements, aeration tank baffles, digester air lines, laboratory improvements, etc. The project will also install catwalk and stairs for aeration tanks and digesters and repair drinking water well wiring of the plant. Existing collection system will also be improved including lift station improvements and collection system lining and point repairs to reduce I/I.

   C. Inspection during construction to be provided by: Triad Associates, Inc.

7. Estimated Project Costs:
   A. Total Cost: $ 5,430,563
   B. Source of Funding: SRF

8. Certification Seal of Engineer:



II. Design Data

1. Current Population: 1,066
2. Design Year and population: Design Year 2040, 1,097
3. Design Population Equivalent: 1,100
4. Design Flow: 0.15 MGD
   - A. Domestic: 0.1023 MGD
   - B. Industrial/Commercial: 0.015 MGD
   - C. Infiltration/Inflow: 0.0327 MGD
5. Maximum Plant Flow Capacity: 0.52 MGD
6. Design Waste Strength:
   - A. $CBOD_5$ 215 mg/l
   - B. TSS 200 mg/l
   - C. NH3-N 35 mg/l
   - D. P 5 mg/l
   - E. Other N/A
7. NPDES Permit Limitation on Effluent Quality (Current Permit)

A. CBOD5		12.5 mg/l monthly	18.8 mg/l weekly
B. TSS		15 mg/l monthly	22.5 mg/l weekly
C. NH3-N	S	1.3 mg/l monthly avg	1.9 mg/l weekly avg
	W	2.0 mg/l monthly avg	3.0 mg/l weekly avg
D. Phosphorus		1.0 mg/l monthly avg	

E. Chlorine Residual(final) NA

F. pH (s.u.) Daily Min 6.0 Daily Max 9.0

G. D.O. (daily minimum) 6.0 mg/l

H. E. Coli 235 daily max 125 monthly avg.

9. Receiving Stream:
   A. Name: Pipe Creek
   B. Tributary To: Wabash River
   C. Stream Uses: Drainage, Recreational
   D. 7-day, 1 in 10 year low flow: 46.0 cfs

III. Treatment Units

A. Plant Influent Lift Station NA

B. Flow Meter Existing

1. Type: mag meter
2. Location: influent pipe before influent screen
3. Indicating, recording and totalizing: Yes

C. Headworks Proposed

1. Type: Automatic Bar screen
2. Maximum Capacity: 0.52 MGD
3. Bypass (overflow) Bar Screen: Bypass Barscreen
4. Location: Plant Headworks before aeration tank

D. Activated Sludge Existing

1. Type of Activated Sludge Process: single stage nitrification
2. Number and Size of Units:

   2 @ 151, 890 gal total

3. Detention Time (hours): 24
4. Organic Loading (lbs. BOD5 /1000 c.f.): 4.4
5. Type of Aeration Equipment: fine bubble diffusers
6. Type/size of Blowers: Centrifugal, 3 @ 325 cfm
7. Air Required: 330 cfm for aeration; 320 cfm for digester; miscellaneous 30 cfm
8. Number and capacity of return sludge pumps: 2 @ 100 gpm with 1 spare
9. Method of return sludge rate control: Manual Weir & Pump Throttling
10. Return sludge rate as % of design flow: 50%-150%

11. Provisions for return rate metering: Yes – Manual Weir
12. Location of return sludge discharge: Aeration
13. Facilities to isolate units: Yes
14. Facilities for flow split control: Yes

E. Secondary Clarifiers Existing

1. Type of Clarifiers: Circular
2. Number and Size of Units: 2 @ 25' diameter
3. Surface Settling Rate (gpd/sf):
   a. at the average design flow: 152.8 gpd/s.f.
   b. at the influent pumping rate: 881.1 gpd/sf.
   c. at max daily flow: 1000 gpd/s.f.
4. Detention Time @ DAF: 16.4 hrs
5. Weir Overflow Rate: 5,985 gpd/l.f. @ DAF
6. Type of sludge removal mechanism: Mechanical Scraper
7. Disposal of scum: Digester
8. Facilities for unit isolation: Yes
9. Facilities for flow split control: Yes

F. Post- Aeration Existing

1. Type of Aeration: Fine Bubble Diffused Air
2. Number of Units: 1
3. Size of Units: 890 gallon
4. Aeration Provided: 30 cfm max

G. Nitrification System Existing

1. Type of Nitrification System: Sigle Stage Activated Sludge
2. Ammonia Loading: 43.8 lbs./day
3. Additional Oxygen Demand: 201.4 lb O_2/lb BOD_5 at maximum flow
4. Air Supply System: Fine Bubble Diffuser
5. Hydraulic Detention Time: 24 hrs

6. Mean Cell Residence Time (days): 16.5

H. Phosphorus Removal Facilities: Existing

1. Type of Chemical to be used: Aluminum Sulfate
2. Location of chemical injection: aeration tank effluent
3. Number and size of chemical feed pumps: 2 @ 3.4 gpd
4. Chemical storage: 200-gal polyethylene tank
5. Capacity of secondary containment: Yes

I. Disinfection, UV Existing

1. Type: Horizontal lamps, open channel
2. Location: Effluent channel
3. Size of channel: 18" W x 15.75" D x 71" L
4. Contact time: 8.7 sec at peak flow
5. Dosage: > 30,000 uWS/cm^2 after 9,000 hrs of system operation with lamp Output at 65% of its initial level
6. Bypass: No
7. Intensity monitoring: Yes

J. Aerobic Digester Existing

1. Number and Size of Units: 2 @ 79,822 gals total
2. Detention Time (days): 153 days
3. Organic Loading: 124.3 lb VSS/1000 cf
4. Air Supply: 320 cfm Diffused Air
5. Decanting Method: Air Lift

K. Sludge Drying Beds NA

1. Number and Size of Drying Beds:
2. Filter Area per Capita:
3. Under-Drain System:
4. Discharge location of filtrate:

5. Accessibility of dry sludge removal equipment:

L. Sludge Disposal Existing

1. Ultimate disposal Method of Sludge: Contact Haul
2. Expected Solids Content of Sludge: 3%
3. Location of Disposal Sites: Contact Haul
4. Ownership of Disposal Sites: Contact Haul
5. Availability of Sludge Transport Equipment: Contact Haul

IV. Sewer Collection System

A. Sanitary Sewer: Proposed Section Rehabilitation

1. Type of Sewer Material: Clay, PVC
2. Diameter and Length of Sewer: 14,449' @ 8" Clay Existing to be lined
   14,524' @ 10" Clay Existing to be lined
   6,589' @ 12" Clay Existing to be lined
   641' @ 8" PVC Existing to be lined
   560' @ 10" PVC Existing to be lined
3. Stream, Highway, and Railroad Crossing: N/A
4. Separation of Combined Sewer or New Sewer: NA
5. Number of Manholes: 65 Existing to be lined
   5 Existing to be replaced

B. Lift Station: Proposed Rehabilitation

1. Location: Lift Station #1 Wet Well Lining
   Lift Station #2 Wet Well Lining
   Lift Station #3 Wet Well Lining
   Lift Station #4 Wet Well Replacement
2. Type of Pump: All Submersible; #4 grinder pumps
3. Number of Pumps: Two each station
4. Constant or Variable Speed: LS #1 Variable; Others Constant
5. Capacity of Pumps: 500 gpm; 200 gpm; 100 gpm; 35 gpm

6. A gate valve and check valve in the discharge line: Yes

7. A gate valve on the suction line: NA

8. Ventilation: NA

9. Standby Power: NA

10. Alarm: Yes

11. Breakwater Tanks: NA

12. Bypass or Overflow: NA

13. Type of Force Main: DI; DI; DI; PVC

14. Diameter and Length of Force Main: 6" @ 3,248'; 6"@ 503' ; 3" @ 1,140 (LS#1 and LS#3 share a common 10" discharge); 2.5" @ 5,699

V. Miscellaneous

A. Laboratory Equipment: Proposed to be upgraded

B. Safety Equipment: Existing

C. Plant Site Fence: NA

D. Handrail for tanks: NA

E. Bypasses: None

F. Relationship to Flood Elevation: Above

G. Provisions to maintain the same degree of treatment during construction: Yes

H. Standby Power Equipment: Yes

I. Site Inspection: Yes

APPENDIX B – NRCS CORRESPONDENCE

TRIAD ASSOCIATES, INC.
ENGINEERING • ARCHITECTURE
5835 LAWTON LOOP EAST DRIVE, INDIANAPOLIS, IN 46216-1064
TELEPHONE: (317) 377-5230
FAX: (317) 377-5241
WEBSITE: www.triadassoc.net • E-MAIL: triad@triadassoc.net

February 27, 2023

Mr. Dan Hovland, State Conservationist
Natural Resources Conservation Service
6013 Lakeside Boulevard
Indianapolis, Indiana 46278

Re: Farmland Conversion Impact Rating, Town of Sweetser, Wastewater System Improvements

Dear Mr. Hovland:

Attached is Form AD-1006, Farmland Conversion Impact Rating, which needs to be completed for a wastewater system improvements project proposed for the Town of Sweetser, Indiana. Funding for the project will be through the Indiana State Revolving Fund (SRF) Loan program. Completion of this form is required as part of the review process by the Indiana Department of Environmental Management (IDEM).

The proposed project will make needed improvements and upgrades to the sewer system. The Town of Sweetser is located in Franklin, Pleasant and Richland townships, Grant County, Indiana in Sections 31, 32 and 5, 6 of Township 25 North, Range 7 East, 24 North, Range 7 East and can be found on the Sweetser Quadrangle map. Activities related to the proposed improvements will occur in rights of way and easements within the Town. Enclosed are USGS, aerial, and soil maps showing the project location and proposed construction.

Triad Associates Inc. is the consulting firm representing the Town and preparing the Preliminary Engineering Report for submittal to IDEM. Correspondence should be directed to our office. Please contact me at **(317) 377-5230** or **kliu@triadassoc.net** if additional information is needed. Thank you for your assistance.

Sincerely,

Kun Liu, Ph.D., P.E.
TRIAD ASSOCIATES, INC.
Engineering * Architecture

Enclosures

United States Department of Agriculture
Farm Production and Conservation
Natural Resources Conservation Service
Indiana State Office
6013 Lakeside Boulevard
Indianapolis, Indiana 46278
317-295-5800

March 31, 2023

Kun Liu, Ph.D., P.E.
Triad Associates, Incorporated
5835 Lawton Loop East Drive
Indianapolis, Indiana 46216

Dear Mr. Liu:

The proposed Sweetser Wastewater Improvements project in the Town of Sweetser, Grant County, Indiana as referred to in your letter received March 30, 2023, will not cause a conversion of prime farmland.

If you need additional information, please contact John Allen at 317-295-5859 or john.allen@usda.gov.

Sincerely,

JOHN ALLEN
State Soil Scientist

Enclosure

USDA is an equal opportunity provider, employer, and lender.

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*		Date Of Land Evaluation Request 02/28/2023	
Name of Project Sweetser Wastewater Improvements		Federal Agency Involved Town of Sweetser, IDEM	
Proposed Land Use Sewer Collection		County and State Grant County, Indiana	
PART II *(To be completed by NRCS)*		Date Request Received By NRCS	Person Completing Form: JRA
Does the site contain Prime, Unique, Statewide or Local Important Farmland? *(If no, the FPPA does not apply - do not complete additional parts of this form)*	YES ☐ NO ☑	Acres Irrigated	Average Farm Size
Major Crop(s)	Farmable Land In Govt. Jurisdiction Acres: %	Amount of Farmland As Defined in FPPA Acres: %	
Name of Land Evaluation System Used	Name of State or Local Site Assessment System	Date Land Evaluation Returned by NRCS 3/31/23	

PART III *(To be completed by Federal Agency)*	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	0			
B. Total Acres To Be Converted Indirectly	0			
C. Total Acres In Site	8.3 ac			
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland				
B. Total Acres Statewide Important or Local Important Farmland				
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted				
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value				
PART V (To be completed by NRCS) Land Evaluation Criterion Relative Value of Farmland To Be Converted (Scale of 0 to 100 Points)				

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(Criteria are explained in 7 CFR 658.5 b. For Corridor project use form NRCS-CPA-106)*	**Maximum Points**	Site A	Site B	Site C	Site D
1. Area In Non-urban Use	(15)				
2. Perimeter In Non-urban Use	(10)				
3. Percent Of Site Being Farmed	(20)				
4. Protection Provided By State and Local Government	(20)				
5. Distance From Urban Built-up Area	(15)				
6. Distance To Urban Support Services	(15)				
7. Size Of Present Farm Unit Compared To Average	(10)				
8. Creation Of Non-farmable Farmland	(10)				
9. Availability Of Farm Support Services	(5)				
10. On-Farm Investments	(20)				
11. Effects Of Conversion On Farm Support Services	(10)				
12. Compatibility With Existing Agricultural Use	(10)				
TOTAL SITE ASSESSMENT POINTS	160	0	0	0	0
PART VII ***(To be completed by Federal Agency)***					
Relative Value Of Farmland *(From Part V)*	100	0	0	0	0
Total Site Assessment *(From Part VI above or local site assessment)*	160	0	0	0	0
TOTAL POINTS ***(Total of above 2 lines)***	260	0	0	0	0

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? YES ☐ NO ☐

Reason For Selection:

Name of Federal agency representative completing this form:	Date:

(See Instructions on reverse side) **Form AD-1006 (03-02)**

STEPS IN THE PROCESSING THE FARMLAND AND CONVERSION IMPACT RATING FORM

Step 1 - Federal agencies (or Federally funded projects) involved in proposed projects that may convert farmland, as defined in the Farmland Protection Policy Act (FPPA) to nonagricultural uses, will initially complete Parts I and III of the form. For Corridor type projects, the Federal agency shall use form NRCS-CPA-106 in place of form AD-1006. The Land Evaluation and Site Assessment (LESA) process may also be accessed by visiting the FPPA website, http://fppa.nrcs.usda.gov/lesa/.

Step 2 - Originator (Federal Agency) will send one original copy of the form together with appropriate scaled maps indicating location(s)of project site(s), to the Natural Resources Conservation Service (NRCS) local Field Office or USDA Service Center and retain a copy for their files. (NRCS has offices in most counties in the U.S. The USDA Office Information Locator may be found at http://offices.usda.gov/scripts/ndISAPI.dll/oip_public/USA_map**,** or the offices can usually be found in the Phone Book under U.S. Government, Department of Agriculture. A list of field offices is available from the NRCS State Conservationist and State Office in each State.)

Step 3 - NRCS will, within 10 working days after receipt of the completed form, make a determination as to whether the site(s) of the proposed project contains prime, unique, statewide or local important farmland. (When a site visit or land evaluation system design is needed, NRCS will respond within 30 working days.

Step 4 - For sites where farmland covered by the FPPA will be converted by the proposed project, NRCS will complete Parts II, IV and V of the form.

Step 5 - NRCS will return the original copy of the form to the Federal agency involved in the project, and retain a file copy for NRCS records.

Step 6 - The Federal agency involved in the proposed project will complete Parts VI and VII of the form and return the form with the final selected site to the servicing NRCS office.

Step 7 - The Federal agency providing financial or technical assistance to the proposed project will make a determination as to whether the proposed conversion is consistent with the FPPA.

INSTRUCTIONS FOR COMPLETING THE FARMLAND CONVERSION IMPACT RATING FORM

(For Federal Agency)

Part I: When completing the "County and State" questions, list all the local governments that are responsible for local land use controls where site(s) are to be evaluated.

Part III: When completing item B (Total Acres To Be Converted Indirectly), include the following:

1. Acres not being directly converted but that would no longer be capable of being farmed after the conversion, because the conversion would restrict access to them or other major change in the ability to use the land for agriculture.
2. Acres planned to receive services from an infrastructure project as indicated in the project justification (e.g. highways, utilities planned build out capacity) that will cause a direct conversion.

Part VI: Do not complete Part VI using the standard format if a State or Local site assessment is used. With local and NRCS assistance, use the local Land Evaluation and Site Assessment (LESA).

1. Assign the maximum points for each site assessment criterion as shown in § 658.5(b) of CFR. In cases of corridor-type project such as transportation, power line and flood control, criteria #5 and #6 will not apply and will, be weighted zero, however, criterion #8 will be weighed a maximum of 25 points and criterion #11 a maximum of 25 points.

2. Federal agencies may assign relative weights among the 12 site assessment criteria other than those shown on the FPPA rule after submitting individual agency FPPA policy for review and comment to NRCS. In all cases where other weights are assigned, relative adjustments must be made to maintain the maximum total points at 160. For project sites where the total points equal or exceed 160, consider alternative actions, as appropriate, that could reduce adverse impacts (e.g. Alternative Sites, Modifications or Mitigation).

Part VII: In computing the "Total Site Assessment Points" where a State or local site assessment is used and the total maximum number of points is other than 160, convert the site assessment points to a base of 160.
Example: if the Site Assessment maximum is 200 points, and the alternative Site "A" is rated 180 points:

$$\frac{\text{Total points assigned Site A}}{\text{Maximum points possible}} = \frac{180}{200} \text{ X } 160 = 144 \text{ points for Site A}$$

For assistance in completing this form or FPPA process, contact the local NRCS Field Office or USDA Service Center.

NRCS employees, consult the FPPA Manual and/or policy for additional instructions to complete the AD-1006 form.

APPENDIX C – RESOLUTION

TOWN OF SWEETSER, INDIANA
SIGNATORY AUTHORIZATION RESOLUTION

WHEREAS, the Town of Sweetser, herein called the Applicant, has plans for a wastewater system improvements project to meet State and Federal regulations, such as the Clean Water Act, and the community intends to proceed with the construction of such works:

WHEREAS, the Town of Sweetser has adopted this Resolution dated MARCH 28, 2023.

NOW THEREFORE, BE IT RESOLVED by the Town Council, the governing body of said Town, that:

1. Kyle Taylor, Council President be authorized to make application for an SRF Loan and provide the Department of Environmental Management such information, data and documents pertaining to the loan process as may be required, and otherwise act as the authorized representative of the Applicant.

2. The Applicant agrees to comply with the Department of Environmental Management, State of Indiana and Federal requirements as they pertain to the SRF.

3. That two certified copies of the resolution be prepared and submitted as part of the Community's Preliminary Engineering Report.

Adopted this 28 day of MARCH, 2023.

The Town of Sweetser, Indiana
By and Through Its Council

Authorized Signatory

Kyle Taylor – Council President

Matthew C. Stewart
Dr. Matt Stewart, PhD. – Council VP

Travis LeMaster
Travis LeMaster – Council Member

Chuck Briede - Council Member

Charles L Myers III
Charles L. Myers III - Council Member

Attest: Jami Briede

TOWN OF SWEETSER
WASTEWATER PER ACCEPTANCE RESOLUTION

WHEREAS, the Town of Sweetser in Grant County, Indiana has caused a Preliminary Engineering Report dated March 2023 to be prepared by the consulting firm of Triad Associates, Inc.; and

WHEREAS, said plan has been presented to the public at a public hearing held March 28, 2023 for their comments; and

WHEREAS, the Town Council finds that there was not sufficient evidence presented in objection to the recommended project in the Preliminary Engineering Report.

NOW, THEREFORE, BE IT RESOLVED THAT:

The Town of Sweetser Wastewater System Improvements Preliminary Engineering Report dated March 2023 be approved and adopted by the Town Council; and

1. That said PER be submitted to the Indiana Department of Environmental Management for review and approval.

Passed and adopted by the Town Council of the Town of Sweetser, Indiana this 28 day of March 2023.

Kyle Taylor – Council President

Matthew C. Stewart
Dr. Matt Stewart, PhD. – Council VP

Travis LeMaster
Travis LeMaster – Council Member

Chuck V. Briede
Chuck Briede - Council Member

Charles L. Myers III
Charles L. Myers III - Council Member

Attest: Jami Briede

APPENDIX D – PUBLIC HEARING REQUIREMENTS

Notice of Public Hearing
Town of Sweetser
Preliminary Engineering Report (PER) to obtain assistance from the Wastewater State Revolving Fund (SRF) Loan Program

The Town of Sweetser will hold a public hearing at 7:00 p.m. on Tuesday, March 28, 2023, at the Town Hall, which is located at 113 N. Main Street, Sweetser, Indiana, 46987.

Sweetser's engineering consultant, Triad Associates, Inc., will present the recommended wastewater project, including wastewater treatment plant improvements and sewer collection system and lift station rehabilitation, which are more fully described in the PER. The project will be funded through the Wastewater State Revolving Fund (WWSRF) loan program.

A copy of the PER will be available for public viewing at the Town Hall from March 17th through March 28th, 2023. Written comments regarding this project will be accepted through June 20, 2013 and should be sent to the Town Hall.

There will be the opportunity for questions and comments from the public at this meeting. Your participation is welcomed and encouraged. If you will require special assistance at the meeting, please contact the Town Hall at (765) 384-5333 or Clerk-Treasurer at (765) 384-5065.

Paxton Media Group
201 South 4th Street Paducah, KY 42003

John Potter
Town of Sweetser
P.O. Box 329
113 North Main Street
Sweetser, IN 46987

Class Liner Ad #70619061 Summary:

Slug Line: Notice of Public Hearing Town
Size: 2.00 x 3.10

Publication Cost	$20.52
Adjustments	$0.00
Net Cost	$20.52
Prepaid Amount	$0.00
Amount Due	$20.52

Order Detail:

Publication	Start	Stop	Insertions	Cost	Adjustments	Total
184MCTD1 Marion Chronicle Tribune	3/16/23	3/16/23	1	20.52	0.00	20.52

Notice of Public Hearing
Town of Sweetser
Preliminary Engineering Report (PER) to obtain assistance from the Wastewater State Revolving Fund (SRF) Loan Program

The Town of Sweetser will hold a public hearing at 7:00 p.m. on Tuesday, March 28, 2023, at the Town Hall, which is located at 113 N. Main Street, Sweetser, Indiana, 46987.

Sweetser's engineering consultant, Triad Associates, Inc., will present the recommended wastewater project, which includes sanitary sewer pipe lining, manhole and lift station repairs, and appurtenant work in the collection system to eliminate inflow and infiltration, improvements at the wastewater treatment plant, as well as sewer service for the Oak Hill School which are more fully described in the PER. The project will be funded through the Wastewater State Revolving Fund (WWSRF) loan program.

A copy of the PER will be available for public viewing at the Town Hall from March 18th through March 28th, 2023. Written comments regarding this project will be accepted through April 3, 2023 and should be sent to the Town Hall.

There will be the opportunity for questions and comments from the public at this meeting. Your participation is welcomed and encouraged. If you will require special assistance at the meeting, please contact the Town Hall at (765) 384-5333 or Clerk-Treasurer at (765) 384-5065.
HSPAXLP.03/16/2023

APPENDIX E – COST AND EFFECTIVENESS CERTIFICATION FORM

Cost & Effectiveness Certification Form

(Pursuant to Section 602(B)(13) of the Federal Water Pollution Control Act)
(Applies to all assistance recipients submitting an application on or after October 1, 2015)
(To be submitted prior to Participant's Wastewater Loan Closing)

Participant Name Town of Sweetser, Indiana		
Street Address 113 N. Main Street	P. O. Box Number PO Box 329	
City Sweetser	State IN	Zip Code 46987

Section 602(B)(13) of the Federal Water Pollution Control Act (FWPCA) requires a recipient of a loan to certify that the recipient:

1) has studied and evaluated the cost and effectiveness of the processes, materials, techniques, and technologies for carrying out the proposed project or activity for which assistance is sought under the Clean Water State Revolving Fund Loan Program; and
2) has selected, to the maximum extent practicable, a project or activity that maximizes the potential for efficient water use, reuse, recapture, and conservation, and energy conservation, taking into account –
   (i) the cost of constructing the project or activity;
   (ii) the cost of operating and maintaining the project or activity over the life of the project or activity; and
   (iii) the cost of replacing the project or activity

Certification

We hereby certify pursuant to Section 602(B)(13) that the Participant has completed the requirements of Section 602(B)(13) as set forth in items (1) and (2) above.

Signature of the Authorized Representative

Printed Name: Matt Stewart, Council VP

Signature: Matthew C. Stewart

Date: 03/28/2023

Signature of Consulting Engineer

Printed Name: Kun Liu

Signature:

Date: 03/28/2023

APPENDIX F – PHOTO LOG OF WASTEWATER SYSTEM



Photo #1 – Plant Influent Screen



Photo #2 – Influent Flow Meter



Photo #3 – Control Panel Rust



Photo #4 – Sampler



Photo #5 – Aerator Tank



Photo #6 –Digester



Photo #7 – Chemical Injection Pump



Photo #8 – Splitter to Clarifier



Photo #9 – Sludge Polymer Pump



Photo #10 – Clarifier



Photo #11 – Lab



Photo #12 –Lab Safety Equipment

APPENDIX G – PHOTO LOG OF FLOODED AREAS



Photo #1 – Lift Station #4 (Case) Flooding



Photo #2 – Lift Station #4 (Case) Heavy Infiltration & Inflow



Photo #3 – Lift Station #3 (Bank) Flooding



Photo #4 – Lift Station #3 (Bank) Heavy Infiltration & Inflow



Photo #5 – Lift Station #2 Valve Vault Lid Traffic Damage



Photo #6 – Lift Station #3 (Bank) Flooding



Photo #7 – Inproperly sealed manhole between cone and chimney



Photo #8 – Inproperly sealed manhole with Infiltration & Inflow

APPENDIX H – OAK HILL HIGH SCHOOL LETTER OF INTENT

Oak Hill
UNITED SCHOOL CORPORATION

Letter of Intent

Date: March 13, 2023
To: Town Council of the Town of Sweeter, IN
From: Oak Hill United School Corporation, Board of School Trustees
Re: OHUSC/Town of Sweetser Regionalization Intent

To Whom It May Concern:

Oak Hill United School Corporation Board of School Trustees hereby provides this Letter of Intent to be used for the application and subsequent Preliminary Engineering Report in seeking funding from the Indiana Clean Water State Revolving Loan Fund (CWSRF). We are aware and understand, the intent of your projects which include Collection System and Wastewater Treatment Plant repairs as well as the construction of a Lift Station and Force Main to connect our Junior High/High School campus to the Sweetser Wastewater system. OHUSC currently operates a wastewater treatment plant, which would be decommissioned and removed in its entirety, and the wastewater from the High School & Jr. High campus and OHUSC Administration building would be collected at a lift station and pumped to the Town's wastewater system. OHUSC administration and Trustees are interested in pursuing this "regionalization" project with the Town of Sweetser who is seeking appropriate grant funding and financing from CWSRF and other potential sources. This letter of intent does not provide any monetary agreements. All monetary agreements including construction cost and rate structure will be determined after an offer by the CWSRF is provided to the Town. Should an offer of funding be provided by CWSRF, additional coordination between the Town and this Board of School Trustees will be required to determine the appropriate financial parameters. We further understand that we can withdraw from agreements at any time.

Respectfully submitted,



Aaron Pickering, President OHUSC Board of School Trustees

CC: Steve Brock, Financial Advisor; Lou Savka, Triad Associates, INC, Eric Woodmansee, AME Consulting

OHUSC Board of School trustees
1474 N 800 W-27 Converse, IN 46919 **T** 765.395.3341 **F** 765.395.3343

Oak Hill United School Corporation

SECTION 01 10 00 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Access to site.
4. Work restrictions.
5. Specification and Drawing conventions.
6. Constraints.
7. Work sequence.

B. Related Requirements:

1. Section 01 50 00 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

A. Project Identification: Sweetser Wastewater Improvements.

1. Project Location: Sweetser, Indiana

B. Owner: Town of Sweetser Town Hall, 113 N Main Street, Sweetser, IN 46987

C. Engineer: DCCM North America LLC., 8770 North St., Suite 110, Fishers, Indiana, 46038.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. Mechanical and Electrical and Control Improvements in the Wastewater Treatment Plant. Mechanical improvements include the addition of a drum screen, screw press, walkway, and ceiling improvements. This project will also involve mechanical and electrical controls improvements to four lift stations and the decommissioning of one lift station. Additionally, three new grinder pits for connection to the existing sewer will be included in the project.

B. The Work includes:

1. Furnishing of all labor, material, equipment, supplies, services and other means of construction necessary or proper for performing and completing the Work.

2. Sole responsibility for adequacy of equipment.

3. Maintaining the Work area and site in a clean and acceptable manner.

4. Maintaining existing facilities in service at all times except where specifically provided for otherwise herein.

5. Protection of finished and unfinished Work.

6. Repair and restoration of Work damaged during construction.

7. Furnishing as necessary proper equipment and machinery, of a sufficient capacity, to facilitate the Work and to handle all emergencies normally encountered in Work of this character.

C. Implied and Normally Required Work: It is the intent of these Specifications to provide the Owner with complete operable systems, subsystems and other items of Work. Any part or item of Work which is reasonably implied or normally required to make each installation satisfactorily and completely operable is deemed to be included in the Work and the Contract Amount. All miscellaneous appurtenances and other items of Work incidental to meeting the intent of these Specifications are included in the Work and the Contract Amount even though these appurtenances may not be specifically called for in these Specifications.

D. Quality of Work: Regard the apparent silence of the Contract Documents as to any detail, or the apparent omission from them of a detailed description concerning any Work to be done and materials to be furnished as meaning that only the best general practice is to prevail and that only materials and workmanship of the best quality are to be used. Interpretation of these Specifications will be made upon this basis.

E. Type of Contract:

1. Project will be constructed under a single prime contract.

1.5 ACCESS TO SITE

A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

B. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Driveways, Walkways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, Residents, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.

a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
c. Do not block or prevent entry to driveways and entrances of adjacent property owners throughout the duration of the project.

2. Limit work to be within public right of way.

C. Condition of Existing Buildings: Maintain portions of existing buildings at or adjacent to the site affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

D. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

1.6 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit work to normal business working hours as described in the Supplementary Conditions.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:

1. Notify Engineer not less than 48 hours in advance of proposed utility interruptions.
2. Obtain Engineer's written permission before proceeding with utility interruptions.

D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.

1. Notify Engineer not less than 48 hours in advance of proposed disruptive operations.
2. Obtain Engineer's written permission before proceeding with disruptive operations.

1.7 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

D. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
1. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and as scheduled on Drawings.

1.8 CONSTRAINTS

A. The Contract Documents are intended to allow the Contractor flexibility in construction of the Work however the following constraints apply:
1. The Engineer is the sole judge of when the Contractor's operations are causing interference with the Owner's daily procedures. The Engineer's orders and instructions on alleviating such interferences will be carried out without delay.
2. Perform the work in strict accordance within the construction limits shown.

B. Coordinate in advance with the Owner all interruptions to existing systems and facilities. In the event of a conflict, Contractor will reschedule his operations so that the Work will not conflict with Owner’s necessary operations or maintenance.

C. Perform connections to existing facilities or systems that interfere with the operation of existing facilities or systems as quickly as possible and with as little delay as possible.

1.9 WORK SEQUENCE

A. Coordinate work of all subcontractors.

B. Engineer has made an attempt at a proposed sequence of construction. Submit for acceptance a detailed sequence of construction with the construction schedule prior to the Work commencing.

C. Suggested Sequence of Construction:

1. Wastewater Treatment Plant
    a. Setup and maintain erosion control measures.
    b. Install proposed improvements per contract documents.
    c. Perform necessary testing and inspections.
    d. Perform final grading improvements.
2. Lift Stations and Residential Grinder Stations
    a. Setup and maintain erosion control measures.
    b. Setup bypass measures (as necessary).
    c. Install proposed improvements per contract documents.
    d. Perform necessary testing and inspections.
    e. Perform final grading improvements.

3. At project completion remove all soil erosion and sediment controls and bypass measures that were installed.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 STARTING WORK

A. Start Work within 10 days following the date stated in the Notice to Proceed and execute with such progress as may be required to prevent delay to other contractors or to the general completion of the project. Execute Work at such items and in or on such parts of the project and with such forces, material and equipment, as to complete the Work in the time established by the Contract. At all times, schedule and direct the Work so that it provides an orderly progression to completion within the specified time for completion.

END OF SECTION 01 10 00

(NO TEXT FOR THIS PAGE)

SECTION 01 20 00 - CONTRACT ITEMS

PART 1 - GENERAL

1.1 DESCRIPTION

A. The Section includes the Contract Items for the Project.

1.2 BASE BID CONTRACT ITEM 1 – MOBILIZATION AND DEMOBILIZATION

A. Description: The Work under this Contract Item includes all work necessary for the movement of personnel and equipment to and from the project site. This shall include the submittal of a Performance Bond, Payment Bond, Maintenance Bond [SC-6.01], Contractor's Insurance for Worker's Compensation [SC-6.03], Contractor's Commercial General Liability [SC-6.03], Automobile Liability [SC-6.03], Excess or Umbrella Liability [SC-6.03], Contractor's Professional Liability [SC-6.03], Owner's Liability Insurance [SC-6.04], and Property Insurance [SC-6.05].

B. Payment: Payment under Item 1 will be made at a Lump Sum Price.

1.3 BASE BID CONTRACT ITEM 2 – MAINTENANCE OF TRAFFIC

A. Description: The Work under this Contract Item includes construction and maintenance of all detours, routing of traffic, and signage necessary to install the wastewater infrastructure as shown on the Drawings, and specified herein in addition to all other work required or incidental thereto.

B. Payment: Payment under Item 2 will be made at a Lump Sum Price.

1.4 BASE BID CONTRACT ITEM 3 – CONSTRUCTION ENGINEERING

A. Description: The Work under this Contract Item includes the planning and management of the project complete with all labor, material, and equipment necessary, including contractor's field office/trailer for work done in the Right of Way, Easements and within the Towns owned properties.

B. Payment: Payment under Item 3 will be made at Lump Sum Price.

1.5 BASE BID CONTRACT ITEM 4 – EROSION AND SEDIMENT CONTROL

A. Description: The Work under this Contract Item includes installing erosion and sediment control devices as shown on the Drawings and specified herein complete with all labor, material, and equipment necessary; along with maintaining and repairing/replacing these devices if determined necessary by the Engineer.

B. Payment: Payment under Item 4 will be made at a Lump Sum Price.

1.6 BASE BID CONTRACT ITEM 5 – SITE GRADING AND RESTORATION

A. Description: Work under this contract item includes all work for site restoration including all restoration of grading, soils, asphalt, concrete, pavement markings, and all other items necessary to restore the project sites to their original condition, including but not limited to removal of existing pavements of all types, granular backfill, stone, HMA, and concrete, and all work complete in place, together with all appurtenant Work as shown and specified in the Contract Documents.

B. Payment: Payment under Item 5 will be made at a Lump Sum Price.

1.7 BASE BID CONTRACT ITEM 6 – DEWATERING AND TEMPORARY FLOW CONTROL (Bypass)

A. Description: Work under this contract item includes all material, labor, and equipment for all dewatering and temporary flow control (bypassing) as depicted in the Contract Documents.

B. Payment: Payment Under Item 6 will be made at a Lump Sum Price.

1.8 BASE BID CONTRACT ITEM 7 – WASTEWATER IMPROVEMENTS

A. Description: The work under this Contract Item includes all labor, materials, equipment, supplies and services, and performing all Work for the installation, maintenance, testing, and placing into trouble-free operation the designed wastewater treatment plant improvements. These improvements include but are not limited to, electrical room - delegated design in the building, but building envelope includes foundations, slab, walls, trusses, and roof - electrical improvements, drum screen, valve improvements, bypass pumping, existing non-potable waterline relocation (3/4” line with 2” drops within the WWTP), walkway improvements, and fire rated wall additions and fire rated ceiling additions (including roof structural improvements associated with the fire rated ceiling and walls, and FRP ceiling improvements) in the wastewater treatment plant within the proposed UV and blower room. The Work includes, but is not limited to, all general, architectural, structural, mechanical, plumbing, electrical and instrumentation and control work complete in place, together with all appurtenant Work as shown and specified in the Contract Documents.

B. Description (by Lift Station): The work under this Contract item includes all labor, materials, equipment, supplies and services, and performing all Work for the installation, maintenance, testing, and placing into trouble-free operation the lift station improvements.

C. Bank Lift Station Improvements: These improvements include but are not limited to, new pumps, wet well lining, piping, and valves and the installation of all electrical and instrumentation and controls improvements as shown and specified in the Contract Documents. Work under this item also includes maintenance of traffic, construction engineering, erosion and sediment control, site grading and restoration, and dewatering and temporary flow control (bypass), and all work complete in place, together with all appurtenant Work as shown and specified in the Contract Documents.

D. Eagle Drive Lift Station Improvements: These improvements include but are not limited to, lining of the existing wet well, installation of hatches for both wet well and valve vault, installation of all electrical and instrumentation and controls improvements as shown and specified in the Contract Documents. Work under this item also includes maintenance of traffic, construction engineering, erosion and sediment control, site grading and restoration, and dewatering and temporary flow control (bypass), and all work complete in place, together with all appurtenant Work as shown and specified in the Contract Documents.

E. Short Street Lift Station Improvements: These improvements include but are not limited to, new pumps, piping, and valves, site improvements, and the installation of all electrical and instrumentation and controls improvements as shown and specified in the Contract Documents. Work under this item also includes maintenance of traffic, construction engineering, erosion and sediment control, site grading and restoration, and dewatering and temporary flow control (bypass), and all work complete in place, together with all appurtenant Work as shown and specified in the Contract Documents.

F. Kelly Drive Lift Station Improvements: These improvements include but are not limited to, installation of all electrical and instrumentation and controls improvements, meter vault and all other appurtenances as shown and specified in the Contract Documents and placing into trouble-free operation. Work under this item also includes maintenance of traffic, construction engineering, erosion and sediment control, site grading and restoration, and dewatering and temporary flow control (bypass), and all work complete in place, together with all appurtenant Work as shown and specified in the Contract Documents.

G. Payment: Payment under Item 7 will be made at a Lump Sum Price.

1.9 BASE BID CONTRACT ITEM 8 – CEILING IMPROVEMENTS

A. Description: The Work under this Contract Item includes providing all labor, materials, equipment, supplies and services, and performing all Work for installation, maintenance, testing, and placing into the trouble-free operation the roof improvements which include the proposed FRP ceiling at the existing WWTP and mold remediation/spot repairs on the roof. This work includes, but is not limited to, proposed ceiling, connecting systems for proposed ceiling, mold remediation, mold clearance test, spot repairs on all sheathing (as noted by the Town), truss reinforcements, and other parts of the roof as needed at the discretion of the Town, and all work complete in place, together with all appurtenant Work as shown and specified in the Contract Documents.

1.10 MANDATORY ALTERNATE #1 – SCREW PRESS AND BUILDING IMPROVEMENTS

A. Description: The work under this Contract Item incudes all labor, materials, equipment, supplies and services, and performing all Work for installation, maintenance, testing, and placing into the trouble-free operation the delegated designed screw press building and screw press equipment improvements. These improvements include but are not limited to the building improvements (building envelope including but not limited to the foundations, slab, walls, truss system, roof, and connections to the existing WWTP building), ventilation, HVAC, lighting, doors, garage doors, electrical, fire rated wall additions, screw press, chemical storage tank, piping, pump station, emergency eye wash station, electrical/mechanical/instrumentation improvements, screw press lift filtrate lift station, concrete sidewalks, concrete drives, maintenance of traffic, construction engineering, erosion and sediment control, site grading and restoration, and dewatering and temporary flow control (bypass). The Work includes, but is not limited to, all general, architectural, structural, mechanical, plumbing, electrical and instrumentation and control work complete in place, together with all appurtenant Work as shown and specified in the Contract Documents.

B. Payment: Payment under this Item will be made at a Lump Sum Price.

1.11 MANDATORY ALTERNATE #2– CASE LIFT STATION DECOMMISIONING AND LOW PRESURE SEWER IMPROVEMENTS

A. Description: The Work under this Contract Item includes providing all labor, materials, equipment, supplies and services, and performing all Work for decommissioning of the existing lift station, capping/abandoning existing sanitary connections into the lift station, and installing all pertinent scope associate with the low pressure sewer improvements, which includes but are not limited to the grinder stations, flushing stations, and connections to the existing sewer. This work should include, but is not limited to capping all incoming piping, and filling in the existing wet well, valve vault and sanitary sewer structure. Work under this item also includes, testing, maintenance of traffic, construction engineering, erosion and sediment control, site grading and restoration, and dewatering and temporary flow control (bypass), and all work complete in place, together with all appurtenant Work as shown and specified in the Contract Documents.

B. Payment: Payment under this Item will be made at a Lump Sum Price.

END OF SECTION 01 20 00

SECTION 01 29 00 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.3 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Engineer and paid for by Owner.

B. Payment Application Times: Submit draft Application for Payment to Engineer by the second Tuesday of the month, or date otherwise discussed with owner. The period covered by each Application for Payment is one month, ending on the Friday prior to the second Tuesday of each month, or other date as discussed with owner.

C. Application for Payment Forms: Use EJCDC Document C-620 as form for Applications for Payment.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Engineer will return incomplete applications without action.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.

E. Stored Materials: Individual items with value of not less than $10,000 are eligible for payment by Owner as stored materials. Contractor may request payment of stored materials as approved by the Owner, submit a separate schedule for Materials Stored showing line item, description, previous value received, value incorporated into the work, and present value. Payment for stored materials is not guaranteed.

F. Transmittal: Submit two signed and notarized original copies of each Application for Payment to Engineer by a method ensuring receipt. Include waivers of lien and similar attachments with each copy.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

G. Waivers of Lien: With each Application for Payment, except for the first, submit waivers of lien from entities lawfully entitled to a lien.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit conditional final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
5. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.

H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of values.
3. Contractor's construction schedule (preliminary if not final).
4. Products list (preliminary if not final).
5. Submittal schedule (preliminary if not final).
6. Copies of building permits.
7. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
8. Initial progress report.
9. Report of preconstruction conference.

I. Application for Payment at Substantial Completion: After Engineer issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.

2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. Indiana State Form 34951
5. Evidence that claims have been settled.
6. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
7. Final liquidated damages settlement statement.

K. Record Drawings: Keep all record drawings current. Recommendation for payment of pay application is subject to Engineer's review and confirmation that all record drawings are up to date.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 29 00

(NO TEXT THIS PAGE)

SECTION 01 31 19 - PROJECT MEETINGS

PART 1 - GENERAL

1.1 PRECONSTRUCTION CONFERENCE

A. The Engineer will schedule meeting after Notice of Award.

B. Attendance Required: Owner, Engineer, Contractor, and Subcontractors.

C. Agenda:

1. Execution of Owner-Contractor Agreements.
2. Submission of executed bonds and insurance certificates.
3. Distribution of Contract Documents.
4. Submission of schedule of values and progress schedule.
5. Designation of personnel representing Owner, Engineer, and Contractor.
6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
7. Use of premises by Owner and Contractor.
8. Owner’s requirements.
9. Construction facilities and controls.
10. Temporary utilities.
11. Survey.
12. Security and housekeeping procedures.
13. Procedures for testing.
14. Procedures for maintaining record documents.
15. Requirements for bringing new pipelines into service.
16. Inspection and acceptance of equipment put into service during construction period.

D. The Engineer will record minutes and distribute copies to participants and those affected by decisions made.

1.2 PROGRESS MEETINGS

A. The Engineer will schedule and administer meetings throughout progress of the Work at maximum monthly intervals.

B. The Engineer will arrange and preside at meetings. For these meetings, the contractor will create an agenda and provide participants with a copy.

C. Attendance Required: Job superintendents, major subcontractors and suppliers, Owner, and Engineer, as appropriate to agenda topics for each meeting.

D. Example Agenda:

1. Review minutes of previous meetings.
2. Progress to date.
3. Anticipated progress until next progress meeting.
4. Identification of problems impeding planned progress.
5. Review of submittals schedule and status of submittals.
6. Maintenance of progress schedule.
7. Corrective measures to regain projected schedules.
8. Review of Requests for Information (RFI's).
9. Review of Requests for Proposal (RFP's).
10. Review of Change Orders (CO's).
11. Review of Pay Applications.
12. Owner discussions, concerns, and comments.
13. Engineer discussions, concerns, and comments.
14. Other business relating to Work.

E. The Engineer will record minutes and distribute copies to participants and those affected by decisions made.

1. Distribute meeting notes to attendees within seven calendar days after each meeting and allow three days for review of meeting notes by all parties. After the three-day review period, re-distribute notes as required and prior to the next progress meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 31 19

SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Submittal schedule requirements.
2. Administrative and procedural requirements for submittals.

B. Related Requirements:

1. Section 01 29 00 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Section 01 40 00 "Quality Requirements" for submitting test and inspection reports, and schedule of tests and inspections.
3. Section 01 77 00 "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
4. Section 01 78 23 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
5. Section 01 78 39 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
6. Section 01 79 00 “Demonstration and Training” for submitting video recordings of demonstration of equipment and training of Owner’s personnel.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Engineer's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Engineer's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

1.4 SUBMITTAL SCHEDULE

A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule within 5 calendar days from Notice to Proceed. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Engineer and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.

    a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.

4. Format: Arrange the following information in a tabular format:

    a. Scheduled date for first submittal.
    b. Specification Section number and title.
    c. Submittal Category: Action; informational.
    d. Name of subcontractor.
    e. Description of the Work covered.
    f. Scheduled date for Engineer's final release or approval.
    g. Scheduled dates for purchasing.
    h. Scheduled date of fabrication.
    i. Scheduled dates for installation.
    j. Activity or event number.

1.5 SUBMITTAL FORMATS

A. Submittal Information: Include the following information in each submittal:

1. Project name.
2. Date.
3. Name of Engineer.
4. Name of Contractor.
5. Name of firm or entity that prepared submittal.
6. Names of subcontractor, manufacturer, and supplier.
7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
8. Category and type of submittal.

9. Submittal purpose and description.
10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
11. Drawing number and detail references, as appropriate.
12. Indication of full or partial submittal.
13. Location(s) where product is to be installed, as appropriate.
14. Other necessary identification.
15. Remarks.
16. Signature of transmitter.

B. Options: Identify options requiring selection by Engineer.

C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Engineer on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.

D. Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

1. Place a permanent label or title block on each submittal item for identification; include name of firm or entity that prepared submittal.
2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Engineer.
3. Transmittal for Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using facsimile of sample form included in Project Manual transmittal form.

1.6 SUBMITTAL PROCEDURES

A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Email Submittals
    a. Prepare submittals in PDF form and transmit electronically via email to the Engineer.
        1) Address email to the Engineer at the email address in Section 01 11 00 or as directed.
        2) Include Project name, Project number, Specification Section, and Submittal description in the email subject line.
        3) Include a completed transmittal form with each submittal identifying the same information required for other electronic transfer method acceptable to the Engineer.
        4) Limit email attachment size to 20 MB; where file size exceeds this limit, divide into multiple clearly labeled transmissions or use an alternate electronic transfer method acceptable to the Engineer.
        5) Submit files in searchable PDF format unless otherwise specified.

6) Contractor is responsible for confirming successful transmission and receipt by the Engineer.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections so processing will not be delayed because of need to review submittals concurrently for coordination.

a. Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as indicated in the General and Supplementary Conditions. Time for review shall commence on Engineer's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Engineer's action stamp.

E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Engineer's action stamp.

1.7 SUBMITTAL REQUIREMENTS

A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. Mark each copy of each submittal to show which products and options are specific to the project.
2. Include the following information, as applicable:

    a. Manufacturer’s catalog cuts.
    b. Manufacturer's product specifications.
    c. Standard color charts.
    d. Statement of compliance with specified referenced standards.
    e. Testing by recognized testing agency.
    f. Application of testing agency labels and seals.
    g. Notation of coordination requirements.
    h. Availability and delivery time information.

3. For equipment, include the following in addition to the above, as applicable:

    a. Wiring diagrams that show factory-installed wiring.
    b. Printed performance curves.
    c. Operational range diagrams.
    d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

    a. Identification of products.
    b. Schedules.
    c. Compliance with specified standards.
    d. Notation of coordination requirements.
    e. Notation of dimensions established by field measurement.
    f. Relationship and attachment to adjoining construction clearly indicated.
    g. Seal and signature of professional engineer if specified.

2. Paper Sheet Size: Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 24 by 36 inches.

3. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
4. Identification: Permanently attach label on unexposed side of Samples that includes the following:

    a. Project name and submittal number.
    b. Generic description of Sample.
    c. Product name and name of manufacturer.
    d. Sample source.

e. Number and title of applicable Specification Section.
f. Specification paragraph number and generic name of each item.

5. Paper Transmittal: Include paper transmittal including complete submittal information indicated. Sent digital copy by email to the Engineer at the email address indicated in Section 01 11 00 Summary or as directed.
6. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

    a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
    b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

7. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

    a. Number of Samples: Submit three full sets of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Engineer will return submittal with options selected.

8. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

    a. Number of Samples: Submit three sets of Samples. Engineer will retain two Sample sets; remainder will be returned with Engineer comments.

        1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
        2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

C. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
2. Manufacturer and product name, and model number if applicable.
3. Number and name of room or space.
4. Location within room or space.

D. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, reference contact information, and other information specified.

E. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.

F. Certificates:

1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

G. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified. Test and Research Reports:

1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

    a. Name of evaluation organization.
    b. Date of evaluation.
    c. Time period when report is in effect.
    d. Product and manufacturers' names.
    e. Description of product.
    f. Test procedures and results.
    g. Limitations of use.

1.8 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Engineer.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

1.9 CONTRACTOR'S REVIEW

A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Engineer.

B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

1. Engineer will not review submittals received from Contractor that do not have Contractor's review and approval.

1.10 ENGINEER'S REVIEW

A. Action Submittals: Engineer will review each submittal, indicate corrections or revisions required and return it.

1. PDF Submittals: Engineer will indicate, via markup on each submittal, the appropriate action as follows:

a. No Exceptions Taken:
1) Where submittals are stamped "No Exceptions Taken". Work covered by submittal may proceed PROVIDED THE WORK COMPLIES WITH THE CONTRACT DOCUMENTS. Acceptance of Work will depend upon that compliance.

b. Make Corrections Noted:

1) When submittals are stamped "Make Corrections Noted". Work covered by submittal may proceed PROVIDED IT COMPLIES WITH ENGINEER'S NOTATIONS AND CORRECTIONS ON SUBMITTAL AND WITH THE CONTRACT DOCUMENTS. Acceptance of Work will depend on that compliance.

c. Submit Specified Item:

1) When submittals are stamped "Submit Specified Item" Contractor may proceed with Work covered by the submittal, except for the requested item, PROVIDED THE WORK COMPLIES WITH THE CONTRACT DOCUMENTS. Acceptance of Work will depend upon that compliance.
2) Submit the requested item in accordance with Paragraph 1.7 of this Section.

d. Revise and Resubmit:

1) When submittals are stamped "Revise and Resubmit" do not proceed with Work covered by submittal. Do not permit Work covered by submittal to use at Project site or elsewhere where Work is in progress.
2) Revise submittal in accordance with Engineer's notations.

e. Rejected:

1) When submittals are stamped "Rejected" do not proceed with Work covered by submittal. Do not permit Work covered by submittal to be used at Project site or elsewhere where Work is in progress.
2) Provide a new submittal that meets the intent of the Specifications and in accordance with Engineer's notations.

B. Informational Submittals

1. When Informational Submittals conform to the format requirements in the Contract Documents, Engineer will acknowledge such submittals via a response transmittal.
2. If an Information Submittal does not conform to the format requirements of the Contract Documents, Engineer will return the submittal with comments or questions. Do not proceed with Work covered by the submittal and do not permit Work covered by the submittal to be used at Project site or elsewhere where Work is in progress. Resubmit the Information Submittal until the Engineer acknowledges that the submittal conforms to the format required.

C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval in writing from Engineer.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Engineer will return without review submittals received from sources other than Contractor.

F. Submittals not required by the Contract Documents will be returned by Engineer without action.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SUBMITTAL NUMBERING

A. Number all submittals as follows:

(A) - (B)

Where:
(A) = Specification Section Number
(B) = Consecutive submittal number for the Specification Section Number listed in (A), with an alphabetic suffix indicating the sequential version of the submittal.

Examples:

01 33 00-001A indicates the initial version of submittal number 001 for Specification Section 01 33 00.
01 33 00-001B indicates the second version of submittal number 001 for Specification Section 01 33 00.
01 33 00-002A indicates the initial version of submittal number 002 for Specification Section 01 33 00.

3.2 REPETITIVE REVIEWS

A. Repetitive Reviews: Submittals will be reviewed no more than twice at the Owner's expense. All subsequent reviews will be performed at times convenient to the Engineer based on the Engineer's then prevailing rates including all direct and indirect costs and fees. Contractor is not entitled to an increase in the Guaranteed Maximum Price for reimbursing Owner for all such costs and fees invoiced for third and subsequent submittals.

3.3 EXAMPLE FORMAT FOR CONTRACTOR'S APPROVAL AND CERTIFICATION STAMP

A. An example format for the Contractor's approval and certification stamp is as follows:

CONTRACTOR'S NAME

____ Approved and Certified to comply with the Contract Documents

____ Approved and Certified to comply with Contract Documents, except for variations specifically noted on the Submittal Transmittal Form and the associated documents.

PRINTED NAME:_____

TITLE:_____

SIGNATURE:_____

DATE:_____

3.4 CONTRACTOR'S SUBMITTAL TRANSMITTAL FORM

A. The format for the Contractor's Submittal Transmittal form is as follows:

CONTRACTOR'S NAME

SUBMITTAL TRANSMITTAL FORM
SWEETSER WASTEWATER IMPROVEMENTS

TO:_____ DATE:_____
SITE:_____
ATTN:_____ SPEC. REF. NO.:_____
DWG REF. NO.:_____
FROM:_____ SUBMITTAL NO.:_____

1. The following documents are forwarded for your review:

No. of Copies	Document Originator	Description	Document No.	Date

2. Will item submitted for review fit in space provided in the Contract Document? _____ Yes _____ No _____ Not Applicable

3. Has work indicated in this submittal been coordinated with all trades? _____ Yes _____ No _____ Not Applicable

4. Has the Contractor approved submittal and affixed completed approval and certification stamp? _____ Yes _____ No

5. Contractor's description and justification for variations from the Contract Documents. (Use additional pages, if necessary)

_____
_____
_____
_____

6. Remarks:_____
_____
_____
_____

Printed Name:_____

Signature:_____

3.5 SUBMITTAL REQUIREMENTS

A. The schedule of submittals below is to be used only as a guide and is not guaranteed as a complete listing. Furnish submittals for any items of material or equipment required by the Technical Specifications.

SECTION	ITEM DESCRIPTION	INFORMATIONAL SUBMITTAL	SHOP DRAWING PRODUCT DATA / LAYOUT DRAWINGS	INSTALLATION INSTRUCTIONS	DESIGN CALCULATIONS AND / OR PE APPROVALS	O&M MANUAL	START-UP REPORT	MANUFACTURERS WARRANTY / CERTIFICATION OF INSTALLATION	SAMPLES AND/OR CERTIFIED TEST REPORTS	DAYS DUE AFTER NOTICE TO PROCEED
01 33 00	Submittal Procedures – Submittal Schedule	X								5
01 40 00	Quality Requirements	X								
01 50 00	Temporary Facilities and Controls	X								
01 60 00	Product Requirements	X								
01 77 00	Closeout Procedures	X	X							
01 78 23	Operation and Maintenance Data	X								
01 78 39	Project Record Documents	X	X							
01 79 00	Demonstration and Training	X								
02 41 19	Selective Demolition	X								
03 10 00	Concrete Formwork	X	X						X	
03 20 00	Concrete Reinforcement	X	X						X	
03 30 00	Cast-in-Place Concrete	X	X						X	
05 12 00	Structural Steel	X	X						X	
05 51 19	Misc. Metals and Aluminum		X							
06 05 00	Timber and Lumber	X	X							
06 10 00	Rough Carpentry	X	X							
06 16 00	Sheathing	X	X							
06 73 13	Fiberglass Materials	X	X							
08 11 16	Aluminum Doors and Frames		X						X	
08 33 23	Overhead Coiling Doors		X	X				X	X	
08 39 19	Sanitary and Watertight Doors and Frames		X	X				X	X	
08 51 13	Aluminum Windows		X	X				X	X	
08 71 00	Door Hardware		X	X				X	X	

SECTION	ITEM DESCRIPTION	INFORMATIONAL SUBMITTAL	SHOP DRAWING PRODUCT DATA / LAYOUT DRAWINGS	INSTALLATION INSTRUCTIONS	DESIGN CALCULATIONS AND / OR PE APPROVALS	O&M MANUAL	START-UP REPORT	MANUFACTURERS WARRANTY / CERTIFICATION OF INSTALLATION	SAMPLES AND/OR CERTIFIED TEST REPORTS	DAYS DUE AFTER NOTICE TO PROCEED
09 96 00	High Performance Coatings		X					X	X	
13 34 20	Post-Frame Building		X					X		
25 13 00	Instrumentation and Controls		X	X		X			X	
25 30 00	Field Mounted Instruments		X							
25 30 10	Instrument Panels and Enclosure Construction		X							
25 30 20	Process Controllers and Computer Systems		X	X		X	X		X	
26 05 00	Common Work Results for Electrical	X	X							
26 05 19	Low-Voltage Electrical Power Conductors and Cables		X						X	
26 05 23	Instrumentation Cables	X	X							
26 05 26	Grounding and Bonding for Electrical Systems		X							
26 05 29	Hangers and Supports for Electrical Systems		X							
26 05 33.13	Conduit for Electrical Systems		X							
26 05 33.16	Boxes for Electrical Systems		X							
26 05 53	Identification for Electrical Systems		X							
26 24 16	Panelboards		X							
26 27 16	Electrical Cabinets and Enclosures		X							
26 27 26	Wiring Devices		X							
26 28 16	Disconnect Switches		X							

SECTION	ITEM DESCRIPTION	INFORMATIONAL SUBMITTAL	SHOP DRAWING PRODUCT DATA / LAYOUT DRAWINGS	INSTALLATION INSTRUCTIONS	DESIGN CALCULATIONS AND / OR PE APPROVALS	O&M MANUAL	START-UP REPORT	MANUFACTURERS WARRANTY / CERTIFICATION OF INSTALLATION	SAMPLES AND/OR CERTIFIED TEST REPORTS	DAYS DUE AFTER NOTICE TO PROCEED
26 29 23	Variable Frequency Drives	X	X				X			
26 51 00	Interior Lighting		X		X					
26 56 00	Exterior Lighting		X		X					
26 90 00	Heat Trace	X	X							
31 10 00	Site Clearing	X								
31 20 00	Earthwork	X		X						
31 23 16	Excavation			X						
31 23 16.13	Trenching			X						
31 23 19	Dewatering			X						
31 23 23	Fill		X							
31 25 00	Erosion and Sediment Control		X	X						
32 31 13	Chain Link Fences and Gates		X					X		
32 90 00	Landscaping Work		X	X						
33 01 30.13	Sanitary Sewer, Force Main, and Manhole Testing								X	
33 05 05.31	Hydrostatic Testing								X	
33 05 13	Precast Concrete Wastewater Structures	X	X						X	
33 05 15	Sewer Structure Rehabilitation		X							
33 05 50	Laying and Jointing Buried Pipes		X							
33 31 13	Sanitary Sewer		X							
40 05 06	Couplings, Adapters, and Specials for Process Piping		X							
40 05 07	Hangers and Supports for Process Piping		X							

SECTION	ITEM DESCRIPTION	INFORMATIONAL SUBMITTAL	SHOP DRAWING PRODUCT DATA / LAYOUT DRAWINGS	INSTALLATION INSTRUCTIONS	DESIGN CALCULATIONS AND / OR PE APPROVALS	O&M MANUAL	START-UP REPORT	MANUFACTURERS WARRANTY / CERTIFICATION OF INSTALLATION	SAMPLES AND/OR CERTIFIED TEST REPORTS	DAYS DUE AFTER NOTICE TO PROCEED
40 05 16	Ductile Iron Pipe and Fittings		X							
40 05 18	Miscellaneous Pipes and Fittings		X							
40 05 20	Valves		X							
40 05 53	Identification for Process Piping and Equipment		X							
40 05 57	Actuators for Process Valves and Gates		X							
43 21 22	Submersible Sewage Pumps		X							
46 21 16	Fine Mechanical Screening Equipment		X							
46 71 46	Thickening Screw Press		X							

END OF SECTION 01 33 00

(NO TEXT THIS PAGE)

SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality-assurance and quality-control services required by Engineer, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.3 DEFINITIONS

A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

B. Field Quality-Control Tests: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.

D. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

E. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

F. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

G. Source Quality-Control Tests: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.

H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

I. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

J. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Engineer.

1.4 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Engineer.

1.5 CONFLICTING REQUIREMENTS

A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements are specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Engineer for direction before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Engineer for a decision before proceeding.

1.6 INFORMATIONAL SUBMITTALS

A. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

B. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification section number and title.
2. Entity responsible for performing tests and inspections.
3. Description of test and inspection.
4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

C. Reports: Prepare and submit certified written reports and documents as specified.

D. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.7 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, telephone number, and email address of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspection.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

1.8 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

F. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

1.9 QUALITY CONTROL

A. Contractor Responsibilities: Tests and inspections are contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the work complies with requirements.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of contractor by authorities having jurisdiction, whether specified or not.
2. Engage a qualified testing agency to perform quality-control services.
3. Notify testing agencies at least 48 hours in advance of time when work that requires testing or inspection will be performed.
4. Where quality-control services are indicated as contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
5. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

B. Field and Laboratory Tests: Provide personnel to perform the following periodic observation and associated services:

1. Soils: Observe and test excavations, placement, and compaction of soils. Determine suitability of excavated material. Observe subgrade soils and foundations.
2. Concrete: Observe forms and reinforcement; observe concrete placement; perform and facilitate air entrainment and slump tests, and concrete cylinder preparation.
3. Asphalt: Observe and test placement and compaction of asphalt. Observe subgrade soils to determine suitability for placement.
4. Provide at least a 24-hour notice prior to when specified testing is required. Provide labor and materials, and necessary facilities at the site as required by the Engineer and the testing laboratory.

C. Retesting/Reinspecting: Retest and reinspect construction that replaced work that failed to comply with the Contract Documents. Costs for retesting or reinspecting the work shall be incurred by the Contractor at no expense to the Owner.

D. Testing Agency Responsibilities: Cooperate with Engineer and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Engineer and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.

4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform duties of Contractor.

E. Associated Contractor Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Security and protection for samples and for testing and inspection equipment at Project site.

F. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.10 COSTS OF INSPECTION

A. Contractor's Obligation: Include in the Contract Price, the cost of all shop and field tests of materials and equipment specifically called for in the Contract Documents. The Owner may perform tests on any material furnished under this Contract at any time during the Contract. If tests performed by the Owner result in failure or rejection for noncompliance, reimburse the Owner for expenditures incurred in making such tests. Tests performed by the Owner shall prevail in determining compliance with Contract requirements.

B. Reimbursements to Owner:

1. Materials and equipment submitted by the Contractor as the equivalent to those specifically named in the Contract may be tested by the Owner for compliance. Reimburse the Owner for expenditures incurred in making such tests on materials and equipment which are rejected for noncompliance.

1.11 ACCEPTANCE TESTS

A. Preliminary Field Tests: As soon as conditions permit, furnish all labor and materials and services to perform preliminary field tests of all equipment provided under this Contract. If the preliminary field tests disclose that any equipment furnished and installed under this Contract does not meet the requirements of the Contract Documents, make all changes, adjustments and replacements required prior to the acceptance tests.

B. Final Field Tests: Upon completion of the Work and prior to final payment, subject all equipment, piping and appliances installed under this Contract to specified acceptance tests to demonstrate compliance with the Contract Documents.

1. Furnish all labor, fuel, energy, water and other materials, equipment, instruments, and services necessary for all acceptance tests.
2. Conduct field tests in the presence of the Engineer. Perform the field tests to demonstrate that under all conditions of operation each equipment item:

a. Has not been damaged by transportation or installation.
b. Has been properly installed.
c. Has been properly lubricated.
d. Has no electrical or mechanical defects.
e. Is in proper alignment.
f. Has been properly connected.
g. Is free of overheating of any parts.
h. Is free of all objectionable vibration.
i. Is free of overloading of any parts.
j. Operates as intended.

C. Certificate of Compliance: Submit a notarized Certificate of Compliance for each equipment item. Provide Certificates in the form of a letter stating the following:

1. Manufacturer has performed all required tests.
2. Materials to be supplied meet all test requirements.
3. Tests were performed not more than one year prior to submittal of the certificate.
4. Materials and equipment subjected to the tests are of the same quality, manufacture and make as those specified.
5. Identification of the materials.

D. Failure of Tests: If the acceptance tests reveal defects in material or equipment, or if the material or equipment in any way fails to comply with the requirements of the Contract Documents, then promptly correct such deficiencies. Failure or refusal to correct the deficiencies, or if the improved materials or equipment, when tested again, fail to meet the guarantees or specified requirements, the Owner, notwithstanding its partial payment for work and materials or equipment, may reject said materials or equipment and may order the Contractor to remove the defective work from the site at no addition to the Contract Price, and replace it with material or equipment which meets the Contract Documents.

1.12 FAILURE TO COMPLY WITH CONTRACT

A. Unacceptable materials: If it is ascertained by testing or inspection that the material or equipment does not comply with the Contract, do not deliver said material or equipment, or if delivered remove it promptly from the site or from the Work and replace it with acceptable material without additional cost to the Owner. Fulfill all obligations under the terms and conditions of the Contract even if the Owner or the Resident Project Representative fail to ascertain noncompliance or notify the Contractor of noncompliance.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 ACCEPTABLE TESTING AGENCIES

A. The following list of Testing Agencies are considered to be pre-approved and acceptable to perform the designated tests and inspections:

1. Earth Exploration
2. Alt & Witzig
3. ATC Group Services
4. CTL Engineering

B. Contractor may submit the qualifications of an alternate agency for approval by the Engineer.

3.2 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Engineer.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Engineer's reference during normal working hours.

1. Submit log at Project closeout as part of Project Record Documents.

3.3 REPAIR AND PROTECTION

A. General: On completion of testing, inspection, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 01 73 00 "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 40 00

(NO TEXT FOR THIS PAGE)

SECTION 01 42 00 – REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Engineer's action on Contractor's submittals, applications, and requests, "approved" is limited to Engineer's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Engineer. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. AABC - Associated Air Balance Council; www.aabc.com.
2. AAMA - American Architectural Manufacturers Association; www.aamanet.org.
3. AAPFCO - Association of American Plant Food Control Officials; www.aapfco.org.
4. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
5. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
6. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
7. ABMA - American Boiler Manufacturers Association; www.abma.com.
8. ACI - American Concrete Institute; (Formerly: ACI International); www.concrete.org
9. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
10. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
11. AF&PA - American Forest & Paper Association; www.afandpa.org.
12. AGA - American Gas Association; www.aga.org.
13. AHAM - Association of Home Appliance Manufacturers; www.aham.org.
14. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
15. AI - Asphalt Institute; www.asphaltinstitute.org.
16. AIA - American Institute of Architects (The); www.aia.org.
17. AISC - American Institute of Steel Construction; www.aisc.org.
18. AISI - American Iron and Steel Institute; www.steel.org.
19. AITC - American Institute of Timber Construction; www.aitc-glulam.org.

20. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
21. ANSI - American National Standards Institute; www.ansi.org.
22. AOSA - Association of Official Seed Analysts, Inc.; www.aosaseed.com.
23. APA - APA - The Engineered Wood Association; www.apawood.org.
24. APA - Architectural Precast Association; www.archprecast.org.
25. API - American Petroleum Institute; www.api.org.
26. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
27. ARI - American Refrigeration Institute; (See AHRI).
28. ARMA - Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
29. ASCE - American Society of Civil Engineers; www.asce.org.
30. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
31. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
32. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.
33. ASSE - American Society of Safety Engineers (The); www.asse.org.
34. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.
35. ASTM - ASTM International; www.astm.org.
36. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.
37. AWEA - American Wind Energy Association; www.awea.org.
38. AWI - Architectural Woodwork Institute; www.awinet.org.
39. AWMAC - Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
40. AWPA - American Wood Protection Association; www.awpa.com.
41. AWS - American Welding Society; www.aws.org.
42. AWWA - American Water Works Association; www.awwa.org.
43. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
44. BIA - Brick Industry Association (The); www.gobrick.com.
45. BICSI - BICSI, Inc.; www.bicsi.org.
46. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.org.
47. BISSC - Baking Industry Sanitation Standards Committee; www.bissc.org.
48. BWF - Badminton World Federation; (Formerly: International Badminton Federation); www.bissc.org.
49. CDA - Copper Development Association; www.copper.org.
50. CE - Conformite Europeenne; http://ec.europa.eu/growth/single-market/ce-marking/
51. CEA - Canadian Electricity Association; www.electricity.ca.
52. CEA - Consumer Electronics Association; www.ce.org.
53. CFFA - Chemical Fabrics and Film Association, Inc.; www.chemicalfabricsandfilm.com.
54. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
55. CGA - Compressed Gas Association; www.cganet.com.
56. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.

57. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
58. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
59. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
60. CPA - Composite Panel Association; www.pbmdf.com.
61. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
62. CRRC - Cool Roof Rating Council; www.coolroofs.org.
63. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
64. CSA - CSA Group; www.csa.ca.
65. CSA - CSA International; (Formerly: IAS - International Approval Services); www.csa-international.org.
66. CSI - Construction Specifications Institute (The); www.csinet.org.
67. CSSB - Cedar Shake & Shingle Bureau; www.cedarbureau.org.
68. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
69. CWC - Composite Wood Council; (See CPA).
70. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
71. DHI - Door and Hardware Institute; www.dhi.org.
72. ECA - Electronic Components Association; (See ECIA).
73. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
74. ECIA - Electronic Components Industry Association; www.eciaonline.org.
75. EIA - Electronic Industries Alliance; (See TIA).
76. EIMA - EIFS Industry Members Association; www.eima.com.
77. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
78. ESD - ESD Association; (Electrostatic Discharge Association); www.esda.org .
79. ESTA - Entertainment Services and Technology Association; (See PLASA).
80. ETL - Intertek (See Intertek); www.intertek.com.
81. EVO - Efficiency Valuation Organization; www.evo-world.org.
82. FCI - Fluid Controls Institute; www.fluidcontrolsinstitute.org.
83. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.
84. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
85. FM Approvals - FM Approvals LLC; www.fmglobal.com.
86. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
87. FRSA - Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; www.floridaroof.com.
88. FSA - Fluid Sealing Association; www.fluidsealing.com.
89. FSC - Forest Stewardship Council U.S.; www.fscus.org.
90. GA - Gypsum Association; www.gypsum.org.
91. GANA - Glass Association of North America; www.glasswebsite.com.
92. GS - Green Seal; www.greenseal.org.
93. HI - Hydraulic Institute; www.pumps.org.
94. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
95. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
96. HPVA - Hardwood Plywood & Veneer Association; www.hpva.org.

97. HPW - H. P. White Laboratory, Inc.; www.hpwhite.com.
98. IAPSC - International Association of Professional Security Consultants; www.iapsc.org.
99. IAS - International Accreditation Service; www.iasonline.org.
100. IAS - International Approval Services; (See CSA).
101. ICBO - International Conference of Building Officials; (See ICC).
102. ICC - International Code Council; www.iccsafe.org.
103. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
104. ICPA - International Cast Polymer Alliance; www.icpa-hq.org.
105. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
106. IDEM - Indiana Department of Environmental Management; www.in.gov/idem/.
107. IEC - International Electrotechnical Commission; www.iec.ch.
108. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
109. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
110. IESNA - Illuminating Engineering Society of North America; (See IES).
111. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
112. IGMA - Insulating Glass Manufacturers Alliance; www.igmaonline.org.
113. IGSHPA - International Ground Source Heat Pump Association; www.igshpa.okstate.edu.
114. ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.
115. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
116. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
117. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
118. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
119. ISO - International Organization for Standardization; www.iso.org.
120. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
121. ITU - International Telecommunication Union; www.itu.int/home.
122. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.
123. LMA - Laminating Materials Association; (See CPA).
124. LPI - Lightning Protection Institute; www.lightning.org.
125. MBMA - Metal Building Manufacturers Association; www.mbma.com.
126. MCA - Metal Construction Association; www.metalconstruction.org.
127. MFMA - Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
128. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
129. MHIA - Material Handling Industry of America; www.mhia.org.
130. MIA - Marble Institute of America; www.marble-institute.com.
131. MMPA - Moulding & Millwork Producers Association; www.wmmpa.com.
132. MPI - Master Painters Institute; www.paintinfo.com.
133. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
134. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.

135. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
136. NADCA - National Air Duct Cleaners Association; www.nadca.com.
137. NAIMA - North American Insulation Manufacturers Association; www.naima.org.
138. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
139. NBI - New Buildings Institute; www.newbuildings.org.
140. NCAA - National Collegiate Athletic Association (The); www.ncaa.org.
141. NCMA - National Concrete Masonry Association; www.ncma.org.
142. NEBB - National Environmental Balancing Bureau; www.nebb.org.
143. NECA - National Electrical Contractors Association; www.necanet.org.
144. NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
145. NEMA - National Electrical Manufacturers Association; www.nema.org.
146. NETA - InterNational Electrical Testing Association; www.netaworld.org.
147. NFHS - National Federation of State High School Associations; www.nfhs.org.
148. NFPA - National Fire Protection Association; www.nfpa.org.
149. NFPA - NFPA International; (See NFPA).
150. NFRC - National Fenestration Rating Council; www.nfrc.org.
151. NHLA - National Hardwood Lumber Association; www.nhla.com.
152. NLGA - National Lumber Grades Authority; www.nlga.org.
153. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).
154. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
155. NRCA - National Roofing Contractors Association; www.nrca.net.
156. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
157. NSF - NSF International; www.nsf.org.
158. NSPE - National Society of Professional Engineers; www.nspe.org.
159. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
160. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
161. NWFA - National Wood Flooring Association; www.nwfa.org.
162. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
163. PDI - Plumbing & Drainage Institute; www.pdionline.org.
164. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); http://www.plasa.org.
165. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
166. RFCI - Resilient Floor Covering Institute; www.rfci.com.
167. RIS - Redwood Inspection Service; www.redwoodinspection.com.
168. SAE - SAE International; www.sae.org.
169. SCTE - Society of Cable Telecommunications Engineers; www.scte.org.
170. SDI - Steel Deck Institute; www.sdi.org.
171. SDI - Steel Door Institute; www.steeldoor.org.
172. SEFA - Scientific Equipment and Furniture Association (The); www.sefalabs.com.
173. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
174. SIA - Security Industry Association; www.siaonline.org.
175. SJI - Steel Joist Institute; www.steeljoist.org.
176. SMA - Screen Manufacturers Association; www.smainfo.org.

177. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
178. SMPTE - Society of Motion Picture and Television Engineers; www.smpte.org.
179. SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.
180. SPIB - Southern Pine Inspection Bureau; www.spib.org.
181. SPRI - Single Ply Roofing Industry; www.spri.org.
182. SRCC - Solar Rating & Certification Corporation; www.solar-rating.org.
183. SSINA - Specialty Steel Industry of North America; www.ssina.com.
184. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
185. STI - Steel Tank Institute; www.steeltank.com.
186. SWI - Steel Window Institute; www.steelwindows.com.
187. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
188. TCA - Tilt-Up Concrete Association; www.tilt-up.org.
189. TCNA - Tile Council of North America, Inc.; www.tileusa.com.
190. TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
191. TIA - Telecommunications Industry Association (The); (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
192. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
193. TMS - The Masonry Society; www.masonrysociety.org.
194. TPI - Truss Plate Institute; www.tpinst.org.
195. TPI - Turfgrass Producers International; www.turfgrasssod.org.
196. TRI - Tile Roofing Institute; www.tileroofing.org.
197. UL - Underwriters Laboratories Inc.; http://www.ul.com.
198. UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.
199. USAV - USA Volleyball; www.usavolleyball.org.
200. USGBC - U.S. Green Building Council; www.usgbc.org.
201. USITT - United States Institute for Theatre Technology, Inc.; www.usitt.org.
202. WA - Wallcoverings Association; www.wallcoverings.org
203. WASTEC - Waste Equipment Technology Association; www.wastec.org.
204. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
205. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
206. WDMA - Window & Door Manufacturers Association; www.wdma.com.
207. WI - Woodwork Institute; www.wicnet.org.
208. WSRCA - Western States Roofing Contractors Association; www.wsrca.com.
209. WWPA - Western Wood Products Association; www.wwpa.org.

B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.

1. DIN - Deutsches Institut fur Normung e.V.; www.din.de.
2. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
3. ICC - International Code Council; www.iccsafe.org.
4. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.

1. COE - Army Corps of Engineers; www.usace.army.mil.
2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
4. DOD - Department of Defense; www.quicksearch.dla.mil.
5. DOE - Department of Energy; www.energy.gov.
6. EPA - Environmental Protection Agency; www.epa.gov.
7. FAA - Federal Aviation Administration; www.faa.gov.
8. FG - Federal Government Publications; www.gpo.gov/fdsys.
9. GSA - General Services Administration; www.gsa.gov.
10. HUD - Department of Housing and Urban Development; www.hud.gov.
11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; www.eetd.lbl.gov.
12. OSHA - Occupational Safety & Health Administration; www.osha.gov.
13. SD - Department of State; www.state.gov.
14. TRB - Transportation Research Board; National Cooperative Highway Research Program; The National Academies; www.trb.org.
15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
16. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
17. USDOJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
18. USP - U.S. Pharmacopeial Convention; www.usp.org.
19. USPS - United States Postal Service; www.usps.com.

D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
2. DOD - Department of Defense; Military Specifications and Standards; Available from DLA Document Services; www.quicksearch.dla.mil.
3. DSCC - Defense Supply Center Columbus; (See FS).
4. FED-STD - Federal Standard; (See FS).
5. FS - Federal Specification; Available from DLA Document Services; www.quicksearch.dla.mil.

    a. Available from Defense Standardization Program; www.dsp.dla.mil.
    b. Available from General Services Administration; www.gsa.gov.
    c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org/ccb.

6. MILSPEC - Military Specification and Standards; (See DOD).
7. USAB - United States Access Board; www.access-board.gov.
8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 42 00

(NO TEXT FOR THIS PAGE)

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Requirements:

1. Section 01 10 00 "Summary for Work" restrictions and limitations on utility interruptions.

1.3 REFERENCES

A. Codes and standards referred to in this Section are:

1. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations

1.4 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner and Owner's staff, Engineer, testing agencies, and authorities having jurisdiction.

B. Sewer Service: No sewer utilities are available in the project area.

C. Water Service: Contractors will need to bring all water needed to the project site.

D. Electric Power Service: Pay electric-power-service use charges for electricity used by all entities for construction operations.

E. Provide water and electric meters for water and electric power services connections. Coordinate with Owner on whether a specific meter type is required for monitoring service.

1.5 INFORMATIONAL SUBMITTALS

A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.

B. Implementation and Termination Schedule: Within 15 days of date established for commencement of the Work, submit schedule indicating implementation and termination dates of each temporary utility.

1.6 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.7 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inchOD line posts and 2-7/8-inch OD corner and pull posts, with 1-5/8-inch OD top and bottom rails. Provide galvanized-steel bases for supporting posts.

B. Dust-Control Adhesive-Surface Walk-Off Mats: Provide mats minimum 36 by 60 inches.

2.2 TEMPORARY FACILITIES

A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

B. Contractor's Office: Erect, furnish, and maintain a field office. Have an authorized agent present at this office at all times while the Work is in progress. Keep readily accessible copies of the Contract Documents, required record documents, and the latest approved shop drawings at this field office.

C. Coordinate location of field offices, material sheds and temporary structures with Engineer and Owner.

D. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

E. Store combustible materials apart from building.

F. Utility Connections:
   1. Connect the water and sanitary sewer to existing lines. If there are no available sanitary sewers:

      a. Provide and maintain, throughout the duration of the construction project, portable commodes next to the field office trailer.
      b. Install Sanitary Holding Tank at project inception and connect the trailer sanitary sewer to the Holding Tank. Pump out tank on not less than a weekly basis.
      c. Provide a suitable water meter installation in accordance with local ordinances. Pay each monthly water bill cost.
      d. Arrange for the local power company to provide separate, complete and metered electrical service to the field office. Provide a suitable meter installation as approved. Connect the electrical service to the trailer to provide a complete operating installation.
      e. Arrange with the local internet service Contractor to provide either DSL or cable modem service to the field office. Pay each monthly internet connection charge.

G. Trailer Removal: Subsequent to final completion, remove trailer from the project site and transport the trailer off-site. Remove all trailer foundations, anchors, supports, and utility connections. Restore site to its original condition or better.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

C. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.

D. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction and marked for intended location and application.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

B. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

3.2 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

B. Locate facilities to limit site disturbance as specified in Section 01 10 00 "Summary."

C. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.3 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

B. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.

D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

1. Prohibit and prevent nuisances on the site of the Work or on adjoining property. Discharge any employee who violates this rule. Abide by all environmental regulations or laws applicable to the Work.

E. Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

F. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.

G. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.

H. Install electric power service as noted on the Drawings.

I. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

J. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

3.4 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
2. Maintain support facilities until Engineer schedules Substantial Completion inspection. Remove after the Substantial Completion walkthrough has been performed. Maintain only the temporary facilities required to achieve Final Completion. Contractor's personnel are not permitted to use the permanent facilities.

B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.

1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.

C. Temporary Use of Planned Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.

1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to the Contract Documents.
3. Recondition base after temporary use, including removing contaminated material, regrading, proof rolling, compacting, and testing.
4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to the Contract Documents.

D. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

E. Parking: Provide temporary parking areas for construction personnel.

F. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

G. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.

1. Identification Signs: Provide Project identification signs as indicated on Drawings.
2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
3. Provide temporary, directional signs for construction personnel and visitors.
4. Maintain and touch up signs so they are legible at all times.

H. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 01 73 00 "Execution."

I. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

J. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.

K. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

B. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.

C. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

D. Comply with work restrictions specified in Section 01 10 00 "Summary."

E. Temporary Erosion and Sedimentation Control: Comply with requirements of the IDEM Construction Stormwater General Permit or as shown on the Construction Documents (as applicable).

F. Storm water Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of storm water from heavy rains.

G. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

H. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

I. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

J. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

K. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.

3.6 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

C. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

D. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

E. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

F. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.

1. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 77 00 "Closeout Procedures."

END OF SECTION 01 50 00

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Requirements:

1. Section 01 42 00 "References" for applicable industry standards for products specified.

1.3 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved by Engineer through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

1.4 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
2. If a dispute arises between contractors over concurrently selectable but incompatible products, Engineer will determine which products shall be used.

B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.

1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is not conspicuous.
2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:

a. Name of product and manufacturer.
b. Model and serial number.
c. Capacity.
d. Speed.
e. Ratings.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.

2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.6 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer’s Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

C. All product warranties shall commence at the date of Substantial Completion unless specified otherwise in the individual Specification Sections.

D. Submittal Time: Comply with requirements in Section 01 77 00 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.

2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
4. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in the General Conditions to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
2. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

2.2 "OR-EQUAL" PRODUCTS

A. Conditions for Consideration of Or-Equal Products: Engineer will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Contractor may return requests without action, except to record noncompliance with these requirements:

1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant product qualities include attributes such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements
2. Evidence that proposed product provides specified warranty.
3. List of similar installations for completed projects with project names and addresses, and contact information for references, if requested.
4. Samples, if requested.

B. Submittal Requirements: Approval by the Engineer of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 60 00

SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Cutting and patching.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection of installed construction.

B. Related Requirements:

1. Section 01 10 00 "Summary" for limits on use of Project site.
2. Section 01 33 00 "Submittal Procedures" for submitting surveys.
3. Section 01 77 00 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.

1.3 REFERENCES

A. Codes and standards referred to in this Section are:

1. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations

1.4 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For land surveyor.

B. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.

C. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.

1. Include description of provisions for temporary services and systems during interruption of permanent services and systems.

D. Certified Surveys: Submit two copies signed by land surveyor.

1.6 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

1. Provide an experienced survey crew including an instrument operator, competent assistants, and any instruments, tools, stakes, and other materials required to complete the survey, layout, and measurement of work performed by the Contractor.

B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, notify Engineer of locations and details of cutting and await directions from Engineer before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
2. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.

3. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Engineer's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

C. Manufacturer’s Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

1.7 DATUM PLANE

A. All elevations indicated or specified refer to the NAVD88, US Foot and are expressed in feet and decimal parts thereof, or in feet and inches.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Engineer for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services; and other utilities.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

1. Description of the Work.
2. List of detrimental conditions, including substrates.
3. List of unacceptable installation tolerances.
4. Recommended corrections.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Engineer in accordance with the General Conditions.

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the survey and existing benchmarks. If discrepancies are discovered, notify Engineer promptly.

B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.

1. Establish limits on use of Project site.
2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
3. Inform installers of lines and levels to which they must comply.
4. Check the location, level and plumb, of every major element as the Work progresses.
5. Notify Engineer when deviations from required lines and levels exceed allowable tolerances.
6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Control Points: Base horizontal and vertical control points are established in the Drawings and are to be used as the datum for the Work.

D. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

E. Protection: Safeguard all points, stakes, grade marks, known property corners, monuments, and benchmarks made or established for the Work. Re-establish them if disturbed and bear the entire expense of checking re-established marks and rectifying work improperly installed.

F. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Engineer.

3.4 FIELD ENGINEERING

A. Identification: Existing benchmarks, control points, and property corners are shown on the Drawings.

B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points. Report lost or destroyed permanent benchmarks or control points promptly.

2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Where possible, select tools or equipment that minimize production of excessive noise levels.

G. Templates: Obtain and distribute to the parties involved, templates for work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Engineer.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Repair or remove and replace damaged, defective, or nonconforming Work.

1. Comply with Section 01 77 00 "Closeout Procedures" for repairing or removing and replacing defective Work.

3.6 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 01 10 00 "Summary."

F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.

    a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    b. Restore damaged pipe covering to its original condition.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 degrees F.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

    a. Use containers intended for holding waste materials of type to be stored.

4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 50 00 "Temporary Facilities and Controls."

F. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

G. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

H. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

A. Not Used.

3.9 Coordinate startup and adjusting of equipment and operating components with requirements in Section 01 79 00 "Demonstration and Training."

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: Comply with qualification requirements in Section 01 40 00 "Quality Requirements."

3.10 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Protection of Existing Items: Provide protection and ensure that existing items remain undisturbed by construction are maintained in condition that existed at commencement of the Work.

C. Comply with manufacturers’ written instructions for temperature and relative humidity.

END OF SECTION 01 73 00

SECTION 01 73 29 – CUTTING AND PATCHING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. General Requirements

B. Scheduling of Shutdown

1.2 RELATED SECTIONS

Related Work Specified in Other Sections Includes, But is Not Limited to, the Following

A. Section 01 11 00 - Summary of Work

1.3 GENERAL REQUIREMENTS

A. Coordination: Perform all cutting, fitting or patching of the Work that may be required to make the several parts thereof join in accordance with the Contract Documents. Perform restoration with competent workmen skilled in the trade.

B. Improperly Timed Work: Perform all cutting and patching required to install improperly timed work, to remove samples of installed materials for testing, and to provide for alteration of existing facilities or for the installation of new Work in the existing construction.

C. Limitations: Except when the cutting or removal of existing construction is specified or indicated, do not undertake any cutting or demolition which may affect the structural stability of the Work or existing facilities without the ENGINEER's concurrence.

1.4 SCHEDULING OF SHUTDOWN

A. Connections to Existing Facilities: If any connections, replacement, or other work requiring the shutdown of an existing facility is necessary, schedule such work at times when the impact on the OWNER's normal operation is minimal. Overtime, night and weekend work without additional compensation from the OWNER, may be required to make these connections, especially if the connections are made at times other than those specified.

B. Request for Shutdowns: Submit a written request for each shutdown to the OWNER and the ENGINEER sufficiently in advance of any required shutdown.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 PREPARATION

A. Safeguards: Provide all shoring, bracing, supports, and protective devices necessary to safeguard all work and existing facilities during cutting and patching operations.

B. Location of Embedment: Employ impulse radar (non x-ray type) nondestructive testing prior to core drilling or cutting of existing walls, floors and ceilings to identify location of embedded pipes or conduits.

C. Material Removal: Cut and remove all materials to the extent shown or as required to complete the Work. Remove materials in a careful manner with no damage to adjacent facilities. Remove materials which are not salvageable from the site.

3.2 RESTORATION

A. Final Appearance and Finish: Restore all work and existing facilities affected by cutting operations, with new materials, or with salvaged materials acceptable to the ENGINEER, to obtain a finished installation with the strength, appearance, and functional capacity required. If necessary, patch and refinish entire surfaces.

END OF SECTION

SECTION 01 74 00 – CLEANING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Final Cleaning

B. Final Inspection

1.2 FINAL CLEANING

A. Requirements: At completion of work and immediately prior to final inspection, clean the entire project as follows:

1. Thoroughly clean, sweep, wash, and polish all work and equipment provided under the Contract, including finishes. Leave the structures and site in a complete and finished condition to the satisfaction of the ENGINEER.

2. Direct all subcontractors to similarly perform, at the same time, an equivalent thorough cleaning of all work and equipment provided under their contracts.

3. Remove all temporary structures and all debris, including dirt, sand, gravel, rubbish and waste material.

4. Should the CONTRACTOR not remove rubbish or debris or not clean the buildings and site as specified above, the OWNER reserves the right to have the cleaning done at the expense of the CONTRACTOR.

B. Employ experienced workers, or professional cleaners, for final cleaning.

C. Use only cleaning materials recommended by manufacturer of surface to be cleaned.

D. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces, and of concealed spaces.

E. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed interior and exterior finished surfaces. Polish surfaces so designated to shine finish.

F. Repair, patch, and touch up marred surfaces to specified finish, to match adjacent surfaces.

G. Remove snow and ice from access to buildings.

H. Replace air-handling filters if units were operated during construction.

I. Clean ducts, blowers, and coils, if air-handling units were operated without filters during construction.

J. Vacuum clean all interior spaces, including inside cabinets.

K. Handle materials in a controlled manner with as few handlings as possible. Do not drop or throw materials from heights.

L. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly-painted surfaces.

M. Clean interior of all panel cabinets, pull boxes, and other equipment enclosures.

N. Wash and wipe clean all lighting fixtures, lamps, and other electrical equipment which may have become soiled during installation.

O. Perform touch-up painting.

P. Broom clean exterior paved surfaces; rake clean other surfaces of the grounds.

Q. Remove erection plant, tools, temporary structures and other materials.

R. Remove and dispose of all water, dirt, rubbish or any other foreign substances.

1.3 FINAL INSPECTION

A. After cleaning is complete the final inspection may be scheduled. The inspection will be done with the OWNER and ENGINEER.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warranties.
4. Final cleaning.
5. Repair of the Work.

B. Related Requirements:

1. Section 01 78 23 “Operation and Maintenance Data” for additional operation and maintenance manual requirements.
2. Section 01 78 39 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
3. Section 01 79 00 "Demonstration and Training" for requirements to train the Owner's maintenance personnel to adjust, operate, and maintain products, equipment, and systems.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of cleaning agent.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

C. Certified List of Incomplete Items: Final submittal at final completion.

1.4 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.6 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor’s List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor’s punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of one week prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Engineer. Label with manufacturer's name and model number.

    a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance and material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Engineer’s signature for receipt of submittals.

5. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures prior to Substantial Completion: Complete the following a minimum of one week prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.

5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 01 79 00 "Demonstration and Training."
6. Advise Owner of changeover in utility services.
7. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
8. Complete final cleaning requirements.
9. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of seven days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Engineer, that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.7 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Section 01 29 00 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Engineer's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Engineer. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of one week prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order.
2. Include the following information at the top of each page:

a. Project name.
b. Date.
c. Name of Engineer.
d. Name of Contractor.
e. Page number.

3. Submit list of incomplete items in the following format:

a. MS Excel electronic file or PDF electronic file. Engineer will return annotated file.

1.9 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Engineer for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

C. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

1.10 COMMISSIONING BINDER

A. Upon completion of training for each equipment item, and prior to Final Completion, provide one (1) commissioning binder. Identify each section based on the equipment using heavy sections dividers with reinforced holes and numbered plastic index tabs. Use 3-ring, slant ring, hard-back binders, Type No. AVE-VS11 as manufactured by Avery Company, or equal. Binder size shall be 3-inch maximum. Punch all loose data for binding. Arrange composition and printing so that punching does not obliterate any data.

B. At a minimum for each section, i.e. equipment item, provide the following:

1. Certificate of Installation, Inspection and Start-up Services
2. Equipment Data Summary
3. Equipment Preventative Maintenance Summary
4. Manufacturer's Operating and Maintenance Instructions
5. Certificate of Instructional Services
6. Manufacturer's Start-up and Installation Checklists
7. Warranty

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected of a typical municipal water treatment building. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

    a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
    d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.

f. Remove labels that are not permanent.
g. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
h. Leave Project clean and ready for occupancy.

C. Construction Waste Disposal: Comply with waste disposal requirements in Section 01 50 00 "Temporary Facilities and Controls."

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair, or remove and replace, defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

END OF SECTION 01 77 00

SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory manuals.
2. Emergency manuals.
3. Systems and equipment operation manuals.
4. Systems and equipment maintenance manuals.
5. Product maintenance manuals.

B. Related Requirements:

1. Section 01 33 00 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
2. Section 01 79 00 "Demonstration and Training" for verification and compilation of data into operation and maintenance manuals.

1.3 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS

A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. Engineer and Owner will comment on whether content of operation and maintenance submittals is acceptable.
2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operation and maintenance manuals in the following format:

C. Initial Manual Submittal: Submit draft copy of each manual at 50% project completion in electronic PDF format. Do not submit O&M Manuals prior to shop drawing approval. Engineer will comment on whether general scope and content of manual are acceptable.

D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 30 days before commencing demonstration and training in electronic PDF format. Engineer will return copy with comments.

1. Correct or revise each manual to comply with Engineer's comments. Submit copies of each corrected manual within 10 days prior to commencing demonstration and training. Provide one digital copy, in PDF Format, and three hard copies of each manual.

E. Comply with Section 01 77 00 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.5 FORMAT OF MANUALS

A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

B. Manuals, Paper Copy: Submit manuals in the form of hard-copy, bound and labeled volumes.

1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

    a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
    b. Identify each binder on front and spine, with printed title, Project title or name, subject matter of contents, and indicate Specification Section number on bottom of spine. Indicate volume number for multiple-volume sets.

3. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

    a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
    b. If drawings are too large to be used as foldouts, fold, and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

1.6 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.

5. Name and contact information for Contractor.
6. Name and contact information for Engineer.
7. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents.

1.7 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY MANUAL

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals. List items and their location to facilitate ready access to desired information. Include the following:

1. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
2. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
3. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

1.8 EMERGENCY MANUALS

A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

B. Content: Organize manual into a separate section for each of the following:

1. Type of emergency.

2. Emergency instructions.
3. Emergency procedures.

C. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.
8. Chemical release or spill.

D. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

E. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Special operating instructions and procedures.

1.9 SYSTEMS AND EQUIPMENT OPERATION AND MAINTENANCE MANUALS

A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, routine and special operating procedures, manufacturers' maintenance documentation, preventative maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name, and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

C. Content: In addition to requirements in this Section, include operation and maintenance data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor has delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.
11. Manufacturers' Maintenance Documentation

D. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

E. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.

9. Special operating instructions and procedures.

F. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

G. Piped Systems: Diagram piping as installed and identify color coding where required for identification.

H. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:

1. Standard maintenance instructions, bulletins, and procedures; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

    a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

2. Maintenance and service schedules.
3. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
4. Identification and nomenclature of parts and components.
5. List of items recommended to be stocked as spare parts.
6. Warranties and Bonds

I. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

J. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

K. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

L. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

M. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1. Do not use original project record documents as part of maintenance manuals.

1.10 PRODUCT MAINTENANCE MANUALS

A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

C. Source Information: List each product included in manual, identified by product name, and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

D. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

E. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 78 23

TOWN OF SWEETSER, INDIANA

SWEETSER WASTEWATER IMPROVEMENTS

Equipment Data Summary

Equipment Tag: Specification Reference:

Manufacturer:

Name:

Address:

Telephone:

Number Supplied: Location/Service:

Model No: Serial No:

Type:

Size/Speed/Capacity/Range (as applicable):

Power Requirement (Phase/Volts/Hertz):

Local Representative:

Name:

Address:

Telephone:

NOTES:

TOWN OF SWEETSER, INDIANA

SWEETSER WASTEWATER IMPROVEMENTS

Preventive Maintenance Summary

Equipment Tag: Location:

Model No: Serial No:

Maintenance Task	Lubricant/Part	D W M Q SA A	O&M Manual Reference

NOTES:

*D-Daily W-Weekly M-Monthly Q-Quarterly SA-Semi-Annual A-Annual

(NO TEXT ON THIS PAGE)

SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.
4. Miscellaneous record submittals.

B. Related Requirements:

1. Section 01 73 00 "Execution" for final property survey
2. Section 01 77 00 "Closeout Procedures" for general closeout procedures.
3. Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.3 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit copies of Record Drawings as follows:

a. Initial Submittal:
   1) Submit PDF electronic files of scanned record prints.
   2) Engineer will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.

b. Final Submittal:

   1) Submit one paper-copy set of marked-up record prints
   2) Submit PDF electronic files of scanned record prints.
   3) Print each drawing, whether or not changes and additional information were recorded.

B. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit number of copies of each submittal as defined in the various Specification Sections.

1.4 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Accurately record information in an acceptable drawing technique.
c. Record data as soon as possible after obtaining it.
d. Record and check the markup before enclosing concealed installations.
e. Cross-reference record prints to corresponding photographic documentation.

2. Content: Types of items requiring marking include, but are not limited to, the following:

a. Dimensional changes to Drawings.
b. Revisions to details shown on Drawings.
c. Locations and depths of underground utilities.
d. Revisions to routing of piping and conduits.
e. Revisions to electrical circuitry.
f. Changes made by Change Order or Work Change Directive.
g. Changes made following Engineer's written orders.
h. Details not on the original Contract Drawings.
i. Field records for variable and concealed conditions.
j. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.

6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Format: Annotated PDF electronic file with comment function enabled.
3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
4. Identification: As follows:

a. Project name.
b. Date.
c. Designation "PROJECT RECORD DRAWINGS."
d. Name of Engineer.
e. Name of Contractor.

1.5 RECORD PRODUCT DATA

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturers' written instructions for installation.
3. Note related Change Orders and record Drawings where applicable.

1.6 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

1.7 MAINTENANCE OF RECORD DOCUMENTS

A. Maintenance of Record Documents: Store record documents in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Engineer's reference during normal working hours.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 78 39

SECTION 01 79 00 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Instruction in operation and maintenance of systems, subsystems, and equipment
2. Demonstration and training video recordings.

1.3 INFORMATIONAL SUBMITTALS

A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

B. Qualification Data: Submit for approval, credentials of equipment manufacturer representatives who are to be course instructors at least 15 days prior to the training sessions.

C. Attendance Record: For each training module, submit list of participants and length of instruction time.

D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.4 CLOSEOUT SUBMITTALS

A. Demonstration and Training Video Recordings: Submit one copy within seven days of end of each training module.

1. Identification: On each copy, provide an applied label with the following information:

    a. Name of Project.
    b. Name and address of videographer.
    c. Name of Engineer.
    d. Name of Contractor.
    e. Date of video recording.

2. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.
3. At completion of training, compile transcripts and submit complete training manual(s) for Owner's use prepared in both hard copy and electronic format required for operation and maintenance manuals specified in Section 01 78 23 "Operation and Maintenance Data."

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 01 40 00 "Quality Requirements," experienced in operation and maintenance procedures and training.

C. Videographer Qualifications: A professional videographer who is experienced photographing demonstration and training events.

1.6 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data have been reviewed and approved by Engineer.

1.7 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

    a. System, subsystem, and equipment descriptions.
    b. Performance and design criteria if Contractor is delegated design responsibility.
    c. Operating standards.
    d. Regulatory requirements.
    e. Equipment function.
    f. Operating characteristics.
    g. Limiting conditions.
    h. Performance curves.

2. Documentation: Review the following items in detail:

    a. Emergency manuals.
    b. Systems and equipment operation manuals.
    c. Systems and equipment maintenance manuals.
    d. Product maintenance manuals.
    e. Project Record Documents.
    f. Identification systems.
    g. Warranties and bonds.

3. Emergencies: Include the following, as applicable:

    a. Instructions on meaning of warnings, trouble indications, and error messages.
    b. Instructions on stopping.
    c. Shutdown instructions for each type of emergency.
    d. Operating instructions for conditions outside of normal operating limits.
    e. Sequences for electric or electronic systems.
    f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:

    a. Startup procedures.
    b. Equipment or system break-in procedures.

c. Routine and normal operating instructions.
d. Regulation and control procedures.
e. Control sequences.
f. Safety procedures.
g. Instructions on stopping.
h. Normal shutdown instructions.
i. Operating procedures for emergencies.
j. Operating procedures for system, subsystem, or equipment failure.
k. Seasonal and weekend operating instructions.
l. Required sequences for electric or electronic systems.
m. Special operating instructions and procedures.

5. Adjustments: Include the following:

a. Alignments.
b. Checking adjustments.
c. Noise and vibration adjustments.
d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:

a. Diagnostic instructions.
b. Test and inspection procedures.

7. Maintenance: Include the following:

a. Inspection procedures.
b. Types of cleaning agents to be used and methods of cleaning.
c. List of cleaning agents and methods of cleaning detrimental to product.
d. Procedures for routine cleaning.
e. Procedures for preventive maintenance.
f. Procedures for routine maintenance.
g. Instruction on use of special tools.

8. Repairs: Include the following:

a. Diagnosis instructions.
b. Repair instructions.
c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
d. Instructions for identifying parts and components.
e. Review of spare parts needed for operation and maintenance.

1.8 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 01 78 23 "Operation and Maintenance Data."

B. Set up instructional equipment at instruction location.

1.9 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. Owner will furnish Contractor with names and positions of participants.

C. Scheduling: Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with Owner, through Owner's operations staff with at least seven days' advance notice.

D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

E. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.

F. Cleanup: Collect used and leftover educational materials and give to Owner unless instructed otherwise. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

1.10 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.

1. At beginning of each training module, record each chart containing learning objective and lesson outline.

2. Perform hands-on training with operations staff to facilitate understanding of operation and maintenance activities. Hands-on training does not need to be recorded.

B. Digital Video Recordings: Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of 12 megapixels and capable of recording in full HD mode.

1. Submit video recordings on a USB thumb drive and upload a copy to the project ShareFile/FTP website.
2. File Hierarchy: Organize folder structure and file locations according to Project Manual table of contents. Provide complete screen-based menu.
3. File Names: Utilize file names based on name of equipment generally described in video segment, as identified in Project specifications.
4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the equipment demonstration and training recording that describes the following for each contractor involved on the Project, arranged according to Project Manual table of contents:

a. Name of Contractor/Installer.
b. Business address.
c. Business phone number.
d. Point of contact.
e. Email address.

C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.

1. Film training session(s) in segments not to exceed 15 minutes.

a. Produce segments to present a single significant piece of equipment per segment.
b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming, and pause training session. Begin training session again upon commencement of new filming segment.

D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.

1. Furnish additional portable lighting as required.

E. Transcript: Provide a transcript of the instruction module. Display images and running time captured from videotape opposite the corresponding training segment.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

3.1 TRAINING SESSIONS (As Applicable)

A. Conduct all training during regular hours on weekdays and coordinate the scheduling of all training with the Owner.

B. Perform training utilizing actual equipment in service. Use of equipment for training will not void manufacturers' or contract warranties.

END OF SECTION 01 79 00

CERTIFICATE OF INSTRUCTIONAL SERVICES

Project: _____

Equipment: _____

Specification Section: _____

I hereby certify the equipment Manufacturers' Representative has instructed Owner's personnel in startup operation and maintenance of this equipment as required in the Contract Documents.

Manufacturer's Representative

Signature _____

Name: (print) _____

Title: _____

Representing _____

Contractor

Signature _____ Date _____

Name (print) _____

Title _____

Owner

Signature _____ Date _____

Name (print) _____

Title _____

Comments:

Complete and submit this form to Engineer upon completion of training as required by Specification Section 01 79 00.

SECTION 02 41 19 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Demolition and removal of selected site elements.
2. Salvage of existing items to be reused or recycled.

B. Related Requirements:

1. Section 01 10 00 "Summary" for restrictions on the use of the premises, Owner-occupancy requirements, and phasing requirements.
2. Section 01 50 00 “Temporary Facilities and Controls” for the preconstruction video.
3. Section 01 73 00 "Execution" for cutting and patching procedures.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner.

C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 REFERENCES

A. Codes and standards referred to in this Section are:

1.	ANSI/ASSE A10.6	-	Safety & Health Program Requirements for Demolition Operations
2.	NFPA 241	-	Standard for Safeguarding Construction, Alteration, and Demolition Operations

1.5 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.6 INFORMATIONAL SUBMITTALS

A. Demolition Plan

1. Include Proposed Protection Measures: Submit plan that indicates the measures proposed for protecting individuals, property, and adjacent buildings, for dust control and, for noise control. Indicate proposed locations and construction of barriers.

2. Plan should provide the most expeditious dismantling of the structure safely feasible to minimize the duration of time partially standing structures remain.

B. Preconstruction/Predemolition Photographs or Video: Submit before Work begins.

C. Contractor shall provide thorough and complete written documentation of demolition. The documentation shall include a description of the material, date of removal, and date of delivery to the receiving facility if requested. The documentation shall include the written verification of the receiving facility.

1.7 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

B. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes if required.

1.8 FIELD CONDITIONS

A. Owner will occupy portions of building adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Notify Engineer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

C. Hazardous Materials: If suspected hazardous materials are encountered, do not disturb; immediately notify Engineer and Owner. They will be removed by Owner under a separate contract.

D. Storage or sale of removed items or materials on-site is not permitted.

E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

PART 2 - PRODUCTS

2.1 PEFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.

C. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Engineer.

3.2 DAMAGE SURVEY.

A. Requirements: Conduct a damage survey of the Work site and adjacent properties prior to commencing the Work and before making application for final payment for the Work. Owner shall be present during the videotaping. Provide Owner with two copies of the videotaping on USB drives. Record all planned construction areas, material storage areas, areas adjacent to these areas, including but not limited to, farmland, streets, driveways, sidewalks, curbs, ditches, fencing, railing, visible utilities, retaining structures, landscaping and trees, and adjacent building structures. The purpose of the video is to document existing site conditions and to provide a fair measure of required restoration. Care should be taken to record all existing conditions which exhibit deterioration, imperfections, structural failures, or situations that would be considered substandard. The video image shall be of sufficient detail to delineate important features and conditions of the project area including public right-of-way and adjacent private property.

B. No recording shall be performed during periods of precipitation, mist, fog or when the ground is covered in snow. The recording shall only be done when sufficient sunlight is present to properly illuminate the subjects of recording. The audio portion of the recording shall reproduce precise and concise explanatory notes by the camera operator with proper volume, clarity and freedom from distortion.

C. At the start of production and at the beginning of a new street, building or basement, an identification summary shall be read into the recording while using a wide-angle view of the video to display numeric displays for visual record. This summary shall include:
   1. Tape number
   2. Project name
   3. Job location
   4. Positional location at start of job
   5. Date and time
   6. Weather
   7. Direction of camera
   8. Any other notable conditions

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

   1. Comply with requirements for existing services/systems interruptions specified in Section 01 10 00 "Summary."

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3.4 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Comply with requirements for access and protection specified in Section 01 50 00 "Temporary Facilities and Controls."

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect furniture, furnishings, and equipment that have not been removed.
5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 01 50 00 "Temporary Facilities and Controls."

C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

3.5 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
3. Do not use cutting torches.
4. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials.
5. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
6. Dispose of demolished items and materials promptly.

B. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area as designated by Owner.
5. Protect items from damage during transport and storage.

C. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Engineer, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them at the expense of the Contractor. The Contractor shall bear full responsibility for any and all fines against the project resulting from improper handling and disposal of the waste materials.

3.7 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 02 41 19

(NO TEXT FOR THIS PAGE)

SECTION 03 10 00 - CONCRETE FORMING AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Form-facing material for cast-in-place concrete.
2. Form liners.
3. Shoring, bracing, and anchoring.

B. Build America, Buy America (BABA) Compliance:

1. Concrete forming systems, panels, form liners, and accessories provided under this Section shall comply with Build America, Buy America (BABA) provisions for manufactured products and be domestically produced.
2. Metal formwork accessories (ties, brackets, clamps, and other iron/steel components) shall comply with BABA provisions for iron and steel, with all manufacturing processes occurring in the United States.

1.2 DEFINITIONS

A. Form-Facing Material: Temporary structure or mold for the support of concrete while the concrete is setting and gaining sufficient strength to be self-supporting.

B. Formwork: The total system of support of freshly placed concrete, including the mold or sheathing that contacts the concrete, as well as supporting members, hardware, and necessary bracing.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at project site.

1. Review the following:

a. Special inspection and testing and inspecting agency procedures for field quality control.
b. Construction, movement, contraction, and isolation joints
c. Forms and form-removal limitations.
d. Shoring and reshoring procedures.
e. Anchor rod and anchorage device installation tolerances.

1.4 ACTION SUBMITTALS

A. Product Data: For each of the following:

1. Exposed surface form-facing material.
2. Concealed surface form-facing material.
3. Forms for cylindrical columns.
4. Pan-type forms.
5. Void forms.
6. Form ties.
7. Form-release agent.

B. Shop Drawings: Prepared by, and signed and sealed by, a qualified professional engineer responsible for their preparation, detailing fabrication, assembly, and support of forms.

1. For exposed vertical concrete walls, indicate dimensions and form tie locations.
2. Indicate dimension and locations of construction and movement joints required to construct the structure in accordance with ACI 301.

    a. Location of construction joints is subject to approval of the Architect.

3. Indicate form liner layout and form line termination details.
4. Indicate proposed schedule and sequence of stripping of forms, shoring removal, and reshoring installation and removal.
5. Indicate layout of insulating concrete forms, dimensions, course heights, form types, and details.

C. Certificate of compliance for Build America, Buy America.

1. Submit manufacturer’s certificate or contractor’s letter confirming that all concrete forming systems and accessories furnished under this Section comply with Build America, Buy America (BABA) requirements.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing and inspection agency.

B. Field quality-control reports.

C. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

A. Testing and Inspection Agency Qualifications: An independent agency, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Concrete Formwork: Design, engineer, erect, shore, brace, and maintain formwork, shores, and reshores in accordance with ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads, so that resulting concrete conforms to the required shapes, lines, and dimensions.

1. Design wood panel forms in accordance with APA's "Concrete Forming Design/Construction Guide."
2. Design formwork to limit deflection of form-facing material to 1/240 of center-to-center spacing of supports.

    a. For architectural concrete specified in Section 033300 "Architectural Concrete," limit deflection of form-facing material, studs, and walers to 0.0025 times their respective clear spans (L/400).

2.2 FORM-FACING MATERIALS

A. As-Cast Surface Form-Facing Material:

1. Provide continuous, true, and smooth concrete surfaces.
2. Furnish in largest practicable sizes to minimize number of joints.
3. Acceptable Materials: As required to comply with Surface Finish designations specified in Section 033000 "Cast-In-Place Concrete, and as follows:

    a. Plywood, metal, or other approved panel materials.
    b. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:

        1) APA HDO (high-density overlay).
        2) APA MDO (medium-density overlay); mill-release agent treated and edge sealed.
        3) APA Structural 1 Plyform, B-B or better; mill oiled and edge sealed.
        4) APA Plyform Class I, B-B or better; mill oiled and edge sealed.

B. Concealed Surface Form-Facing Material: Lumber, plywood, metal, plastic, or another approved material.

1. Provide lumber dressed on at least two edges and one side for tight fit.

2.3 RELATED MATERIALS

A. Reglets: Fabricate reglets of not less than 0.022-inch- thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

B. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.

D. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.

E. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
2. Form release agent for form liners shall be acceptable to form liner manufacturer.

F. Form Ties: Factory-fabricated, removable or snap-off, glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

PART 3 - EXECUTION

3.1 INSTALLATION OF FORMWORK

A. Comply with ACI 301.

B. Construct formwork, so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 and to comply with the Surface Finish designations specified in Section 033000 "Cast-In-Place Concrete" for as-cast finishes.

C. Limit concrete surface irregularities as follows:

1. Surface Finish-1.0: ACI 117 Class D, 1 inch.
2. Surface Finish-2.0: ACI 117 Class B, 1/4 inch.
3. Surface Finish-3.0: ACI 117 Class A, 1/8 inch.

D. Construct forms tight enough to prevent loss of concrete mortar.

1. Minimize joints.
2. Exposed Concrete: Symmetrically align joints in forms.

E. Construct removable forms for easy removal without hammering or prying against concrete surfaces.

1. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces.
2. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
3. Install keyways, reglets, recesses, and other accessories, for easy removal.

F. Do not use rust-stained, steel, form-facing material.

G. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces.

1. Provide and secure units to support screed strips
2. Use strike-off templates or compacting-type screeds.

H. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible.

1. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar.
2. Locate temporary openings in forms at inconspicuous locations.

I. Chamfer exterior corners and edges of permanently exposed concrete.

J. At construction joints, overlap forms onto previously placed concrete not less than 12 inches.

K. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work.

1. Determine sizes and locations from trades providing such items.
2. Obtain written approval of Architect prior to forming openings not indicated on Drawings.

L. Construction and Movement Joints:

1. Construct joints true to line with faces perpendicular to surface plane of concrete.
2. Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
3. Place joints perpendicular to main reinforcement.
4. Locate joints for beams, slabs, joists, and girders in the middle third of spans.

    a. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.

5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.

6. Space vertical joints in walls as indicated on Drawings.

    a. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.

M. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection.

1. Locate ports and openings in bottom of vertical forms, in inconspicuous location, to

allow flushing water to drain.

2. Close temporary ports and openings with tight-fitting panels, flush with inside face of form, and neatly fitted, so joints will not be apparent in exposed concrete surfaces.

N. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

O. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

P. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 INSTALLATION OF EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete.

1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.
3. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
4. Install dovetail anchor slots in concrete structures, as indicated on Drawings.
5. Clean embedded items immediately prior to concrete placement.

3.3 INSTALLATION OF INSULATING CONCRETE FORMS

A. Comply with ACI 301 and manufacturer's instructions.

B. Construct formwork, so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Install forms in running bond pattern.

1. Align joints.
2. Align furring strips.

D. Construct forms tight to prevent loss of concrete mortar.

E. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work.

1. Determine sizes and locations from trades providing such items.
2. Obtain written approval of Architect prior to forming openings not indicated on

Drawings.

F. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection.

1. Locate ports and openings in bottom of vertical forms, in inconspicuous location, to allow flushing water to drain.
2. Close temporary ports and openings with tight fitting panels, flush with inside face of form, and neatly fitted, so joints will not be apparent in exposed concrete surfaces.

G. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

H. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

I. Shore insulating concrete forms to ensure stability and to resist stressing imposed by construction loads.

3.4 REMOVING AND REUSING FORMS

A. Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that support weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. Clean and repair surfaces of forms to be reused in the Work.

1. Split, frayed, delaminated, or otherwise damaged form-facing material are unacceptable for exposed surfaces.
2. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints.

1. Align and secure joints to avoid offsets.
2. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.5 SHORING AND RESHORING INSTALLATION

A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring.

1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Contractor will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

B. Inspections:

1. Inspect formwork for shape, location, and dimensions of the concrete member being formed.
2. Inspect insulating concrete forms for shape, location, and dimensions of the concrete member being formed.

END OF SECTION 03 10 00

SECTION 03 20 00 - CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel reinforcement bars.
2. Welded-wire reinforcement.

B. Related Requirements:

1. Section 033000 "Cast-in-place Concrete" for reinforcing related to cast-in-place concrete.

C. Build America, Buy America compliance:

1. All reinforcing steel and related accessories furnished under this Section shall comply with Build America, Buy America (BABA) requirements and be domestically manufactured.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review the following:

a. Construction contraction and isolation joints.
b. Steel-reinforcement installation.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Each type of steel reinforcement.
2. Bar supports.
3. Mechanical splice couplers.

B. Shop Drawings: Comply with ACI SP-066:

1. Include placing drawings that detail fabrication, bending, and placement.
2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.

3. For structural thermal break insulated connection system, indicate general configuration, insulation dimensions, tension bars, compression pads, shear bars, and dimensions.

C. Construction Joint Layout: Indicate proposed construction joints required to build the structure.

1. Location of construction joints is subject to approval of Engineer.

D. Certificate of compliance for Build America, Buy America.

1. Submit manufacturer's certificate or contractor's letter confirming that all concrete masonry units, steel accessories, and non-steel masonry accessories furnished under this Section comply with Build America, Buy America (BABA) requirements.

1.4 INFORMATIONAL SUBMITTALS

A. Welding certificates.

1. Reinforcement To Be Welded: Welding procedure specification in accordance with AWS D1.4/D1.4M.

B. Material Test Reports: For the following, from a qualified testing agency:

1. Steel Reinforcement:

a. For reinforcement to be welded, mill test analysis for chemical composition and carbon equivalent of the steel in accordance with ASTM A706/A706M.

2. Mechanical splice couplers.

C. Field quality-control reports.

D. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

B. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.4/D 1.4M.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

1. Store reinforcement to avoid contact with earth.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A615/A615M, Grade 60 (Grade 420), deformed.

B. Low-Alloy Steel Reinforcing Bars: ASTM A706/A706M, deformed.

C. Headed-Steel Reinforcing Bars: ASTM A970/A970M.

D. Plain-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from as-drawn steel wire into flat sheets.

E. Deformed-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, flat sheet.

2.2 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A615/A615M, Grade 60 (Grade 420), plain-steel bars, cut true to length with ends square and free of burrs.

B. Epoxy-Coated Joint Dowel Bars: ASTM A615/A615M, Grade 60 (Grade 420), plain-steel bars, ASTM A775/A775M epoxy coated.

C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.

1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

a. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.

D. Mechanical Splice Couplers: ACI 318 (ACI 318M) Type 1 same material of reinforcing bar being spliced; compression-only type, tension-compression type, dowel-bar type, mechanical-lap type.

1. Finish: compatible with steel reinforcement.

2.3 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

PART 3 - EXECUTION

3.1 PREPARATION

A. Protection of In-Place Conditions:

1. Do not cut or puncture vapor retarder.
2. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

3.2 INSTALLATION OF STEEL REINFORCEMENT

A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.

B. Accurately position, support, and secure reinforcement against displacement.

1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
2. Do not tack weld crossing reinforcing bars.

C. Preserve clearance between bars of not less than 1 inch (25 mm), not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.

D. Provide concrete coverage in accordance with ACI 318 (ACI 318M).

E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

F. Splices: Lap splices as indicated on Drawings.

1. Bars indicated to be continuous, and all vertical bars to be lapped not less than 36 bar diameters at splices, or 24 inches (610 mm), whichever is greater.
2. Stagger splices in accordance with ACI 318 (ACI 318M).
3. Mechanical Splice Couplers: Install in accordance with manufacturer's instructions.
4. Weld reinforcing bars in accordance with AWS D1.4/D 1.4M, where indicated on Drawings.

G. Install welded-wire reinforcement in longest practicable lengths.

1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice."

a. For reinforcement less than W4.0 or D4.0, continuous support spacing to not exceed 12 inches (305 mm).

2. Lap edges and ends of adjoining sheets at least one wire spacing plus 2 inches (50 mm) for plain wire and 8 inches (200 mm) for deformed wire.

3. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.
4. Lace overlaps with wire.

3.3 JOINTS

A. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Engineer.

1. Place joints perpendicular to main reinforcement.
2. Continue reinforcement across construction joints unless otherwise indicated.
3. Do not continue reinforcement through sides of strip placements of floors and slabs.

B. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length, to prevent concrete bonding to one side of joint.

3.4 INSTALLATION TOLERANCES

A. Comply with ACI 117 (ACI 117M).

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Contractor will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

B. Inspections:

1. Steel-reinforcement placement.
2. Steel-reinforcement mechanical splice couplers.
3. Steel-reinforcement welding.

END OF SECTION 03 20 00

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cast-in-place concrete, including concrete materials, mixture design, placement procedures, and finishes.

B. Related Requirements:

1. Section 031000 "Concrete Forming and Accessories" for form-facing materials, form liners, and insulating concrete forms,
2. Section 032000 "Concrete Reinforcing" for steel reinforcing bars and welded-wire

C. Build America, Buy America compliance:

1. All cast-in-place concrete furnished under this Section shall comply with Build America, Buy America (BABA) provisions for construction materials, with final batching and production occurring in the United States.
2. Steel reinforcement embedded in the concrete shall comply with Build America, Buy America (BABA) provisions for iron and steel, with all manufacturing processes occurring domestically.
3. Chemical admixtures and specialty concrete additives (e.g., plasticizers, crystalline waterproofing admixtures) shall comply with Build America, Buy America (BABA) provisions for manufactured products, unless a federally approved waiver is documented.

1.2 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:

a. Contractor's superintendent.
b. Independent testing agency responsible for concrete design mixtures.
c. Ready-mix concrete manufacturer.
d. Concrete Subcontractor.
e. Special concrete finish Subcontractor.

2. Review the following:

a. Special inspection and testing and inspecting agency procedures for field quality control.
b. Construction joints, control joints, isolation joints, and joint-filler strips.
c. Semirigid joint fillers.
d. Vapor-retarder installation.
e. Anchor rod and anchorage device installation tolerances.
f. Cold and hot weather concreting procedures.
g. Concrete finishes and finishing.
h. Curing procedures.
i. Forms and form-removal limitations.
j. Shoring and reshoring procedures.
k. Methods for achieving specified floor and slab flatness and levelness.
l. Floor and slab flatness and levelness measurements.
m. Concrete repair procedures.
n. Concrete protection.
o. Initial curing and field curing of field test cylinders (ASTM C31/C31M.)
p. Protection of field cured field test cylinders.

1.4 ACTION SUBMITTALS

A. Product Data: For each of the following.

1. Portland cement.
2. Fly ash.
3. Slag cement.
4. Blended hydraulic cement.
5. Silica fume.
6. Performance-based hydraulic cement
7. Aggregates.
8. Admixtures:

a. Include limitations of use, including restrictions on cementitious materials, supplementary cementitious materials, air entrainment, aggregates, temperature at time of concrete placement, relative humidity at time of concrete placement, curing conditions, and use of other admixtures.

9. Color pigments.
10. Fiber reinforcement.
11. Vapor retarders.
12. Floor and slab treatments.

13. Liquid floor treatments.
14. Curing materials.

    a. Include documentation from color pigment manufacturer, indicating that proposed methods of curing are recommended by color pigment manufacturer.

15. Joint fillers.
16. Repair materials.

B. Design Mixtures: For each concrete mixture, include the following:

1. Mixture identification.
2. Minimum 28-day compressive strength.
3. Durability exposure class.
4. Maximum w/cm.
5. Calculated equilibrium unit weight, for lightweight concrete.
6. Slump limit.
7. Air content.
8. Nominal maximum aggregate size.
9. Steel-fiber reinforcement content.
10. Synthetic micro-fiber content.
11. Indicate amounts of mixing water to be withheld for later addition at Project site if permitted.
12. Include manufacturer's certification that permeability-reducing admixture is compatible with mix design.
13. Include certification that dosage rate for permeability-reducing admixture matches dosage rate used in performance compliance test.
14. Intended placement method.
15. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

C. Shop Drawings:

1. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.

    a. Location of construction joints is subject to approval of the Architect.

D. Samples: For vapor retarder.

E. Concrete Schedule: For each location of each Class of concrete indicated in "Concrete Mixtures" Article, including the following:

1. Concrete Class designation.
2. Location within Project.
3. Exposure Class designation.
4. Formed Surface Finish designation and final finish.
5. Final finish for floors.
6. Curing process.

7. Floor treatment if any.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For the following:

1. Installer: Include copies of applicable ACI certificates.
2. Ready-mixed concrete manufacturer.
3. Testing agency: Include copies of applicable ACI certificates.

B. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Fiber reinforcement.
4. Curing compounds.
5. Floor and slab treatments.
6. Bonding agents.
7. Adhesives.
8. Vapor retarders.
9. Semirigid joint filler.
10. Joint-filler strips.
11. Repair materials.

C. Material Test Reports: For the following, from a qualified testing agency:

1. Portland cement.
2. Fly ash.
3. Slag cement.
4. Aggregates.
5. Admixtures:

a. Permeability-Reducing Admixture: Include independent test reports, indicating compliance with specified requirements, including dosage rate used in test.

D. Floor surface flatness and levelness measurements report, indicating compliance with specified tolerances.

E. Research Reports:

1. For concrete admixtures in accordance with ICC's Acceptance Criteria AC198.
2. For sheet vapor retarder/termite barrier, showing compliance with ICC AC380.

F. Preconstruction Test Reports: For each mix design.

G. Field quality-control reports.

H. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs Project personnel qualified as an ACI-certified Flatwork Technician and Finisher and a supervisor who is a certified ACI Flatwork Concrete Finisher/Technician or an ACI Concrete Flatwork Technician.

1. Post-Installed Concrete Anchors Installers: ACI-certified Adhesive Anchor Installer.

B. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.

1. Manufacturer certified in accordance with NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

C. Laboratory Testing Agency Qualifications: A testing agency qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated and employing an ACI-certified Concrete Quality Control Technical Manager.

1. Personnel performing laboratory tests to be an ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor to be an ACI-certified Concrete Laboratory Testing Technician, Grade II.

D. Field Quality-Control Testing Agency Qualifications: An independent agency qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

1. Personnel conducting field tests to be qualified as an ACI Concrete Field Testing Technician, Grade 1, in accordance with ACI CPP 610.1 or an equivalent certification program.

1.7 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on each concrete mixture.

1. Include the following information in each test report:

a. Admixture dosage rates.
b. Slump.
c. Air content.
d. Seven-day compressive strength.
e. 28-day compressive strength.
f. Permeability.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with ASTM C94/C94M and ACI 301 (ACI 301M).

1.9 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 301 (ACI 301 M) and ACI 306.1 and as follows.

1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
2. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301 (ACI 301 M).
3. Do not use frozen materials or materials containing ice or snow.
4. Do not place concrete in contact with surfaces less than 35 deg F (1.7 deg C), other than reinforcing steel.
5. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301 (ACI 301 M) and ACI 305.1 (ACI 305.1 M), and as follows:

1. Maintain concrete temperature at time of discharge to not exceed 95 deg F (35 deg C).
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

1.10 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to furnish replacement sheet vapor retarder/termite barrier material and accessories for sheet vapor retarder/ termite barrier and accessories that do not comply with requirements or that fail to resist penetration by termites within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with ACI 301 (ACI 301 M) unless modified by requirements in the Contract Documents.

2.2 CONCRETE MATERIALS

A. Source Limitations:

1. Obtain all concrete mixtures from a single ready-mixed concrete manufacturer for entire Project.
2. Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant.
3. Obtain aggregate from single source.
4. Obtain each type of admixture from single source from single manufacturer.

B. Cementitious Materials:

1. Portland Cement: ASTM C150/C150M, Type I or Type III.
2. Fly Ash: ASTM C618, Class C or F.
3. Slag Cement: ASTM C989/C989M, Grade 100 or 120.

C. Normal-Weight Aggregates: ASTM C33/C33M, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source.

1. Alkali-Silica Reaction: Comply with one of the following:

   a. Expansion Result of Aggregate: Not more than 0.04 percent at one-year when tested in accordance with ASTM C1293.
   b. Expansion Results of Aggregate and Cementitious Materials in Combination: Not more than 0.10 percent at an age of 16 days when tested in accordance with ASTM C1567.
   c. Alkali Content in Concrete: Not more than 4 lb./cu. yd. (2.37 kg/cu/ m) for moderately reactive aggregate or 3 lb./cu. yd. (1.78 kg/cu. m) for highly reactive aggregate, when tested in accordance with ASTM C1293 and categorized in accordance with ASTM C1778, based on alkali content being calculated in accordance with ACI 301 (ACI 301 M).

2. Maximum Coarse-Aggregate Size: 3/4 inch (19mm) nominal.
3. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

D. Air-Entraining Admixture: ASTM C260/C260M.

E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
2. Retarding Admixture: ASTM C494/C494M, Type B.
3. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.

   a. Basis of Design: MAPEI Dynamon SX 37 or an approved equivalent.
5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.
7. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier

and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C494/C494M, Type C.

8. Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.

F. Water and Water Used to Make Ice: ASTM C94/C94M, potable.

2.3 FIBER REINFORCEMENT

A. Synthetic Monofilament Micro-Fiber: Monofilament polypropylene micro-fibers engineered and designed for use in concrete, complying with ASTM C1116/C1116M, Type III, 1/2 to 1-1/2 inches (13 to 38 mm) long.

B. Synthetic Macro-Fiber: Synthetic macro-fibers engineered and designed for use in concrete, complying with ASTM C1116/C1116M, Type III, 1 to 2-1/4 inches (25 to 57 mm) long.

1. Basis of Design: MAPEI Mapefibre ST 42 or an approved equivalent.

2.4 VAPOR RETARDERS

A. Sheet Vapor Retarder, Class A: ASTM E1745, Class A; not less than 10 mils (0.25 mm) thick. Include manufacturer's recommended adhesive or pressure-sensitive tape.

2.5 LIQUID FLOOR TREATMENTS

A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.

1. Basis of Design: Curecrete Distribution Inc.; Ashford Formula. Provide indicated product, or comparable by the following:

    a. Dayton Superior Corporation; Day-Chem Sure Hard (J-17)
    b. Euclid Chemical Company (The), an RPM company; Euco Diamond Hard.
    c. L&M Construction Chemicals, Inc.; Seal Hard.
    d. Symons by Dayton Superior; Buff Hard.

2.6 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.

C. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.

1. Color:

a. Ambient Temperature Below 50 deg F (10 deg C): Black.
b. Ambient Temperature between 50 deg F (10 deg C) and 85 deg F (29 deg C): Any color.
c. Ambient Temperature Above 85 deg F (29 deg C): White.

D. Water: Potable or complying with ASTM C1602/C1602M.

E. Clear, Waterborne, Membrane-Forming, Dissipating Curing Compound: ASTM C309, Type 1, Class B, certified by curing compound manufacturer to not interfere with bonding of floor covering.

2.7 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber.

B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, in accordance with ASTM D2240.

C. Bonding Agent: ASTM C1059/C1059M, Type II, non-re-dispersible, acrylic emulsion or styrene butadiene.

D. Epoxy Bonding Adhesive: ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade and class to suit requirements, and as follows:

1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

E. Floor Slab Protective Covering: 8-feet- (2438 mm) wide cellulose fabric.

2.8 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3 mm) and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C150/C150M Portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.

3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm) or coarse sand, as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 5000 psi (29 MPa) at 28 days when tested in accordance with ASTM C109/C109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch (6 mm) and that can be filled in over a scarified surface to match adjacent floor elevations.

1. Cement Binder: ASTM C150/C150M Portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi (34.5 MPa) at 28 days when tested in accordance with ASTM C109/C109M.

2.9 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301 (ACI 301M).

1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than Portland cement in concrete as follows:

1. Fly Ash or Other Pozzolans: 25 percent by mass.
2. Slag Cement: 50 percent by mass.
3. Silica Fume: 10 percent by mass.
4. Total of Fly Ash or Other Pozzolans, Slag Cement, and Silica Fume: 50 percent by mass, with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.
5. Total of Fly Ash or Other Pozzolans and Silica Fume: 35 percent by mass with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.

C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.

1. Use water-reducing, high-range water-reducing, or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete and concrete with a w/cm below 0.50.
4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.
5. Use permeability-reducing admixture in concrete mixtures where indicated.

D. Color Pigment: Add color pigment to concrete mixture in accordance with manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

2.10 CONCRETE MIXTURES

A. Concrete Class: As indicated on the Drawings.

2.11 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M, and furnish batch ticket information.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete in accordance with ASTM C94/C94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixer capacity of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least 1-1/2 minutes, but not more than five minutes after ingredients are in mixer, before any part of batch is released.
2. For mixer capacity larger than 1 cu. yd. (0.76 cu. m), increase mixing time by 15 seconds for each additional 1 cu. yd. (0.76 cu. m).
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:

1. Before placing concrete, verify that installation of concrete forms, accessories, and reinforcement, and embedded items is complete and that required inspections have been performed.
2. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:

1. Daily access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Secure space for storage, initial curing, and field curing of test samples, including source of water and continuous electrical power at Project site during site curing period for test samples.

4. Security and protection for test samples and for testing and inspection equipment at Project site.

3.3 INSTALLATION OF EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.

1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI/AISC 303.
3. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

3.4 INSTALLATION OF VAPOR RETARDER

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.

1. Install vapor retarder with longest dimension parallel with direction of concrete pour.
2. Face laps away from exposed direction of concrete pour.
3. Lap vapor retarder over footings and grade beams not less than 6 inches (150 mm), sealing vapor retarder to concrete.
4. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.
5. Terminate vapor retarder at the top of floor slabs, grade beams, and pile caps, sealing entire perimeter to floor slabs, grade beams, foundation walls, or pile caps.
6. Seal penetrations in accordance with vapor retarder manufacturer's instructions.
7. Protect vapor retarder during placement of reinforcement and concrete.

    a. Repair damaged areas by patching with vapor retarder material, overlapping damages area by 6 inches (150 mm) on all sides, and sealing to vapor retarder.

3.5 JOINTS

A. Construct joints true to line, with faces perpendicular to surface plane of concrete.

B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.

1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.
2. Place joints perpendicular to main reinforcement.

    a. Continue reinforcement across construction joints unless otherwise indicated.

b. Do not continue reinforcement through sides of strip placements of floors and slabs.

3. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
4. Locate joints for beams, slabs, joists, and girders at third points of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
6. Space vertical joints in walls as indicated on Drawings. Unless otherwise indicated on Drawings, locate vertical joints beside piers integral with walls, near corners, and in concealed locations where possible.
7. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
8. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Control Joints in Slabs-on-Ground: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Grooved Joints: Form control joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3.2 mm). Repeat grooving of control joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.

D. Isolation Joints in Slabs-on-Ground: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated on Drawings.
2. Terminate full-width joint-filler strips not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished concrete surface, where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Doweled Joints:

1. Install dowel bars and support assemblies at joints where indicated on Drawings.
2. Lubricate or asphalt coat one-half of dowel bar length to prevent concrete bonding to one side of joint.

F. Dowel Plates: Install dowel plates at joints where indicated on Drawings.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.

1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.

B. Notify Architect and testing and inspection agencies 24 hours prior to commencement of concrete placement.

C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect in writing, but not to exceed the amount indicated on the concrete delivery ticket.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301 (ACI 301M), but not to exceed the amount indicated on the concrete delivery ticket.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

E. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.

1. If a section cannot be placed continuously, provide construction joints as indicated.
2. Deposit concrete to avoid segregation.
3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301 (ACI 301M).

    a. Do not use vibrators to transport concrete inside forms.
    b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer.
    c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
    d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

F. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Do not place concrete floors and slabs in a checkerboard sequence.
2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
3. Maintain reinforcement in position on chairs during concrete placement.
4. Screed slab surfaces with a straightedge and strike off to correct elevations.
5. Level concrete, cut high areas, and fill low areas.
6. Slope surfaces uniformly to drains where required.
7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
8. Do not further disturb slab surfaces before starting finishing operations.

3.7 FINISHING FORMED SURFACES

A. As-Cast Surface Finishes:

1. ACI 301 Surface Finish SF-3.0:

    a. Patch voids larger than 3/4 inch (19 mm) wide or 1/2 inch (13 mm) deep.
    b. Remove projections larger than 1/8 inch (3 mm).
    c. Patch tie holes.
    d. Surface Tolerance: ACI 117 (ACI 117M) Class A.
    e. Locations: Apply to concrete surfaces exposed to public view, to receive a rubbed finish, or to be covered with a coating or covering material applied directly to concrete.

2. Grout-Cleaned Rubbed Finish:

    a. Clean concrete surfaces after contiguous surfaces are completed and accessible.
    b. Do not clean concrete surfaces as Work progresses.
    c. Mix 1 part Portland cement to 1-1/2 parts fine sand, complying with ASTM C144 or ASTM C404, by volume, with sufficient water to produce a mixture with the consistency of thick paint. Add white Portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces.
    d. Wet concrete surfaces.
    e. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap, and keep surface damp by fog spray for at least 36 hours.
    f. Maintain required patterns or variances as shown on Drawings or to match field sample panels.

3. Cork-Floated Finish:

    a. Mix 1 part Portland cement to 1 part fine sand, complying with ASTM C144 or ASTM C404, by volume, with sufficient water to produce a mixture with the consistency of thick paint.
    b. Mix 1 part Portland cement and 1 part fine sand with sufficient water to produce a mixture of stiff grout. Add white Portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces.
    c. Wet concrete surfaces.

d. Compress grout into voids by grinding surface.
e. In a swirling motion, finish surface with a cork float.
f. Maintain required patterns or variances as shown on Drawings or to match field sample panels.

4. Scrubbed Finish: After concrete has achieved a compressive strength from 1000 to 1500 psi (6.9 to 10.3 MPa), apply scrubbed finish.

a. Wet concrete surfaces thoroughly and scrub with stiff fiber or wire brushes, using water freely, until top mortar surface is removed, and aggregate is uniformly exposed.
b. Rinse scrubbed surfaces with clean water.
c. Maintain continuity of finish on each surface or area of work.
d. Remove only enough concrete mortar from surfaces to field sample panels

B. Related Unformed Surfaces:

1. At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a color and texture matching adjacent formed surfaces.
2. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.8 FINISHING FLOORS AND SLABS

A. Comply with ACI 302.1R recommendations for screeding, re-straightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Float Finish:

1. When bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operation of specific float apparatus, consolidate concrete surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats.
2. Repeat float passes and re-straightening until surface is left with a uniform, smooth, granular texture and complies with ACI 117 (ACI A117M) tolerances for conventional concrete.
3. Apply float finish to surfaces to receive trowel finish and to be covered with fluid-applied or sheet waterproofing.

C. Trowel Finish:

1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
2. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.
3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
4. Do not add water to concrete surface.

5. Do not apply hard-troweled finish to concrete, which has a total air content greater than 3 percent.
6. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
7. Finish surfaces to the following tolerances, in accordance with ASTM E1155 (ASTM E1155M), for a randomly trafficked floor surface:

    a. Slabs on Ground:
        1) Specified overall values of flatness, F_F 45; and of levelness, F_L 35; with minimum local values of flatness, F_F 30; and of levelness, F_L 24.

    b. Suspended Slabs:
        1) Specified overall values of flatness, F_F 45; and of levelness, F_L 35; with minimum local values of flatness, F_F 30; and of levelness, F_L 24.

D. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated on Drawings. While concrete is still plastic, slightly scarify surface with a fine broom perpendicular to main traffic route.

1. Coordinate required final finish with Architect before application.
2. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

E. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and locations indicated on Drawings.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.
2. Coordinate required final finish with Architect before application.

F. Slip-Resistive Finish: Before final floating, apply slip-resistive aggregate finish to concrete stair treads, platforms, ramps as indicated on Drawings

1. Apply in accordance with manufacturer's written instructions and as follows:

    a. Uniformly spread 25 lb/100 sq. ft. (12 kg/10 sq. m) of dampened slip-resistive aggregate over surface in one or two applications.
    b. Tamp aggregate flush with surface, but do not force below surface.
    c. After broadcasting and tamping, apply float finish.
    d. After curing, lightly work surface with a steel wire brush or an abrasive stone and water to expose slip-resistive aggregate.

3.9 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

A. Filling In:

1. Fill in holes and openings left in concrete structures after Work of other trades is in place unless otherwise indicated.

2. Mix, place, and cure concrete, as specified, to blend with in-place construction.
3. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations:

1. Coordinate sizes and locations of concrete bases with actual equipment provided.
2. Construct concrete bases 6 inches (150 mm) high unless otherwise indicated on Drawings, and extend base not less than 6 inches (150 mm) in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated on Drawings, or unless required for seismic anchor support.
3. Minimum Compressive Strength: 4000 psi (27.6 MPa) at 28 days.
4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of concrete base.
5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete substrate.
6. Prior to pouring concrete, place and secure anchorage devices.

    a. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
    b. Cast anchor-bolt insert into bases.
    c. Install anchor bolts to elevations required for proper attachment to supported equipment.

D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items.

1. Cast-in inserts and accessories, as shown on Drawings.
2. Screed, tamp, and trowel finish concrete surfaces.

3.10 CONCRETE CURING

A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

1. Comply with ACI 301 (ACI 301M) and ACI 306.1 for cold weather protection during curing.
2. Comply with ACI 301 (ACI 301M) and ACI 305.1 (ACI 305.1M) for hot-weather protection during curing.
3. Maintain moisture loss no more than 0.2 lb/sq. ft. x h (1 kg/sq. m x h), calculated in accordance with ACI 305.1, before and during finishing operations.

B. Curing Formed Surfaces: Comply with ACI 308.1 (ACI 308.1M) as follows:

1. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces.

2. Cure concrete containing color pigments in accordance with color pigment manufacturer's instructions.
3. If forms remain during curing period, moist cure after loosening forms.
4. If removing forms before end of curing period, continue curing for remainder of curing period, as follows:

    a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
    b. Continuous Sprinkling: Maintain concrete surface continuously wet.
    c. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously wet.
    d. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.
    e. Membrane-Forming Curing Compound: Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.

        1) Recoat areas subject to heavy rainfall within three hours after initial application.
        2) Maintain continuity of coating and repair damage during curing period.

C. Curing Unformed Surfaces: Comply with ACI 308.1 (ACI 308.1M) as follows:

1. Begin curing immediately after finishing concrete.
2. Interior Concrete Floors:

    a. Floors to Receive Floor Coverings Specified in Other Sections: Contractor has option of the following:

        1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.

            a) Lap edges and ends of absorptive cover not less than 12 inches (300 mm).
            b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.

        2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive.

            a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
            b) Cure for not less than seven days.

3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:

a) Water.
b) Continuous water-fog spray.

b. Floors to Receive Penetrating Liquid Floor Treatments: Contractor has option of the following:

1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.

a) Lap edges and ends of absorptive cover not less than 12 inches (300 mm).
b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.

2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive.

a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
b) Cure for not less than seven days.

3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:

a) Water.
b) Continuous water-fog spray.

c. Floors to Receive Polished Finish: Contractor has option of the following:

1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.

a) Lap edges and ends of absorptive cover not less than 12 inches (300 mm).
b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.

2) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:

a) Water.
b) Continuous water-fog spray.

d. Floors to Receive Chemical Stain:

1) As soon as concrete has sufficient set to permit application without marring concrete surface, install curing paper over entire area of floor.
2) Install curing paper square to building lines, without wrinkles, and in a single length without end joints.
3) Butt sides of curing paper tight; do not overlap sides of curing paper.
4) Leave curing paper in place for duration of curing period, but not less than 28 days.

e. Floors to Receive Urethane Flooring:

1) As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
2) Rewet absorptive cover and cover immediately with polyethylene moisture-retaining cover with edges lapped 6 inches (150 mm) and sealed in place.
3) Secure polyethylene moisture-retaining cover in place to prohibit air from circulating under polyethylene moisture-retaining cover.
4) Leave absorptive cover and polyethylene moisture-retaining cover in place for duration of curing period, but not less than 28 days.

f. Floors to Receive Curing Compound:

1) Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
2) Recoat areas subjected to heavy rainfall within three hours after initial application.
3) Maintain continuity of coating, and repair damage during curing period.
4) Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project.

g. Floors to Receive Curing and Sealing Compound:

1) Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller in accordance with manufacturer's written instructions.
2) Recoat areas subjected to heavy rainfall within three hours after initial application.
3) Repeat process 24 hours later and apply a second coat. Maintain continuity of coating, and repair damage during curing period.

3.11 TOLERANCES

A. Conform to ACI 117 (ACI 117M).

3.12 APPLICATION OF LIQUID FLOOR TREATMENTS

A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment in accordance with manufacturer's written instructions.

1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
2. Do not apply to concrete that is less than days old.
3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing.
4. Rinse with water; remove excess material until surface is dry.
5. Apply a second coat in a similar manner if surface is rough or porous.

B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller in accordance with manufacturer's written instructions.

3.13 JOINT FILLING

A. Prepare, clean, and install joint filler in accordance with manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least one month.
2. Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints.

D. Overfill joint, and trim joint filler flush with top of joint after hardening.

3.14 CONCRETE SURFACE REPAIRS

A. Defective Concrete:

1. Repair and patch defective areas when approved by Architect.
2. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension to solid concrete.

    a. Limit cut depth to 3/4 inch (19 mm).
    b. Make edges of cuts perpendicular to concrete surface.
    c. Clean, dampen with water, and brush-coat holes and voids with bonding agent.
    d. Fill and compact with patching mortar before bonding agent has dried.
    e. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.

2. Repair defects on surfaces exposed to view by blending white Portland cement and standard Portland cement, so that, when dry, patching mortar matches surrounding color.

    a. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching.
    b. Compact mortar in place and strike off slightly higher than surrounding surface.

3. Repair defects on concealed formed surfaces that will affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces:

1. Test unformed surfaces, such as floors and slabs, for finish, and verify surface tolerances specified for each surface.

    a. Correct low and high areas.
    b. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

2. Repair finished surfaces containing surface defects, including spalls, pop-outs, honeycombs, rock pockets, crazing, and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
3. After concrete has cured at least 14 days, correct high areas by grinding.
4. Correct localized low areas during, or immediately after, completing surface-finishing operations by cutting out low areas and replacing with patching mortar.

    a. Finish repaired areas to blend into adjacent concrete.

5. Correct other low areas scheduled to receive floor coverings with a repair underlayment.

    a. Prepare, mix, and apply repair underlayment and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.

b. Feather edges to match adjacent floor elevations.

6. Correct other low areas scheduled to remain exposed with repair topping.

   a. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations.
   b. Prepare, mix, and apply repair topping and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.

7. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete.

   a. Remove defective areas with clean, square cuts, and expose steel reinforcement with at least a 3/4-inch (19-mm) clearance all around.
   b. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.
   c. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate.
   d. Place, compact, and finish to blend with adjacent finished concrete.
   e. Cure in same manner as adjacent concrete.

8. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar.

   a. Groove top of cracks and cut out holes to sound concrete, and clean off dust, dirt, and loose particles.
   b. Dampen cleaned concrete surfaces and apply bonding agent.
   c. Place patching mortar before bonding agent has dried.
   d. Compact patching mortar and finish to match adjacent concrete.
   e. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.15 FIELD QUALITY CONTROL

Retain "Special Inspections" or "Testing Agency" Paragraph below.

A. Testing Agency: Contractor will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

1. Testing agency to be responsible for providing curing container for composite samples on Site and verifying that field-cured composite samples are cured in accordance with ASTM C31/C31M.

2. Testing agency to immediately report to Architect, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
3. Testing agency to report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.

    a. Test reports to include reporting requirements of ASTM C31/C31M, ASTM C39/C39M, and ACI 301, including the following as applicable to each test and inspection:

        1) Project name.
        2) Name of testing agency.
        3) Names and certification numbers of field and laboratory technicians performing inspections and testing.
        4) Name of concrete manufacturer.
        5) Date and time of inspection, sampling, and field testing.
        6) Date and time of concrete placement.
        7) Location in Work of concrete represented by samples.
        8) Date and time sample was obtained.
        9) Truck and batch ticket numbers.
        10) Design compressive strength at 28 days.
        11) Concrete mixture designation, proportions, and materials.
        12) Field test results.
        13) Information on storage and curing of samples before testing, including curing method and maximum and minimum temperatures during initial curing period.
        14) Type of fracture and compressive break strengths at seven days and 28 days.

B. Batch Tickets: For each load delivered, submit three copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design strength, aggregate size, design air content, design slump at time of batching, and amount of water that can be added at Project site.

C. Inspections:

1. Headed bolts and studs.
2. Verification of use of required design mixture.
3. Concrete placement, including conveying and depositing.
4. Curing procedures and maintenance of curing temperature.
5. Verification of concrete strength before removal of shores and forms from beams and slabs.
6. Batch Plant Inspections: On a random basis, as determined by Architect.

D. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M to be performed in accordance with the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.

a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing to be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C143/C143M:

a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
b. Perform additional tests when concrete consistency appears to change.

3. Slump Flow: ASTM C1611/C1611M:

a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
b. Perform additional tests when concrete consistency appears to change.

4. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete;

a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

5. Concrete Temperature: ASTM C1064/C1064M:

a. One test hourly when air temperature is 40 deg F (4.4 deg C) and below or 80 deg F (27 deg C) and above, and one test for each composite sample.

6. Compression Test Specimens: ASTM C31/C31M:

a. Cast and laboratory cure two sets of two 6-inch (150 mm) by 12-inch (300 mm) or 4-inch (100 mm) by 8-inch (200 mm) cylinder specimens for each composite sample.
b. Cast, initial cure, and field cure two sets of two standard cylinder specimens for each composite sample.

7. Compressive-Strength Tests: ASTM C39/C39M.

a. Test one set of two laboratory-cured specimens at seven days and one set of two specimens at 28 days.
b. Test one set of two field-cured specimens at seven days and one set of two specimens at 28 days.
c. A compressive-strength test to be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor to evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
9. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive

strength by more than 500 psi (3.4 MPa) if specified compressive strength is 5000 psi (34.5 MPa), or no compressive strength test value is less than 10 percent of specified compressive strength if specified compressive strength is greater than 5000 psi (34.5 MPa).

10. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
11. Additional Tests:

    a. Testing and inspecting agency to make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
    b. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by Architect.

        1) Acceptance criteria for concrete strength to be in accordance with ACI 301 (ACI 301M), Section 1.6.6.3.

12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
13. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

E. Measure floor and slab flatness and levelness in accordance with ASTM E1155 (ASTM E1155M) within 48 hours of completion of floor finishing and promptly report test results to Architect.

3.16 PROTECTION

A. Protect concrete surfaces as follows:

1. Protect from petroleum stains.
2. Diaper hydraulic equipment used over concrete surfaces.
3. Prohibit vehicles from interior concrete slabs.
4. Prohibit use of pipe-cutting machinery over concrete surfaces.
5. Prohibit placement of steel items on concrete surfaces.
6. Prohibit use of acids or acidic detergents over concrete surfaces.
7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.
8. Protect concrete surfaces scheduled to receive surface hardener or polished concrete finish using Floor Slab Protective Covering.

END OF SECTION 03 30 00

(NO TEXT THIS PAGE)

SECTION 05 12 00 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Structural steel.
2. Shrinkage-resistant grout.

B. Related Requirements:

1. Section 053100 "Steel Decking" for field installation of shear stud connectors through deck.

C. Build America, Buy America compliance:

1. Structural steel shapes, plates, bolts, and other framing materials provided under this Section shall be produced in the United States in accordance with Build America, Buy America (BABA) provisions.

1.2 DEFINITIONS

A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in ANSI/AISC 303.

1.3 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data:

1. Structural-steel materials.
2. High-strength, bolt-nut-washer assemblies.
3. Anchor rods.
4. Threaded rods.
5. Forged-steel hardware.
6. Slide bearings.
7. Shop primer.
8. Galvanized-steel primer.
9. Etching cleaner.
10. Galvanized repair paint.
11. Shrinkage-resistant grout.

B. Shop Drawings: Show fabrication of structural-steel components.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Include embedment Drawings.
3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.
5. Indicate locations and dimensions of protected zones.
6. Identify demand-critical welds.
7. Identify members not to be shop primed.

C. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide in accordance with AWS D1.1/D1.1M for each welded joint whether prequalified or qualified by testing, including the following:

1. Power source (constant current or constant voltage).
2. Electrode manufacturer and trade name, for demand-critical welds.

D. Certificate of compliance for Build America, Buy America.

1. Submit manufacturer’s certificate or contractor’s letter of compliance confirming that all materials furnished under this Section meet Build America, Buy America (BABA) requirements.

E. Delegated Design Submittal: For structural-steel connections indicated on Drawings to comply with design loads, include analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installer and fabricator.

B. Welding certificates.

C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

D. Mill test reports for structural-steel materials, including chemical and physical properties.

E. Product Test Reports: For the following:

1. Bolts, nuts, and washers, including mechanical properties and chemical analysis.
2. Direct-tension indicators.
3. Tension-control, high-strength, bolt-nut-washer assemblies.
4. Shear stud connectors.

F. Survey of existing conditions.

G. Source quality-control reports.

H. Field quality-control reports.

1.7 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.1/D1.1M.

1. Welders and welding operators performing work on bottom-flange, demand-critical welds are to pass the supplemental welder qualification testing, as required by AWS D1.8/D1.8M. FCAW-S and FCAW-G are to be considered separate processes for welding personnel qualification.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.

1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
2. Clean and relubricate bolts and nuts that become dry or rusty before use.

3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F3125/F3125M, Grade F1852 bolt assemblies and for retesting bolt assemblies after lubrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Comply with applicable provisions of the following specifications and documents:

1. ANSI/AISC 303.
2. ANSI/AISC 341.
3. ANSI/AISC 360.
4. RCSC's "Specification for Structural Joints Using High-Strength Bolts."

B. Connection Design Information:

1. Design connections and final configuration of member reinforcement at connections in accordance with ANSI/AISC 303 by fabricator's qualified professional engineer.

2.2 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: ASTM A992/A992M.

B. Channels, Angles, S-Shapes: ASTM A36/A36M.

C. Plate and Bar: ASTM A36/A36M.

D. Cold-Formed Hollow Structural Sections: ASTM A500/A500M, Grade C structural tubing.

E. Steel Pipe: ASTM A53/A53M, Type E or Type S, Grade B.

1. Weight Class: as indicated on Drawings.
2. Finish: Black except where indicated to be galvanized.

F. Steel Castings: ASTM A216/A216M, Grade WCB, with supplementary requirement S11.

G. Steel Forgings: ASTM A668/A668M.

H. Welding Electrodes: Comply with AWS requirements.

2.3 BOLTS AND CONNECTORS

A. High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325 (Grade A325M), Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH (ASTM A563M,

Class 10S), heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.

1. Direct-Tension Indicators: ASTM F959/F959M, Type 325-1 (Type 8.8-1), compressible-washer type with plain finish.

B. High-Strength A490 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A490 (Grade A490M), Type 1, heavy-hex steel structural bolts ASTM A563, Grade DH (ASTM A563M, Class 10S), heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.

C. Zinc-Coated High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325 (Grade A325M), Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH (ASTM A563M, Class 10S), heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.

1. Finish: Hot-dip or mechanically deposited zinc coating.
2. Direct-Tension Indicators: ASTM F959/F959M, Type 325-1 (Type 8.8-1), compressible-washer type with mechanically deposited zinc coating, baked epoxy-coated finish.

D. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F3125/F3125M, Grade F1852, Type 1, heavy-hex head assemblies, consisting of steel structural bolts with splined ends; ASTM A563, Grade DH (ASTM A563M, Class 10S), heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.

1. Finish: Plain.

2.4 RODS

A. Unheaded Anchor Rods: ASTM F1554, Grade 36.

1. Configuration: Straight.
2. Nuts: ASTM A563 (ASTM A563M) heavy-hex carbon steel.
3. Plate Washers: ASTM A36/A36M carbon steel.
4. Washers: ASTM F436 (ASTM F436M), Type 1, hardened carbon steel.
5. Finish: Plain.

B. Headed Anchor Rods: ASTM F1554, Grade 36

1. Nuts: ASTM A563 (ASTM A563M) heavy-hex carbon steel.
2. Plate Washers: ASTM A36/A36M carbon steel.
3. Washers: ASTM F436 (ASTM F436M), Type 1, hardened carbon steel.
4. Finish: Plain.

C. Threaded Rods: ASTM A36/A36M.

1. Nuts: ASTM A63 (ASTM A563M) heavy-hex carbon steel.
2. Washers: ASTM F436 (ASTM F436M), Type 1, hardened carbon steel.

3. Finish: Plain.

2.5 PRIMER

A. Steel Primer:
   1. Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.

B. Galvanized-Steel Primer:

   1. Etching Cleaner: MPI#25, for galvanized steel.
   2. Galvanizing Repair Paint: MPI#18, MPI#19, or SSPC-Paint 20.

2.6 SHRINKAGE-RESISTANT GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.7 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate in accordance with ANSI/AISC 303 and to ANSI/AISC 360.

   1. Camber structural-steel members where indicated.
   2. Fabricate beams with rolling camber up.
   3. Identify high-strength structural steel in accordance with ASTM A6/A6M and maintain markings until structural-steel framing has been erected.
   4. Mark and match-mark materials for field assembly.
   5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

   1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.

C. Bolt Holes: Cut, drill, mechanically thermal cut, or punch standard bolt holes perpendicular to metal surfaces.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted in accordance with SSPC-SP 1.

2.8 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened.

B. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in ANSI/AISC 303 for mill material.

2.9 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel in accordance with ASTM A123/A123M.

1. Fill vent and drain holes that are exposed in the finished Work unless they function as weep holes, by plugging with zinc solder and filing off smooth.
2. Galvanize lintels, and shelf angles attached to structural-steel frame and located in exterior walls.

2.10 SHOP PRIMING

A. Shop prime steel surfaces, except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches (50 mm).
2. Surfaces to be field welded.
3. Surfaces of high-strength bolted, slip-critical connections.
4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
5. Galvanized surfaces unless indicated to be painted.
6. Corrosion-resisting (weathering) steel surfaces.
7. Surfaces enclosed in interior construction.

B. Surface Preparation of Steel: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces in accordance with the following specifications and standards:

1. SSPC-SP 2.
2. SSPC-SP 3
3. SSPC-SP 7 (WAB)/NACE WAB-4.
4. SSPC-SP 14 (WAB)/NACE WAB-8.
5. SSPC-SP 11.
6. SSPC-SP 6 (WAB)/NACE WAB-3.

7. SSPC-SP 10 (WAB)/NACE WAB-2.
8. SSPC-SP 5 (WAB)/NACE WAB-1.
9. SSPC-SP 8.

C. Surface Preparation of Galvanized Steel: Prepare galvanized-steel surfaces for shop priming by thoroughly cleaning steel of grease, dirt, oil, flux, and other foreign matter, and treating with etching cleaner.

D. Priming: Immediately after surface preparation, apply primer in accordance with manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

2.11 SOURCE QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform shop tests and inspections.

1. Allow testing agency access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
2. Bolted Connections: Inspect shop-bolted connections in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts."
3. Welded Connections: Visually inspect shop-welded connections in accordance with AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

    a. Liquid Penetrant Inspection: ASTM E165/E165M.
    b. Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
    c. Ultrasonic Inspection: ASTM E164.
    d. Radiographic Inspection: ASTM E94/E94M.

4. In addition to visual inspection, test and inspect shop-welded shear stud connectors in accordance with requirements in AWS D1.1/D1.1M for stud welding and as follows:

    a. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear stud connector.
    b. Conduct tests in accordance with requirements in AWS D1.1/D1.1M on additional shear stud connectors if weld fracture occurs on shear stud connectors already tested.

5. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

1. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated on Drawings.

1. Do not remove temporary shoring supporting composite deck construction and structural-steel framing until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and in accordance with ANSI/AISC 303 and ANSI/AISC 360.

B. Baseplates, Bearing Plates and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.

1. Set plates for structural members on wedges, shims, or setting nuts as required.
2. Weld plate washers to top of baseplate.
3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
4. Promptly pack shrinkage-resistant grout solidly between bearing surfaces and plates, so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for grouting.

C. Maintain erection tolerances of structural steel within ANSI/AISC 303.

D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure. Slope roof framing members to slopes indicated on Drawings.
2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

E. Splice members only where indicated.

F. Do not use thermal cutting during erection unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1/D1.1M.

G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.4 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt and joint type specified.

1. Joint Type: Snug tightened.

B. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with ANSI/AISC 303 and ANSI/AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
3. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in ANSI/AISC 303 for mill material.

C. Shear Stud Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Weld using end welding of headed-stud shear connectors in accordance with AWS D1.1/D1.1M and manufacturer's written instructions.

3.5 REPAIR

A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing, and repair galvanizing to comply with ASTM A780/A780M.

B. Touchup Painting:

1. Immediately after erection, clean exposed areas where primer is damaged or missing, and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

    a. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Contractor will engage a qualified testing agency to perform tests and inspections.

1. Bolted Connections: Inspect bolted connections in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts."
2. Welded Connections: Visually inspect field welds in accordance with AWS D1.1/D1.1M.

    a. In addition to visual inspection, test and inspect field welds in accordance with AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

        1) Liquid Penetrant Inspection: ASTM E165/E165M.
        2) Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
        3) Ultrasonic Inspection: ASTM E164.
        4) Radiographic Inspection: ASTM E94/E94M.

END OF SECTION 05 12 00

SECTION 055119 – MISC. METAL AND ALUMINUM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Aluminum Handrails

1.2 COORDINATION

A. The Contractor shall furnish and install all miscellaneous metals, including pipe supports, anchors, lintels, steel angles, platforms, hatches, grating, hand railing, etc. all indicated on the drawings and as specified for the complete construction of the work. Schedule installation of railings and guards so wall attachments are made only to completed walls.

B. Do not support railings and guards temporarily by any means that do not satisfy structural performance requirements.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Aluminum Handrails

B. Sustainable Design Submittals:

1. Environmental product declaration.
2. Third-Party Certifications: For each product.
3. Third-Party Certified Life Cycle Assessment: For each product.

C. Shop Drawings:

1. Include plans, elevations, sections, details, and attachment to other work.
2. Indicate sizes of metal sections, thickness of metals, profiles, holes, and field joints.
3. Include plan at each level.

D. Delegated Design Submittal: For stairs, railings, and guards, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For professional engineer's experience with providing delegated design

engineering services of the kind indicated, including documentation that engineer is licensed in the State in which Project is located.

B. Welding certificates.

C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of products.

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification.

1. Keep members off ground and spaced by using pallets, dunnage, or other supports and spacers.
2. Protect members and packaged materials from corrosion and deterioration.
3. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures.

a. Repair or replace damaged materials or structures as directed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design stairs railings, and guards, including attachment to building construction.

B. Structural Performance of Stairs: Metal stairs withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Uniform Load: 100 lbf/sq. ft..
2. Concentrated Load: 300 lbf applied on an area of 4 sq. in..
3. Uniform and concentrated loads need not be assumed to act concurrently.
4. Stair Framing: Capable of withstanding stresses resulting from railing and guard loads in addition to loads specified above.
5. Limit deflection of treads, platforms, and framing members to L/360.

C. Structural Performance of Railings and Guards: Railings and guards, including attachment to

building construction, withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Handrails and Top Rails of Guards:

    a. Uniform load of 50 lbf/ft. applied in any direction.
    b. Concentrated load of 200 lbf applied in any direction.
    c. Uniform and concentrated loads need not be assumed to act concurrently.

2. Infill of Guards:

    a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft..
    b. Infill load and other loads need not be assumed to act concurrently.
    c. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces

2.2 MISCELLANEOUS STRUCTURAL STEEL

A. Structural steel members shall be in full compliance with applicable sections of ASTM Standards. Structural steel for building construction shall be specified in the detailed specifications.

B. All steel members used in the construction of various platforms and stairs shall be sized as shown on the drawings, but not less than 6" channels.

C. All platforms and stairs shall be designed for a minimum of 200 lbs per square foot.

Steel members shall be hot dipped galvanized.

2.3 MISCELLANEOUS STEEL GRATING SUPPORTS

A. Steel members used along channels and walks to support grating shall be provided by the Contractor.

B. Steel angles with a minimum of 1/4" thickness shall be used along the edge of openings. Angles shall have sufficient depth to keep surface of grating level with the top of concrete.

C. Angles may be either surface mounted or embedded. The minimum bearing dimensions shall be 2".

D. Where grating panels abutt, the Contractor shall install steel support members along the joint to prevent deflection of panels. An angle or channel section shall be used.

E. Where removable grating panels are to be provided, the edge of these openings shall be supported with triple angles, wide flange beam or as indicated by the drawings.

F. All steel members shall be hot dipped galvanized.

2.4 ALUMINUM HANDRAIL

A. Aluminum handrail and posts shall be one and one half (1 ½) inch I.P.S. Schedule 40 aluminum pipe. The posts and the rails shall be made of 6063(T6), 6005 (T5), or 6105 (T5) alloy. Post spacing shall not exceed six (6) feet apart, unless otherwise shown on the plans or approved by the Engineer. All exposed castings such as wall and floor flanges, flush type fittings etc. shall be 214F alloy to assure compatibility with the posts and rails for uniformity of finish. Mounting screws shall be hardened aluminum or stainless steel as per manufacturer's recommendations.

B. The railing shall be constructed with welded connections or mechanically assembled, with panels of suitable lengths and shapes to facilitate shipping, handling and speedy erection. The finish of the railing shall be anodized with clear anodic coating in accordance with the Aluminum Association. Coating shall be shop applied and protected during shipment by plastic.

C. Suitable dielectric insulators shall be provided where connections are made to ferrous metals. Hardened aluminum or stainless steel chains shall be provided for all shown chained openings.

D. Where a three (3) rail system is required or shown, the system shall consist of a top rail 3'-6" high, an intermediate rail 2'-0" high, and bottom rail 6" high.

E. Where a two (2) rail system is required or shown, the system shall consist of a top rail 3'-6" high and bottom rail 1'-9" high.

F. Where a four (4) rail system is required or shown, the system shall consist of a top rail 3'-6" high, and intermediate rails spaced at 10 1/4".

G. Four (4") inch extruded channel toe boards shall be supplied and secured with screws along walkways.

H. Provisions shall be made for thermal expansion and contraction; expansion joints shall be provided at a maximum of 24 foot on center. A single, unspliced length of top rail to be attached to a minimum of three (3) posts where possible.

I. Water drainage shall be provided by 3/16" weep holes at the bottom where posts are grouted in concrete.

J. Complete railing system shall meet or exceed the load and design requirements of OSHA, UBC and other local and state agencies.

PART 3 – EXECUTION

3.1 STEEL MEMBERS

A. The Contractor shall install all steel supports in accordance with all details provided on the drawings.

B. All welds shall be smooth and free of sharp edges.

C. All field welds on galvanized coatings shall receive a field applied coating to seal weld areas.

D. Anchors and bolts shall be stainless steel.

E. Metal stairways shall have slopes between 30 and 40 degrees from the horizontal to facilitate carrying samples, tools, etc. Each tread and riser shall be of uniform dimension in each flight. Minimum tread run shall not be less than 9 inches (230 mm). The sum of the tread run and riser shall not be less than 17 inches (430 mm) nor more than 18 inches (460 mm). A flight of stairs shall consist of not more than a 12-foot (3.7 m) continuous rise without a platform.

3.2 ALUMINUM HANDRAILS

A. The Contractor shall protect all railings from damage prior to installation.

B. Manufacturer supplied protection plastic wrapping shall be kept on railing until erection is complete.

C. Contractor shall comply with all of the manufacturer's installation requirements for fastening and thermal expansion/contraction control.

D. Contractor shall place an isolator between handrail base plate and any other ferrous metal surface.

E. Contractor shall place a bituminous coating on post or base plate where in contact with concrete.

END OF SECTION 055119

SECTION 06 05 00 – TIMBER AND LUMBER

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Timber and lumber materials used for structural purposes, graded in accordance with ASTM D 245. Fabricate, erect, and install timber and lumber in accordance with the recommendations of the National Design Specifications for wood construction of the National Forest Products Association. Timber and lumber uses under this Section include structural lumber decking and supports, temporary and permanent sheeting, shoring, bracing, baffles, stop logs, and stop gates. For other uses, use lumber of the kind and grade shown or specified.

1.2 REFERENCES

A. Codes and standards referred to in this Section are:

1. ASTM D 245 Establishing Structural Grades and Related Allowable Properties for Visually Graded Lumber

1.3 DELIVERY, STORAGE AND HANDLING

A. General: Deliver, store and handle all products and materials as specified in Division 1 (and as follows:)

B. Handling and Storing: Carefully handle all timber and lumber to avoid splitting or damage to the surfaces and edges and store all timber and lumber in piles at least 1 foot above dry ground and placed to shed water and prevent distortion and warping. Open-stack untreated lumber; close-stack treated lumber. Protect lumber piles from the weather.

PART 2 PRODUCT

2.1 MANUFACTURER

A. Acceptable manufacturers must be Build America, Buy America (BABA) compliant.

2.2 STRUCTURAL LUMBER

A. General: Provide structural lumber of Douglas Fir-Larch, Southern Pine or Redwood unless otherwise shown or specified.

B. Grading: Use structural lumber of the following minimum grades unless otherwise shown or specified:

	Minimum Grade
Light Framing and Joists and Planks	No. 1
Beams and Stringers, and Posts and Timbers	
Douglas Fir-Larch	No. 1
Southern Pine	No. 1 SR
Redwood	Clear Heart Structural

1. Grade materials in accordance with the rules of the following Agencies:

Douglas Fir-Larch:

West Coast Lumber Inspection Bureau
Western Wood Products Association
National Lumber Grades Authority (Canada)

Southern Pine:

Southern Pine Inspection Bureau

Redwood:

Redwood Inspection Service

2. Meet the requirements of the above grades throughout the entire length of each piece.

2.3 TREATED TIMBER AND LUMBER

A. Impregnate Southern Yellow Pine timber and lumber to be treated with water-borne preservatives conforming to AWPA Preservative Standard P-5, CCA Type C. Impregnate Douglas Fir-Larch timber and lumber to be treated with water-borne preservatives conforming to AWPA Preservative Standard P-5 ACZA. Apply the preservative in a closed cylinder by pressure process - full cell method in accordance with AWPA Product Standard C2. Ensure the minimum net retention is 0.40 pounds per cubic foot.

2.4 BAFFLES AND STOP LOGS

A. General: Construct baffles and stop logs in contact with potable water of untreated lumber unless otherwise specified. Baffles and stop logs not in contact with potable water may be constructed of either treated or untreated lumber.

B. Treated Lumber: Use treated lumber baffles and stop logs made of Douglas Fir-Larch or Southern Pine as specified for structural lumber, and treat as specified.

C. Untreated Lumber: Construct untreated lumber baffles and stop logs of clear, heart structural redwood lumber having a minimum of four growth rings per inch. Do not furnish pieces containing sapwood. Surface the lumber smooth on four sides.

D. Sealing: Seal the ends of green lumber with a wax emulsion.

2.5 SHEETING

A. General: For wood sheeting which is to be part of the permanent structure, use tongue and groove structural lumber, unless Wakefield sheet piling or lap joint sheet piling is shown. All permanent sheeting shall be treated in accordance with Section 2.3.

B. Tongue and Groove Sheet Piling: Provide tongue and groove sheet piling with tongues and grooves of ample proportions cut from the solid material.

C. Lap Joint Sheet Piling: Provide lap joint sheet piling made up of two thicknesses of material securely spiked or bolted together with the two thicknesses overlapping at least one-third the width of the boards so that the sheeting in place consists of two thicknesses throughout with broken joints.

D. Wakefield Sheet Piling: Provide Wakefield sheet piling consisting of three thicknesses of material securely spiked or bolted together with the center board offset a distance of 2 inches to form a tongue and groove on opposite edges of the sheet pile.

E. Wood Lagging: Provide treated structural lumber for wood lagging which will be a part of the permanent structure.

F. Tight Joint: Provide corners for any type of sheeting built up in a manner to provide a reasonably tight joint.

G. Driving Piles: Sharpen timber sheet piles in a manner which will assist in holding them in true alignment during driving and protect the tops with caps or other means to prevent damage by the driving equipment. Remove and replace any pieces damaged or split below the point of cutoff with undamaged pieces.

H. Temporary Structure Sheeting: Wood sheeting which is not to become part of the permanent structure may be new or used lumber of any species or grade approved and suitable for the proposed use. Approval of such sheeting does not eliminate the requirement for full responsibility for the adequacy of the sheeting.

PART 3 EXECUTION

3.1 PREPARATION

A. Cutting and Boring: Cut and frame all timber and lumber true and exact to a close fit in such a manner that the joints will have an even bearing over the entire contact surfaces. Drive nails and spikes to set the heads flush with the surface of the wood, unless specified otherwise. Deep or frequent hammer marks in surfaces and edges of timbers are not allowed. Perform all cutting and boring of treated timber before treatment. Temporary bolting, spiking, or nailing of treated lumber is not permitted.

END OF SECTION

SECTION 06 73 13 - FIBERGLASS MATERIALS

PART 1 - GENERAL

1.1 SUMMARY

The contractor shall furnish and install all fiberglass related materials and other specials as shown on the plans or specified and necessary to complete the work.

1.4 ACTION SUBMITTALS

Prior to fabrication the contractor shall submit shop drawings for approval.

Shop drawings shall be based upon field measurements to assure proper fit in tanks channels, trenches etc.

PART 2 - PRODUCTS

2.1 FIBERGLASS GRATING

A. All FRP items furnished under this Section shall be composed of fiberglass reinforcement and resin in qualities, quantities, properties, arrangements and dimensions as necessary to meet the design requirements and dimensions as specified in the Contract Documents.

B. Fiberglass reinforcement shall be continuous roving in sufficient quantities as needed by the application and/or physical properties required.

C. Resin shall be (Corvex), with chemical formulations as necessary to provide the corrosion resistance, strength and other physical properties as required.

D. All finished surfaces of FRP items and fabrications shall be smooth, resin-rich, free of voids and without dry spots, cracks, crazes or unreinforced areas. All glass fibers shall be well covered with resin to protect against their exposure due to wear or weathering.

E. All grating products shall have a tested flame spread rating of (25) or less per ASTM E-84 Tunnel Test. Gratings shall also have tested burn time of less than 30 seconds and an extent to burn rate of less than or equal to 10 millimeters per ASTM D635.

F. All mechanical grating clips shall be manufactured of Type 316SS (stainless steel).

2.2 MOLDED FRP GRATING

A. Grating shall be of a one piece molded construction with tops and bottoms of bearing bars and cross bars in the same plane. Grating shall have a (1 ½" or 2") square mesh pattern providing bi-directional strength. Grating shall be reinforced with continuous rovings of equal number of layers in each direction. The top layer

B. of reinforcement shall be no more than 3/16” below the top surface of the grating so as to provide maximum stiffness and prevent resin chipping of unreinforced surfaces. Percentage of glass (by weight) shall not exceed 35% so as to achieve maximum corrosion resistance, and as required to maintain the structural requirements of the CONTRACT.

C. After molding, no dry glass fibers shall be visible on any surface of bearing bars or cross bars. All bars shall be smooth and uniform with no evidence of fiber orientation irregularities, interlaminar voids, porosity, resin rich or resin starved areas. bearing bars and cross bars in the same plane. Grating shall have a 1 ½” or 2” square mesh.

D. Non-slip surfacing: Grating shall be manufactured with a quartz grit bonded to the top surface of the finished grating products. Grit shall be applied as a secondary operation to the finished product which maintains the maximum strength, stiffness, and corrosion resistance to the finished grating. Embedded grit, which penetrates to the top layer of reinforcement, shall not be allowed as it displaces reinforcement and reduces panel strength and stiffness.

E. Unless otherwise specified, FRP grating shall have minimum dimensions and weight according to clear span as follows:

Grid Height	Wt. Lbs. Per Sq. Ft.	Grid Bar Spacing	Max Span
1"	2.6	1-1/2" x 1-1/2” O.C.	2'-6"
1 1/2"	3.8	1-1/2" x 1-1/2” O.C.	4'-0"
2"	4.0	2" x 2” O.C.	4'-6"

F. Substitutions: Other products of equal strength, stiffness, corrosion resistance and overall quality may be submitted with the proper supporting data to the engineer for approval.

G. Color: yellow, gray or green.

H. Thickness: *See table above.*

I. Mesh Configuration: *See table above.*

2.3 FRP GRATING STAIR TREADS

A. Form treads to configurations shown from pultruded, Fiberglass Reinforced Polymer material with integral nosings.

B. Limit tread deflection to ¼-inch due to a 300-lbs concentrated point load.

C. Fasten FRP treads to steel support angles using manufacturers standard clips.

D. The surface of each tread shall have a slip resistant surface.

E. Color: yellow, gray or green.

1. Tread color selection to be coordinated with Owner.

2.4 GRATING FABRICATION

A. Measurements: Grating supplied shall meet the dimensional requirements and tolerances as shown or specified. The contractor shall provide and/or verify measurements in field for work fabricated to fit field conditions as required by grating manufacturer to complete the work. When field dimensions are not required, contractor shall determine correct size and locations of required holes or cutouts from field dimensions before grating fabrication.

B. Layout: Each grating section shall be readily removable, except where indicated on drawings. Manufacturer to provide openings and holes where located on the contract drawings. Grating openings which fit around protrusions (pipes, cables, machinery, etc.) shall be discontinuous at approximately the centerline of opening so each section of grating is readily removable. Gratings shall be fabricated free from warps, twists, or other defects which affect appearance and serviceability.

C. Sealing: All shop fabricated grating cuts shall be coated with vinyl ester resin to provide maximum corrosion resistance. All field fabricated grating cuts shall be coated similarly by the contractor in accordance with the manufacturer's instructions.

D. Hardware: Type 316 stainless steel hold-down clips shall be provided and spaced at a maximum of four feet apart with a minimum of four per piece of grating, or as recommended by the manufacturer.

PART 3 -EXECUTION

3.1 FIBERGLASS GRATING

A. The fabricator shall give ample notice to Contractor prior to the beginning of any fabrication work so that inspection may be provided. The grating shall be as free, as commercially possible, from visual defects such as foreign inclusions, delamination, blisters, resin burns, air bubbles and pits. The surface shall have a smooth finish (except for grit top surfaces).

B. Contractor shall install gratings in accordance with manufacturers assembly drawings. Lock grating panels securely in place with hold-down fasteners as specified herein. Field cut and drill fiberglass reinforced plastic products with carbide or diamond tipped bits and blades. Seal cut or drilled surfaces in accordance with manufacturer's instructions. Follow manufacturer's instructions when cutting or drilling fiberglass products or using resin products; provide adequate ventilation.

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Framing with dimension lumber.
2. Wood blocking, cants, and nailers.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product.

1.3 INFORMATIONAL SUBMITTALS

A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

B. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated wood.
2. Fire-retardant-treated wood.
3. Shear panels.
4. Power-driven fasteners.
5. Post-installed anchors.
6. Metal framing anchors.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. Dress lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat items indicated on Drawings, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, and similar concealed members in contact with masonry or concrete.
3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
4. Wood framing members that are less than 18 inches (460 mm) above the ground in crawlspaces or unexcavated areas.
5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 DIMENSION LUMBER FRAMING

1. Truss Members, Headers, and Other Framing by Grade Application: No. 2
2. Species:

a. Southern pine or mixed southern pine; SPIB.

2.4 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Cants.
4. Furring.
5. Grounds.

2.5 FASTENERS

A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

C. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, ICC-ES AC58, ICC-ES AC193 or ICC-ES AC308 as appropriate for the substrate.

2.6 METAL FRAMING ANCHORS

A. Allowable design loads, as published by manufacturer, shall meet or exceed those of basis-of-design products. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.

B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.

1. Use for interior locations unless otherwise indicated.

C. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A 653/A 653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 (Z550) coating designation; and not less than 0.036 inch (0.9 mm) thick.

1. Use for wood-preservative-treated lumber and where indicated.

2.7 MISCELLANEOUS MATERIALS

A. Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1-inch (25-mm) nominal thickness, compressible to 1/32 inch (0.8 mm); selected from manufacturer's standard widths to suit width of sill members indicated.

B. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to suit width of sill members indicated.

C. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch (0.6 mm).

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

B. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.

C. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

D. Do not splice structural members between supports unless otherwise indicated.

E. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

F. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

G. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code (IBC).
2. ICC-ES evaluation report for fastener.

3.2 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061000

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SECTION 061600 - SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Roof sheathing.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Roof sheathing.
2. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Indicate type of preservative used and net amount of preservative retained.
3. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Include physical properties of treated materials.

1.3 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated plywood.
2. Fire-retardant-treated plywood.
3. Foam-plastic sheathing.
4. Air-barrier and water-resistant glass-mat gypsum sheathing.

B. Field quality-control reports.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance Ratings: As tested in accordance with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 WOOD PANEL PRODUCTS

A. Certified Wood: The following wood products shall be certified as "FSC Pure according to FSC STD-01-00 and FSC STD-40-004.

1. Plywood.
2. Oriented strand board.

2.3 PRESERVATIVE-TREATED PLYWOOD

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground**.**

B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.

C. Application: Treat items indicated on Drawings or used with roofing, flashing, vapor barriers, and waterproofing.

2.4 ROOF SHEATHING

A. Plywood Sheathing, Roofs: As indicated.

2.5 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. For roof sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.

B. Nails, Brads, and Staples: ASTM F1667.

2.6 MISCELLANEOUS MATERIALS

A. Adhesives for Field Gluing Panels to Wood Framing: Formulation complying with APA AFG-01 that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

C. Securely attach to substrate by fastening as indicated, complying with the following:

1. Table 2304.10.1, "Fastening Schedule," in the ICC's International Building Code.
2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in the ICC's International Residential Code for One- and Two-Family Dwellings.
3. ICC-ES evaluation report for fastener.

D. Use common wire nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.

E. Coordinate roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 INSTALLATION OF WOOD STRUCTURAL PANEL

A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.

B. Fastening Methods: Fasten panels as indicated below:

1. Combination Subfloor-Underlayment:

    a. Nail to wood framing.
    b. Screw to cold-formed metal framing.
    c. Space panels 1/8 inch apart at edges and ends.

2. Subflooring:

    a. Nail to wood framing.
    b. Screw to cold-formed metal framing.
    c. Space panels 1/8 inch apart at edges and ends.

3. Roof Sheathing:

    a. Nail to wood framing.
    b. Screw to cold-formed metal framing.
    c. Space panels 1/8 inch apart at edges and ends.

4. Underlayment:

    a. Nail to subflooring.
    b. Space panels 1/32 inch apart at edges and ends.
    c. Fill and sand edge joints of underlayment receiving resilient flooring immediately before installing flooring.

3.3 INSTALLATION OF GYPSUM SHEATHING

A. Comply with GA-253 and with manufacturer's written instructions.

1. Fasten gypsum sheathing to wood framing with nails or screws.
2. Fasten gypsum sheathing to cold-formed metal framing with screws.
3. Install panels with a 3/8-inch gap where non-load-bearing construction abuts structural elements.
4. Install panels with a 1/4-inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.

B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.

C. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent panels without forcing. Abut ends over centers of studs, and stagger end joints of adjacent panels not less than one stud spacing. Attach at perimeter and within field of panel to each stud.

1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of panels.
2. For sheathing under stucco cladding, panels may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.

D. Vertical Installation: Install vertical edges centered over studs. Abut ends and edges with those of adjacent panels. Attach at perimeter and within field of panel to each stud.

1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of panels.
2. For sheathing under stucco cladding, panels may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.

E. Seal sheathing joints in accordance with sheathing manufacturer's written instructions.

1. Apply elastomeric sealant to joints and fasteners and trowel flat. Apply sufficient amount of sealant to completely cover joints and fasteners after troweling. Seal other penetrations and openings.
2. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints and apply and trowel sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.

3.4 FIELD QUALITY CONTROL

A. ABAA Quality Assurance Program: Perform examinations, preparation, installation, testing, and inspections under ABAA's Quality Assurance Program.

B. Testing and Inspecting Agency: Contractor will engage a qualified testing agency to perform tests and inspections.

END OF SECTION 061600

SECTION 08 11 16 – ALUMINUM DOORS AND FRAMES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Flush panel aluminum doors, aluminum and glass doors and aluminum door frames.

B. Related Work Specified in Other Sections Includes, But is Not Limited to, the Following:

1. Section 08 71 00 - Hardware
2. Section 09 96 00 - High Performance Coatings

1.2 REFERENCES

A. Codes and standards referred to in this Section are:

1. AADAF-45 - Aluminum Association Designation System for Aluminum Finishes
2. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, rods, Wire, Shapes, and Tubes
3. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate

1.3 SUBMITTALS

A. General: Provide all submittals, including the following, as specified in Division 1.

B. Shop Drawings: Submit Shop Drawings for approval indicating head and jamb details and locations of any types of fastenings.

C. Samples: Submit three samples illustrating pre-finished aluminum surface for color selection and approval.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable manufacturers must be Build America Buy America (BABA) Compliant.

2.2 MATERIALS

A. Provide commercial quality 6063-T5 extruded aluminum conforming to ASTM B221 for doors, frames and transoms. Provide 5005-H14 aluminum for door face sheets. Provide all aluminum conforming to ASTM B209 meeting the requirements of NAAMM for the finish specified.

2.3 FABRICATION

A. General: Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.

B. Joints and Corners: Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.

C. Aluminum and Glass Doors: Construct aluminum and glass doors as follows.

1. Provide wide stile doors made of extruded aluminum tubular sections having walls not less than 1/8-inch thick and with hairline joints. Fasten top and bottom rails with 3/8-inch diameter steel tension rods fixed at the ends with stainless steel tension plates and locknuts.

2. Provide cross webs at the top and bottom rails not less than 0.188-inch thick for hardware attachments. Provide snap-in type glazing members at all doors.

D. Flush Panel Doors: Construct aluminum flush panel doors as follows.

1. Construct flush type doors of tubular extrusions and .090-inch thick smooth finish face sheets. Do not cap door edges with any distorting or protruding channels. Conform to minimal member thicknesses:

Lock or hinge rail edge	0.220-inch
Internal grid members	0.080-inch

2. Construct doors with tops and bottoms reinforced with minimum 1.57- by 5.50-inch tubular sections. Weld a similarly sized cross rail across the center of the door.

3. Construct doors with an internal grid system comprised of 1.562 by 1.875 inch tubular sections spaced horizontally at no less than 24 inches apart. Reinforce cut out with the same members.

4. Fill all voids in the doors between the grid sections with specified soundproofing insulating material. Bond face sheets to the rim, grid sections and insulation with a thermal setting epoxy adhesive. Guarantee adhesion unconditionally for the life of the door.

E. Transom Panels: Construct transom panels the same as the doors.

F. Frames: Construct frames of extruded aluminum as shown with walls not less than 1/8-inch thick and suitable for weather stripping. Reinforce doors and the head and jamb sections for door frames for specified hardware. Reinforce the head and jamb sections of doors greater than 3 feet wide with 3/8-inch thick stainless steel 10 inches long for the full width of the frame and securely held in place at each hardware location.

2.4 FINISHES

A. General: Finish all aluminum doors and frames with a color anodic finish conforming to the Architectural Class 1 finish designation AA-A42 as described in the Aluminum Association Designation System for Aluminum Finishes, white color. (Finish all aluminum doors and frames with the manufacturer's standard Kynar 500 coating of white color. (Color as approved and selected from the full range of standard colors.)

B. Clear anodize all internal members of flush panel doors.

C. Special Coating: Apply bituminous paint to concealed aluminum surfaces in contact with cementitious or dissimilar materials as specified in Section 09 96 00.

D. Finishes: Provide Architectural Class II, AA-C22.A31 clear coating for interior doors and a Class I, AA-C22A41 clear coating for exterior doors.

PART 3 EXECUTION

3.1 INSTALLATION

A. General: Install the aluminum doors and frames in accordance with the manufacturer's recommendations and approved shop drawings and as specified in Division 1.

B. Anchors: Secure frames to side and head jambs by means of approved anchor bolts.

(NO TEXT THIS PAGE)

SECTION 08 33 23 - OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Electric operated overhead insulated rolling doors.

B. Design Requirements:
   1. Air Infiltration to Comply with:
      a. American Society of Heating, Refrigeration, and Air-Condition Engineers (ASHRAE) Standard 90.1-2007, 2010 &2013 requirements of less than 0.3 CFM/sqft.
      b. International Energy Conservation Code 2012 requirements of less than 1.0 CFM/sqft.
   2. Wind Loading
      a. Supply doors to withstand up to 36.2 psf design wind load.
   3. Cycle Life
      a. Design doors of standard construction for normal use of up to 20 cycles per day maximum, and an overall maximum of 50,000 operating cycles for the life of the door.
   4. Seismic Performance
      a. Provide manufacturer’s seismic calculations confirming ASCE7-10.
   5. Insulated Door Slat Material Requirements
      a. Flame Spread Index of 0 and a Smoke Developed Index of 10 as tested per ASTM E84.
      b. Sound Transmission Class (STC) rating up to 30 for the curtain and up to 22 for the entire assembly. If an STC of 32 is desired, additional options are required. All configurations are evaluated per ASTM E90 and based on testing a complete, operable assembly.
      c. Minimum R-value of 8.0 (U-value of 0.125) as calculated using the ASHRAE Handbook of Fundamentals.
      d. Insulation to be CFC Free with an Ozone Depletion Potential (ODP) rating of zero.

1.3 SUBMITTALS

A. Product Data: For each type and size of overhead coiling door and accessory.

1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.

B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.

1. Include plans, elevations, sections, and mounting details.
2. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
4. For exterior components, include details of provisions for assembly expansion and contraction and for excluding and draining moisture to the exterior.
5. Show locations of controls, locking devices, and other accessories.

C. Samples for Initial Selection: Manufacturer's finish charts showing full range of colors and textures available for units with factory-applied finishes.

1. Include similar Samples of accessories involving color selection.

D. Quality Assurance/Control Submittals:
1. Provide manufacturer ISO 9001:2015 registration.
2. Provide manufacturer installation instruction.
3. Provide manufacturer’s Health Product Declaration (HPD) for each product.
4. Manufacturer must provide independent testing lab results proving 0.3 CFM/sqft of less air infiltration.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For overhead coiling doors to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

B. Manufacturer Qualifications: ISO 9001:2015 registered and a minimum of five years experience in producing doors of the type specified.

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of doors that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1. PERFORMANCE REQUIREMENTS

A. Structural Performance, Exterior Doors: Capable of withstanding the following design wind loads:

1. Design Wind Load: 36.2 psf
2. Deflection Limits: Design overhead coiling doors to withstand design wind load without evidencing permanent deformation or disengagement of door components.
3. Operability under Wind Load: Design overhead coiling doors to remain operable under design wind load, acting inward and outward.

2.2. DOOR ASSEMBLY

A. Insulated Service Door: Overhead coiling door formed with curtain of interlocking metal slats.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. ACME Rolling Doors.
    b. C.H.I. Overhead Doors, Inc.
    c. Cornell Iron Works, Inc.
    d. Overhead Door Corporation.
    e. Approved Equal
2. Manufacturers must be Build America Buy America (BABA) Complaint.

B. Operation Cycles: Door components and operators capable of operating for not less than 20,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.

C. Curtain:

1. Fabrication:
    a. Slat Material: No. 6F, (Listed Exterior/Interior):
        i Stainless Steel/Stainless Steel: Minimum 22/22 gauge AISI type 316 series stainless steel.
    b. Insulation: 7/8 inch (22 mm) foamed-in-place, closed cell urethane
    c. Total Slat Thickness: 15/16 inch (24 mm)
    d. Flame Spread Index of 0 and a Smoke Developed Index of 10 as tested per

ASTM E84

e. R-value: 8.0

f. STC Rating: Sound Transmission Class (STC) rating up to 30 for the entire assembly. If an STC of 32 is desired, additional options are required. All configurations are evaluated per ASTM E90 and based on testing a complete, operable assembly

2. Exterior Slat Finish
   a. Stainless Steel: type 316 #4 finish
3. Interior Slat Finish
   a. Stainless Steel: Type 304 #4 finish

D. Endlocks: Alternate slats each secured with two ¼" (6.35 mm) stainless steel rivets. Fabricate interlocking sections with high strength stamped 304 series stainless steel. Provide endlocks/windlocks as required to meet specified wind load.

E. Bottom Bar
1. Configuration:
   a. Structural Steel Angles: #4 type 316 Stainless Steel
2. Finish:
   a. Stainless Steel: Type 316 #4 brushed finish

F. Guides:
1. Fabrication:
   a. Thermal break required. Minimum 3/16 inch stainless steel angles. Provide windlock bars of same material when windlocks are required to meet specified wind load. Top of inner and outer guide angles to be flared outwards to form bellmouth for smooth entry of curtain into guides. Provide removable guide stoppers to prevent over travel of curtain and bottom bar. Stainless steel fasteners to be used for assembly bolts
2. Finish
   a. Stainless steel: #4 type 304 finish

G. Counterbalance Shaft Assembly:
1. Barrel: Steel pipe capable of supporting curtain load with maximum deflection of 0.03 inches per foot of width.
2. Spring Balance: Oil-tempered, heat-treated steel helical torsion spring assembly designed for proper balance of door to ensure that maximum effort to operate will not exceed 25 lbs. Provide wheel for applying and adjusting spring torque.
3. Finish:
   a. Corrosion Inhibitive: Zirconium treatment followed by a corrosion inhibitive baked-on zinc-rich gray polyester powder coat; minimum 2.5 mils (0.065 mm) cured film thickness

H. Brackets:
1. Fabricate from minimum 3/16 inch (5 mm) stainless steel plate with permanently lubricated ball or roller bearings at rotating support points to support counterbalance shaft assembly and form end closures. Corrosion inhibitive zirconium treatment required for all bearings.
2. Finish: #4 type 304 Stainless Steel

I. Hood:
1. Minimum 24 gauge stainless steel with reinforced top and bottom edges. Provide minimum 1/4 inch (6.35 mm) steel intermediate support brackets as required to prevent excessive sag.

a. Finish: Stainless Steel: type 304 #4 finish

J. Weatherstripping
1. Bottom Bar:
a. Motor Operated Doors: Sensing/weather edge with neoprene astragal extending full width of door bottom bar
2. Guides: Replaceable vinyl strip on guides sealing against fascia side of curtain
3. Lintel Seal: Double brush seal with EPDM sandwiched between the two brush seals at door header to impede air flow.

2.3. OPERATION

A. Motor-Continuous Use – NEMA 4X Operator
1. UL Listed NEMA 4X rated
2. The operator must not extend above or below the door coil when mounted front-of-soil.
3. Totally Enclosed Non-ventilated gear head operator(s) rated as recommended by door manufacturer for size and type of door, 208 Volts, 3 phase.
4. Provide complete with electric motor and factory pre-wired motor control terminals, maintenance free solenoid actuated brake, emergency manual chain hoist provided up to 2 hp and control station(s).
5. Motor shall be high starting torque, industrial type, with overload protection.
6. Primary speed reduction shall be heavy-duty gears running in grease or oil bath with mechanical braking to hold the door in any position.
7. When equipped, the emergency manual chain hoist assembly is automatically disengaged when motor is energized. A disconnect chain shall not be required to engage or release the manual chain hoist.
8. Operator drive and door driven sprockets shall be provided with minimum #50 roller chain.
9. Operator shall be capable of driving the door at a speed of up to 9” per second or as recommended for door size.
10. Fully adjustable, driven linear screw type cam limit switch mechanism shall synchronize the operator with the door. The motor shall be removable without affecting the limit switch settings.
11. The electrical contractor shall mount the control station(s) and supply the appropriate disconnect switch, all conduit and wiring per the overhead door wiring instructions.
12. Stainless Steel Corrosion Resistant finish to withstand low pressure direct spray

B. Control Station:
1. Surface Mounted: “open/Close/Stop” push buttons; NEMA 4X (standard)

C. Control Operation:
1. Constant Pressure to Close:
a. 2-wire, electric sensing edge seal extending full width of door bottom bar. Contact before door fully closes shall cause door to immediately stop downward travel and reverse direction to the fully opened position. Provide a retracting safety cord and reel connection to control circuit.
2. Sensing/Weather Edge: Automatic reversing control by an automatic sensing switch within neoprene or rubber astragal extending full width of door bottom bar

a. Electric sensing edge device. Provide a wireless sensing edge connection to motor operator eliminating the need for a physical traveling electric cord connection between bottom bar sensing edge device and motor operator.

2.4. ALUMINUM FINISHES

A. Baked-Enamel or Powder-Coat Finish: AAMA 2603. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.

B. Examine locations of electrical connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.

B. Install overhead coiling doors, hoods, controls, and operators at the mounting locations indicated for each door.

C. Accessibility: Install overhead coiling doors, switches, and controls along accessible routes in compliance with the accessibility standard.

D. Smoke-Control Doors: Install according to NFPA 80 and NFPA 105.

3.3 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.
2. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.

3.4 ADJUSTING

A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.

1. Adjust exterior doors and components to be weather resistant.

B. Lubricate bearings and sliding parts as recommended by manufacturer.

C. Adjust seals to provide tight fit around entire perimeter.

END OF SECTION 08 33 23

(NO TEXT THIS PAGE)

SECTION 08 39 19 - SANITARY AND WATERTIGHT DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Sanitary/watertight swinging doors and frames.

B. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
8. ASTM A924 - Standard Specification General Requirements for Steel Sheet, Metallic Coated by the Hot Dip Process.
9. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.
10. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
11. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
12. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
13. UL 10C (1998) - Positive Pressure Fire Tests of Door Assemblies; UL 1784 (2001) - Standard for Air Leakage Tests of Door Assemblies.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.

B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.

C. Shop Drawings: Include the following:
   1. Elevations of each door design.
   2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
   3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
   4. Locations of reinforcement and preparations for hardware.
   5. Details of each different wall opening condition.
   6. Details of anchorages, joints, field splices, and connections.
   7. Details of accessories.
   8. Details of moldings, removable stops, and glazing.
   9. Details of preparations for power, signal, and control systems.

D. Samples for Verification:
   1. Samples are only required by request of the architect and for manufactures that are not current members of the Steel Door Institute.

E. Informational Submittals:
   1. Certificates of Compliance: Submit any information necessary to indicate compliance with this specification section.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver sanitary/watertight steel work palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store sanitary/watertight steel work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch- (102-mm-) high wood blocking. Do not store in a manner that traps excess humidity.
   1. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.6 COORDINATION

A. Coordinate installation of anchorages for sanitary/watertight steel frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.7 WARRANTY

A. Provide manufacturer's written 5 year warranty against defects in materials and workmanship upon final completion and acceptance of Work in this section.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. CECO Door Products.
   2. Curries Company.

B. Substitutions: Material from alternate sanitary/watertight steel door and frame fabricators will not be accepted on jobsite without prior written and sample approval in accordance with requirements specified in Division 01.

C. Manufacturers must be Build America Buy America (BABA) compliant.

2.2 MATERIALS

A. General: Sanitary/watertight doors and frames to be manufactured of commercial quality galvanized steel complying with ASTM A924/A924M, or ASTM A653/A653M, with a minimum coating of G90. Door and frame corners, seams, closures and channels shall be welded and sealed watertight.

B. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

C. Glazing: Comply with requirements in Division 08 Section, "Glazing."

2.3 SANITARY/WATERTIGHT STEEL DOORS

A. General: Provide 1-3/4 inch doors of type and design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.

1. Design: Flush panel.
2. Core Construction: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, mineral core, or vertical steel-stiffener core.
    1) Polystyrene and Polyurethane Doors: Manufacturer's standard polystyrene or polyurethane core permanently bonded to both faces.
    2) Standard Vertical Steel-Stiffener Core: Minimum 22 gage steel-stiffeners at 6 inches on-center construction attached by spot welds spaced not more than 5" on centers. Spaces inside and between stiffeners to be completely filled with inorganic non-combustible batt-type insulation. Organic materials including, but not limited to, wood, paper, cardboard, glue, mastics, resins or fillers are not acceptable.
3. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
4. Level/Model: Level 3 and Physical Performance Level A (Extra Heavy Duty), Minimum 16 gage (0.053-inch - 1.3-mm) thick steel, Model 2 (Fully welded, seamless face and edges).
5. Vertical Edges: Vertical edges to have the face sheets joined by a continuous weld extending the full height of the door. Welds are to be ground, filled and dressed smooth. Beveled Edge, 1/8 inch in 2 inches (3 mm in 50 mm).
6. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gage (0.053-inch - 1.3-mm), extending the full width of the door and welded to the face sheet. Finish top and bottom to provide a smooth flush condition.
7. Surface Applied Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

2.4 SANITARY/WATERTIGHT STEEL FRAMES

A. General: Provide frames of the type and profile indicated, not less than thickness indicated; to comply with ANSI/SDI A250.8.

1. Fabricate frames with mitered corners.
2. Fabricate frames with "closed and tight" mitered, full depth continuously welded seams, finished smooth with no visible seam unless otherwise indicated. Knock down type frames are not permitted.
3. Minimum 16 gage (0.053-inch -1.3-mm) thick steel sheet
4. Provide where indicated cutoff stops not to exceed 6" in height and capped at a 45 degree angle. Filler shall be welded watertight.

B. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.

C. Surface Applied Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

2.5 STOPS AND GLAZED LITES

A. Moldings for Glazed Lites in Doors and Loose Stops for Glazed Lites in Frames: Minimum 16 gage (0.8 mm) thick, fabricated from same material as door face sheet in which they are installed.

2.6 FABRICATION

A. Fabricate sanitary/watertight steel work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.

B. Tolerances: Fabricate sanitary/watertight steel work to tolerances indicated in ANSI/SDI A250.8.

C. Sanitary/Watertight Steel Doors and Frames:
   1. Sanitary Water Tight Design Doors: Where indicated, provide optional sanitary design to completely seal door against water penetration. Hardware cutouts to be completely sealed to prevent water penetration inside of the door.
   2. Glazed Lites: Factory cut openings in doors with fixed glass molding flush with the door skin and removable glass molding overlapping and welded into a single "picture frame" assembly. Glass cutouts to be completely sealed to prevent water penetration inside of the door.
   3. Astragals: Provide overlapping astragals on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch (19 mm) beyond edge of door on which astragal is mounted.
   4. Continuous Hinge Reinforcement: Provide welded continuous 12 gage strap for continuous hinges specified in hardware sets in Division 08, Section "Door Hardware".

D. Sanitary/Watertight Steel Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
   1. Welded Frames: Full depth continuously weld frame seams; grind, fill, dress, and make smooth and flush.
      1) Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.
   2. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
   3. High Frequency Hinge Reinforcement: Provide 12 gage angle reinforcements for butt type hinges on every door and frame assembly.

4. Continuous Hinge Reinforcement: Provide welded continuous 12 gage straps for continuous hinges specified in hardware sets in Division 08 Section, "Door Hardware".
5. Electrical Knock Out Boxes: Factory weld 18 gage electrical knock out boxes to frame for electrical hardware preps; this includes but not limited to electric through wire transfer hardware, electrical raceways and wiring harnesses, door position switches, electric strikes, magnetic locks, and jamb mounted card readers as noted in door hardware sets in Division 08 Section, "Door Hardware".
    1) Provide electrical knock out boxes as required for Project.
6. Conduit to be coordinated and installed in the field (Division 26) from middle hinge box and strike box to door position box.
7. Electrical knock out boxes to comply with NFPA requirements and fit electrical door hardware as specified in hardware sets in Division 08 Section, "Door Hardware".
8. Electrical knock out boxes for continuous hinges should be located in the center of the vertical dimension on the hinge jamb.
9. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
10. Jamb Anchors: Provide number and spacing of anchors as follows:
    1) Masonry and Stud Wall Types: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:
        a) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 84 inches (2137 mm) high.

E. Surface Hardware Preparation: Factory prepare sanitary/watertight steel work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section, "Door Hardware."
    1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
    2. Reinforce doors and frames to receive non-template, mortised and surface-mounted door hardware.
    3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of sanitary/watertight steel work for hardware.
    4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

F. Stops and Moldings: Provide stops and moldings around glazed lites where indicated.
    1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of sanitary/watertight steel work.
    2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so glazed lites are capable of being removed independently.
    3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.

2.7 STEEL FINISHES

A. Prime Finish: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.
   1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. General Contractor to verify the accuracy of dimensions given to door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Prior to installation, adjust and securely brace welded sanitary/watertight steel frames for squareness, alignment, twist, and plumbness.

C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."

D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

3.3 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including sanitary/watertight steel work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from sanitary/watertight steel work immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

3.4 FIELD QUALITY CONTROL

A. Field Inspection (Punch Report): Reference Division 01 Sections “Closeout Procedures”. Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.

1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

END OF SECTION 08 39 19

SECTION 08 51 13 - ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes aluminum windows for exterior locations.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.

C. Samples: For each exposed product and for each color specified.

1.4 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period.

1. Warranty Period:

a. Window: 10 years from date of Substantial Completion.
b. Aluminum Finish: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 WINDOW PERFORMANCE REQUIREMENTS

A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:

1. Minimum Performance Class: AW.
2. Minimum Performance Grade: 40.

C. Thermal Movements: Provide aluminum windows, including anchorage, that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change: 120 deg F ambient; 180 deg F material surfaces.

2.2 ALUMINUM WINDOWS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following**:**

1. Arcadia, Inc..
2. Kawneer North America; an Alcoa company.
3. Manko Window Systems, Inc..
4. Wausau Window and Wall Systems; Apogee Wausau Group.
5. YKK AP America Inc.

B. Manufacturers must be Build America Buy America (BABA) compliant.

C. Frames and Sashes: Aluminum extrusions complying with AAMA/WDMA/CSA 101/I.S.2/A440.

1. Thermally Improved Construction: Fabricate frames, sashes, and muntin’s with an integral, concealed, low-conductance thermal barrier located between exterior materials and window members exposed on interior side in a manner that eliminates direct metal-to-metal contact.

D. Hardware, General: Provide manufacturer's standard corrosion-resistant hardware sized to accommodate sash weight and dimensions.

1. Exposed Hardware Color and Finish: Color selection from manufacturer to be submitted for review and approval by Owner.

E. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.

F. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.

2.3 ACCESSORIES

A. Subsills: Thermally broken, extruded-aluminum subsills in configurations indicated on Drawings.

B. Receptor System: Two-piece, snap-together, thermally broken, extruded-aluminum receptor system that anchors windows in place.

2.4 FABRICATION

A. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.

B. Glaze aluminum windows in the factory.

C. Weather strip each operable sash to provide weathertight installation.

D. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.

E. Provide water-shed members above side-hinged sashes and similar lines of natural water penetration.

F. Mullions: Provide mullions and cover plates, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections. Provide mullions and cover plates capable of withstanding design wind loads of window units.

G. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation.

2.5 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Apply baked enamel complying with paint manufacturer's written instructions for cleaning, conversion coating, and painting.

1. Organic Coating: Thermosetting, modified-acrylic or polyester enamel primer/topcoat system complying with AAMA 2603, except with a minimum dry film thickness of 1.5 mils, medium gloss.
2. Color: Color selection from manufacturer to be submitted for review and approval by Owner.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E 2112.

B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.

C. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.

D. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

E. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.

F. Clean exposed surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

G. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION 08 51 13

SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes commercial door hardware for the following:

1. Swinging doors.
2. Other doors to the extent indicated.

B. Door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.
2. Electromechanical door hardware.
3. Cylinders specified for doors in other sections.

C. Related Sections:

1. Division 08 Section “Hollow Metal Doors and Frames”.
2. Division 08 Section “Sanitary and Watertight Doors and Frames”.

D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 70 - National Electrical Code.
4. NFPA 80 - Fire Doors and Windows.
5. NFPA 101 - Life Safety Code.
6. NFPA 105 - Installation of Smoke Door Assemblies.
7. State Building Codes, Local Amendments.

E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:

1. ANSI/BHMA Certified Product Standards - A156 Series.

2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
3. ANSI/UL 294 - Access Control System Units.
4. UL 305 - Panic Hardware.
5. ANSI/UL 437- Key Locks.

1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
3. Content: Include the following information:
   a) Type, style, function, size, label, hand, and finish of each door hardware item.
   b) Manufacturer of each item.
   c) Fastenings and other pertinent information.
   d) Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
   e) Explanation of abbreviations, symbols, and codes contained in schedule.
   f) Mounting locations for door hardware.
   g) Door and frame sizes and materials.
   h) Warranty information for each product.
4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Shop Drawings: Details of electrified access control hardware indicating the following:

1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:
   a) Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
   b) Complete (risers, point-to-point) access control system block wiring diagrams.
   c) Wiring instructions for each electronic component scheduled herein.

2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.

D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

E. Informational Submittals:

1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

F. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

1.4 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).

C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.

1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.

F. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.

G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:

1. Function of building, purpose of each area and degree of security required.
2. Plans for existing and future key system expansion.
3. Requirements for key control storage and software.
4. Installation of permanent keys, cylinder cores and software.
5. Address and requirements for delivery of keys.

H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
3. Review sequence of operation narratives for each unique access controlled opening.

4. Review and finalize construction schedule and verify availability of materials.
5. Review the required inspecting, testing, commissioning, and demonstration procedures

I. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.

C. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of the hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
4. Electrical component defects and failures within the systems operation.

C. Warranty Period: Unless otherwise indicated, warranty shall be one year from date of Substantial Completion.

1.8 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:

1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

D. All manufacturers must be Build American Buy America (BABA) compliant.

2.2 HANGING DEVICES

A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity:
   a) Two Hinges: For doors with heights up to 60 inches.
   b) Three Hinges: For doors with heights 61 to 90 inches.
   c) Four Hinges: For doors with heights 91 to 120 inches.
   d) For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
   e) One additional hinge on doors 3’8” wide to 4’0” wide up to 90-inches high when the door is using a door closer.

2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

1. Widths up to 3’0”: 4-1/2” standard or heavy weight as specified.
2. Sizes from 3’1” to 4’0”: 5” standard or heavy weight as specified.

3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

1. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
2. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
   a) Interior door that is 3'8" to 4'0" wide, require heavy weight hinges.

4. Hinge Options: Comply with the following:

1. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.

5. Manufacturers:

1. McKinney (MK) - TA/T4A Series, 5 knuckle.

2.3 POWER TRANSFER DEVICES

A. Concealed Quick Connect Electric Power Transfers: Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified door hardware. Furnish with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1. Manufacturers:

    1. Securitron (SU) - EL-CEPT Series.

B. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.

    1. Provide one each of the following tools as part of the base bid contract:
        a) McKinney (MK) - Electrical Connecting Kit: QC-R001.
        b) McKinney (MK) - Connector Hand Tool: QC-R003.

2. Manufacturers:

    1. McKinney (MK) - QC-C Series.

2.4 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.

B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:

    1. Threaded mortise cylinders with rings and cams to suit hardware application.
    2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
    3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
    4. Tubular deadlocks and other auxiliary locks.
    5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
    6. Keyway: Match Facility Standard.

C. Keying System: Each type of lock and cylinders to be factory keyed.

    1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
    2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
    3. Existing System: Field verify and key cylinders to match Owner's existing system.

D. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Two (2)
2. Master Keys (per Master Key Level/Group): Five (5).
3. Construction Keys (where required): Ten (10).
4. Construction Control Keys (where required): Two (2).

E. Construction Keying: Provide construction master keyed cylinders.

F. Construction Keying: Provide temporary keyed construction cores.

G. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Owner.

2.5 KEY CONTROL

A. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.

1. Manufacturers:
   a) Lund Equipment (LU).
   b) MMF Industries (MM).
   c) Telkee (TK).

2.6 MECHANICAL LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body.

1. Heavy duty mortise locks shall have a ten-year warranty.
   a) Where specified, provide status indicators with highly reflective color and wording for “locked/unlocked” or “vacant/occupied” with custom wording options if required. Indicator to be located above the cylinder with the inside thumb-turn not blocking the visibility of the indicator status. Indicator window size to be a minimum of 2.1” x 0.6” with a curved design allowing a 180-degree viewing angle with protective covering to prevent tampering.

2. Manufacturers:
   a) Corbin Russwin Hardware (RU) - ML2000 Series.

b) Sargent Manufacturing (SA) - 8200 Series.
c) Lever design to match facility standards

2.7 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
4. Dustproof Strikes: BHMA A156.16.

2.8 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. Exit devices shall have a five-year warranty.
2. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
3. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer’s catalog and template book for specific requirements.
4. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
5. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is

required in any case where the door light extends behind the device as in a full glass configuration.

6. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
   a) Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
   b) Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.

7. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
8. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2” wide stiles.
9. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
10. Rail Sizing: Provide exit device rails factory sized for proper door width application.
11. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.

1. Manufacturers:
   a) Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
   b) Sargent Manufacturing (SA) - 80 Series.

2.9 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.

4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.

1. Heavy duty surface mounted door closers shall have a 25-year warranty.
2. Manufacturers:
   a) Corbin Russwin Hardware (RU) - DC6000 Series.
   b) Norton Rixson (NO) - 7500 Series.
   c) Sargent Manufacturing (SA) - 351 Series.

C. Door Closers, Surface Mounted (Cam Action): ANSI/BHMA 156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, high efficiency door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be of the cam and roller design, one piece cast aluminum silicon alloy body with adjustable backcheck and independently controlled valves for closing sweep and latch speed.

1. Manufacturers:
   a) Corbin Russwin (RU) - DC5000 Series.
   b) Norton Rixson (NO) - 2800ST Series.
   c) Sargent Manufacturing (SA) - 422 Series.

2.10 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1” LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.

3. Where plates are applied to fire rated doors with the top of the plate more than 16” above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer’s catalog and template book for specific requirements for size and applications.
4. Protection Plates: ANSI/BHMA A156.6 protection plates (kick, armor, or mop), fabricated from the following:
   a) Stainless Steel: 300 grade, 050-inch thick.

5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
6. Manufacturers:
   a) Rockwood (RO).

2.11 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1. Manufacturers:
   a) Rockwood (RO).

C. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

1. Manufacturers:
   a) Norton Rixson (RF).

2.12 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

F. Manufacturers:

1. Pemko (PE).

2.13 ELECTRONIC ACCESSORIES

A. Intelligent Switching Power Supplies: Provide power supplies with single, dual or multi-voltage configurations at 12 and/or 24VDC. Power Supply shall have battery backup function with an integrated battery charging circuit. The power supply shall have a standard, integrated Fire Alarm Interface (FAI). The power supply shall provide capability for secondary voltage, power distribution, direct lock control and network monitoring through add on modules. The power supply shall be expandable up to 16 individually protected outputs. Output modules shall provide individually protected, continuous outputs and/or individually protected, relay controlled outputs. Network modules shall provide remote monitoring functions such as status reporting, fault reporting and information logging.

1. Provide the least number of units, at the appropriate amperage level, sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.
2. Manufacturers:
   a) Securitron (SU) - AQL Series.

2.14 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.15 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.

1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

D. Door Closers:

1. Install closers on room side of corridor doors, and stair side of stairways.
2. Lobby doors: Mount on vestibule side.
3. Exterior doors: Parallel rigid arm installation.
4. Where through-bolts are required, install closers using only manufacturer-furnished through-bolts.
5. Install closers using only manufacturer-furnished template machine screws for metal doors and manufacturer -furnished wood screws for wood doors.
6. Coordinate with door supplier to provide proper blocking for surface mounting.
7. Use of self-drilling or self-tapping fasteners is not allowed.
8. Where full glazed door units are specified, use closer arm and mounting configuration as required to avoid use of drop brackets whenever possible.

E. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

F. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

A. Field Inspection (Punch Report): Reference Division 01 Sections “Closeout Procedures”. Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.

1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

1. Quantities listed are for each pair of doors, or for each single door.
2. The supplier is responsible for handing and sizing all products.
3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified

hardware will work as required. Provide alternate solutions and proposals as needed.

B. Manufacturer's Abbreviations:
1. MK - McKinney
2. MR - Markar
3. SU - Securitron
4. SA - SARGENT
5. RF - Rixson
6. RO - Rockwood
7. PE - Pemko
8. CR - Curries (Hardware Only)

Hardware Sets

Set: 1.0
Doors: Exterior Access Doors for Screw Press and Electrical Buildings
Storeroom Lock x Closer

	Hinge (qty per spec)	TA2314 (size per spec, NRP as applicable)	US32D	MK
1	Storeroom Lock	8204	US32D	SA
1	Permanent Core	As Specified	US15	
1	Surface Closer	351 O / 351 P10	EN	SA
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Wall Stop	RM860 / RM861	US32D	RO
1	Gasketing	S88		PE

Door Type: As noted in Contract Documents.

Set: 2.0
Doors: Interior Access Doors for Screw Press and Electrical Buildings
Privacy Lock w/ Indicator x Door Closer

	Hinge (qty per spec)	TA2314 (size per spec)	US32D	MK
1	Privacy Lock	V21 8266	US32D	SA
1	Surface Closer	422 CTB2 / 422 PCTB2	EN	SA
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Coat Hook	RM840	US32D	RO
1	Gasketing	S88		PE

Door Type: As noted in Contract Documents.

END OF SECTION 08 71 00

SECTION 09 96 00 – HIGH PERFORMANCE COATINGS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Preparation of surfaces, shop painting of items furnished, field painting of new structures, and masonry waterproofing.

1.2 REFERENCES

A. Codes and standards referred to in this Section are:

1. SSPC - The Society for Protective Coatings

   a. SSPC SP 1 - Solvent Cleaning
   b. SSPC SP 2 - Hand Tool Cleaning
   c. SSPC SP 3 - Power Tool Cleaning
   d. SSPC SP 5 - White Metal Blast Cleaning
   e. SSPC SP 6 - Commercial Blast Cleaning
   f. SSPC SP 10 - Near-White Blast Cleaning
   g. SSPC SP 11 - Power Tool Cleaning to Bare Metal
   h. SSPC SP 13 - Surface Preparation of Concrete
   i. SSPC SP 16 - Brush-off Blast Cleaning of Non-Ferrous Metals

2. ASTM D4263 - Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method

3. NACE SP0178 - Standard Practice for Design, Fabrication, and Surface Finish Practices for Tanks and Vessels to Be Lined for Immersion Service

1.3 SUBMITTALS

A. Provide all submittals, including the following, as specified in Division 1.

1. Submit manufacturer's standard color chart for color selection.

2. Furnish affidavits from the manufacturer certifying that materials furnished conform to the requirements specified and that paint products have been checked for compatibility.

3. Submit a supplementary schedule of paint products with mil thickness and solids by volume, including all paint applied in the shop and in the field. Provide a schedule that is in accordance with the recommendations of the paint manufacturer.

4. Furnish affidavits from the manufacturer certifying that coatings in immersion service contain no water-soluble solvents or corrosion inhibitive (active) pigments with slight water solubility.

1.4 PAINTING REQUIREMENTS

A. Shop Primed and Field Painted Items: Furnish the following items shop primed and field painted: structural steel and wrought metals, hangers and supports, steel stair framing, and steel lintels.

B. Unpainted Items: Do not paint the following items, unless otherwise specified: floor gratings, stainless steel, surfaces to receive field welding, faying surfaces of high strength bolted connections, and steel to be embedded or in contact with cast-in-place concrete.

1.5 DELIVERY, STORAGE AND HANDLING

A. General: Deliver, store and handle all products and materials as specified in Division 1 (and as follows:)

B. Delivery and Storage: Deliver and store paint at the site from the approved manufacturer only.

C. Packaging and Labeling: Prepare, pack and label paints, stains, varnish or ingredients of paints to be used on the job. Deliver all material to the site in original, unbroken containers.

D. Storage: Store the painting materials at the site in accordance with applicable codes and regulations and in accordance with manufacturer's instructions. Keep the storage space clean at all times. Take every precaution to eliminate fire hazards.

1.6 JOB CONDITIONS

A. Provide all necessary labor equipment supplies, power and materials to protect the surrounding property and facilities and personnel during sandblasting and painting operations and preclude the migration of sandblast residue or coating materials.

1.7 QUALITY ASSURANCE

A. Observe all applicable local, state and federal rules and regulations for removal, storage and disposal of sandblast residue, and for application of the new coating systems.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted.

1. Paint - General:

a. AkzoNobel (Ceilcote, Devoe, Enviroline, International)

2. Protective Coating – Concrete and concrete-block parapet walls, concrete roofs of walkways and where indicated

a. Mameco; Vulkum 450/451 over 171 primer

2.2 MATERIALS

A. General: Furnish paint and other materials of the type and quality of the manufacturer on which the painting schedule specified herein is based.

1. Provide compatible shop and field coats.

2. Provide all coats of paint for any particular surface from the same manufacturer.

3. Provide paint of approved color as selected from the manufacturer's standard range of colors.

B. Paint Schedule: Provide all painting in accordance with the following schedule with the number of coats not less than the number shown on the schedule.

Class of Work	Surface Preparation	Field Coats 1st	2nd	3rd	Total DFT
Steel-Structural:					
Exterior	SSPC-SP 6	E	F	C	8.5-15.0
Concrete Walls (Cast and Precast):					
Below Grade	SSPC SP-13	H			16.0-20.0
Exterior Exposed	SSPC SP-13	O	N	N	7.0-10.0

C. Schedule of Paints: Alphabetical designations in the following list are given solely for the purpose of indicating the type and quality of materials desired. Equivalent material from other approved manufacturers may be submitted for approval.

Symbol	Product Name and Number	Volume Solids %	Dry Film Thickness Mils Per Coat	VOCs (g/L)
A	International Paint-Devoe Coatings Bar-Rust 231	71	4.0-8.0	271
B	International Paint-Devoe Coatings Bar-Rust 233H	80	4.0-6.0	170
C	International Paint-Devoe Coatings Devthane 379	63	2.0-3.0	311
D	International Paint-Devoe Coatings Pre-Prime 167	100	1.0-1.5	95
E	International Paint-Devoe Coatings Cathacoat 302H	78	2.5-4.0	282
F	International Paint-Devoe Coatings Devran 224V	77	4.0-8.0	28
G	International Paint-Devoe Coatings Devran 201H	58	2.0-3.0	327

H	International Paint-Devoe Coatings Devtar 5A-HS	79	16.0-20.0	98
I	International Paint-Devoe Coatings Intertherm 228HS	70	4.0-6.0	265
J	International Paint-Devoe Coatings Tru-Glaze 4015	53	9.0-11.0	99
L	International Paint-Devoe Coatings Tru-Glaze 4015	53	9.0-11.0	99
M	International Paint-Devoe Coatings Tru-Glaze-WB 4428	36	2.0-4.0	43
N	International Paint-Devoe Coatings Devcryl 1448 – Semi-gloss	38	1.5-4.0	98
O	International Paint-Devoe Coatings Devran 203	45	3.0-4.0	91
P	International Paint-Devoe Coatings Devcryl 1440	44	2.0-3.0	77

PART 3 EXECUTION

3.1 REPAIR

A. Fill all pits in concrete having a depth in excess of 1/8 of an inch with a 100 percent solids epoxy repair compound.

B. Notify the ENGINEER of all pits with a depth greater than 1/4 inch to determine whether structural repairs are necessary. Repair such pits in a manner approved by ENGINEER.

3.2 PREPARATION

A. Inspection: Prior to surface preparation perform the following:

1. Verify that surface substrate conditions are ready to receive Work as instructed by the product manufacturer.

2. Examine specifications for all Work and become thoroughly familiar with all provisions regarding painting.

3. Document conditions of substrate prior to beginning work. Indicate any damaged or deficient substrates requiring repair and report findings to the ENGINEER.

B. Surface Preparation: After inspection and prior to painting, perform the following:

1. Inspect all Work prior to application of any paint or finishing material.

2. Brush and wash concrete and masonry surfaces. Remove all loose dirt, free lime, form oil, curing compounds and other foreign matter by approved methods such as SSPC SP13. Patch concrete surfaces requiring repair and spackle and repair surfaces to receive paint. Acid etch concrete surfaces to be painted as recommended by the manufacturer of the coating to be applied, to produce a slightly granular surface required for adherence of the paint to the concrete unless otherwise indicated. Determine that concrete and concrete masonry is thoroughly dry prior to painting per ASTM D4263.

3. Thoroughly clean surfaces to be given protective coatings.

4. Do not begin field painting prior to approval of the surface preparation.

5. Prepare and clean all surfaces prior to painting, as specified and required. Verify that surfaces are dry before any paint is applied. Perform special surface preparation work as directed by the manufacturer of the paint specified to be applied to the surface.

6. Clean the surface of structural steel by removing all rust, mill scale, oil, grease or dirt in accordance with SSPC-SP6.

7. Prior to painting steel, grind smooth all welds, beads, blisters or protuberances per NACE SP0178, other than identification markings and remove other imperfections. Remove all rust, mill scale, oil, grease and dirt by abrasive blasting in accordance with SSPC-SP-10 unless otherwise indicated.

8. Prime cleaned metal the same day immediately after sandblasting to prevent rusting.

3.3 INSTALLATION

A. General: Install all painting and coatings in accordance with the manufacturer's recommendations and approved shop drawings and as specified in Division 1.

1. Refer to manufacturer’s guidelines as it relates to minimum/maximum allowable temperatures for application.

2. The surface temperature of the steel shall be at least 5 degrees F above the dew point.

3. Paint surfaces in accordance with the material painting schedule included in this Section.

4. Completely cover all surfaces to be painted. Cover by additional coats when color on undercoats shows through the final coat of paint, until paint is of uniform color and appearance and coverage is complete.

5. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

6. Provide sufficient temporary ventilation during painting operations in enclosed areas to remove moisture and solvents, and to keep the atmosphere safe from harmful or dangerous fumes and dust levels for personnel.

B. Touch-Up Shop-Primed and Finished Items: Touch-up all damaged portions and imperfections in shop-primed and finished items. Use the same paint as used for the shop prime and finish. Prepare the surface prior to touch-up by wire brushing and sanding to remove rust, scale and loose paint per SSPC SP 2, 3, or 11, as determined by each situation.

C. Aluminum and Incompatible Surfaces: Where aluminum surfaces come in contact with incompatible metals, lime, mortar, concrete or other masonry materials, apply one field coat of International Paint-Devoe Coatings Bar-Rust 231 Epoxy or two coats of asphalt varnish conforming to FS-TT-V-51F. The aluminum surface should be abraded to a 1.5-2.0 mil profile before coatings application is done to ensure maximum adhesion to the surface.

D. Field Painting: Perform field painting at the job site as follows:

1. Mix all paints and similar materials in approved containers of adequate capacity.

2. Mix all paint thoroughly before being taken from the containers. Keep mixed while painting. Apply all ready-mixed paint exactly as received from the manufacturer without addition of any kind of drier or thinner, except as specified, to mix colors to conform to approved color schedule. Tint successive coats of paint to make various coats easily distinguishable. Tint undercoats of paint to the approximate shade of the final coat of paint.

3. Use only skilled painters on the Work, and employ specialists where required. Apply paint by brush, roller or sprayer in accordance with the manufacturer's recommendation.

4. Thoroughly and uniformly sand undercoats on hollow metal Work with No. 00 sandpaper or equal abrasive to remove all surface defects and provide a smooth, even surface. Do not allow brush marks or other irregularities on finished surfaces.

5. Perform painting as a continuous and orderly operation to facilitate adequate inspection. Prime coat and paint materials subject to weathering or corrosion before erection. Perform all paint application methods in accordance with the instructions of the paint manufacturer and as approved.

6. Fully protect areas under and adjacent to painted work at all times and promptly remove dripped or spattered paint.

7. Repair, refinish and repaint any adjacent surfaces that have been damaged or discolored by overspray.

8. Do not paint when the air or surface temperature is below that recommended by the manufacturer, or in dust-laden air, or until moisture on the surface has completely disappeared. If necessary, provide sufficient heating and ventilation to keep the atmosphere and all surfaces to be painted dry and warm until each coat of paint has hardened.

9. Remove any painting found defective. Touch-up and provide remedial painting as directed and as required until completion and acceptance of final work.

10. Apply coatings at vertical and horizontal surfaces in strict conformance with the coating manufacturer's recommendations.

3.4 HEALTH AND SAFETY

A. Introduction

1. Products listed in this specification and used in high-performance coatings situations contain high volume solids; the aerosol droplets/particulates produced during airless spray of some of these materials may form an explosive mixture with air and additionally may contain materials which may necessitate personal protection against potential health hazards. A summary of the main precautions to be taken includes:
   - Danger of explosion or fire
   - Provision of a suitable breathing environment for workers.
   - Prevention of skin irritation problems.
   - Use of paints which have been specially formulated for use in tanks.

B. Consult with manufacturer prior to commencing work to review recommended Health and Safety procedures.

3.5 QUALITY CONTROL

A. General Coatings:

1. At least daily, check temperature, humidity, and Dew Point as to time and readings obtained. Submit “Paint Inspection: Daily Coating Inspection Report” to ENGINEER on a daily basis. See Supplement below.

2. Perform daily wet film thickness readings or spreading rate checks to make certain that proper film thickness is being achieved. If proper film thickness is not being achieved more frequent checks may be required by the ENGINEER at their discretion. Provide daily written report to ENGINEER. Correct any deficiencies in film thickness by application of additional paint. See Supplement below.

3.6 CLEANING AND FINAL TOUCH UP PAINTING

A. Touch up and restore any damaged finish. Remove paint or other finishes spilled, splashed or splattered from all surfaces taking care not to mar any surface or item being cleaned.

3.7 SUPPLEMENT

A. The supplement listed below is a part of this Specification:

1. Paint Inspection: Daily Coating Inspection Report

Paint Inspection:

Daily Coating Inspection Report

Date: / / M T W Th F S Su | Pg. Of

Project #:

Inspector:

COPY To: ☐ QC Mgr ☐ Owner ☐ Contr ☐ _____

Attachments: ☐ DFT Sheet ☐ NCR/CAR ☐ _____

Project/Client:

Location:

Description:

Requirements:

Contractor:

Spec #

Revision #

Description of Areas & Work Performed

Hold Point Inspections Performed

- ☐ 1 Pre Surface Pep/Condition & Cleanliness
- ☐ 2 Surface Preparation Monitoring
- ☐ 3 Post Surface Preparation/Cleanliness & Profile
- ☐ 4 Pre Application Prep/Surface Cleanliness
- ☐ 5 Application Monitoring/Wet Film Thickness (WFT)
- ☐ 6 Post Application/Application Defects
- ☐ 7 Post Cure/Dry Film Thickness (DFT)
- ☐ 8 Nonconformance/Corrective Actions Follow-up
- ☐ 9 Final Inspection

Approved By: _____

Surface Conditions

☐ New ☐ Maint ☐ Primer/Paint ☐ Age/Dry/Cure_____

☐ Steel ☐ Galvanize ☐ Concrete ☐ Other_____

☐ Hazard _____ ☐ Sample Report # _____

☐ Degree of contamination: _____

Test: ☐ Cl_____ µg/cm² / ppm ☐ Fe ____ppm ☐ pH _____

☐ Degree of Corrosion: _____

☐ Scale ☐ Pitting/Holes ☐ Crevices ☐ Sharp Edges

☐ Weld _____ ☐ Moisture ☐ Oils ☐ Other_____

☐ Painted Surface Condition: _____

Dry to: ☐ Touch ☐ Handle ☐ Recoat

☐ Dry/Over Spray ☐ Runs/Sags ☐ Pinholes ☐ Holidays

☐ Abrasion ☐ Fall Out ☐ Other _____

Surface Preparation

Start Time: Finish Time: Est Sq/ft:

☐ Solvent Clean ☐ Hand Tool ☐ Power Tool

☐ HP Wash PSI_____ ☐ Other _____

☐ Abrasive Blast ☐ Abrasive Type _____ ☐ Sample

☐ Blast Hose Size _____ ☐ Nozzle Size / PSI _____

☐ Air Supply CFM _____ ☐ Air Supply Cleanliness

☐ Water/Oil Trap Check ☐ Equipment Condition Check

Surface Cleanliness & Profile Measurement

☐ Job Specification ☐ SSPC/NACE - SP- _____

☐ SSPC/NACE Spec / Visual Stds ☐ _____

Profile Check: _____ ☐ Disc ☐ Tape ☐ Gauge

☐ Specified _____ mils avg. / Achieved _____ mils

☐ Surface effect on DFT Gauge/BMR _____ mils

Dry Film Thickness

Gage Type / Model	Gage Serial #	Gage Calib. Verified	Spec Avg. DFT	Total Avg DFT	DFT Last Coat	DFT This Coat

Ambient Conditions

Time (Indicate AM or PM)	:	:	:	:
Dry Bulb Temp° (C/F)	°	°	°	°
Wet Bulb Temp° (C/F)	°	°	°	°
% Relative Humidity	%	%	%	%
Surface Temp° (C/F) Min/Max	/ °	/ °	/ °	/ °
Dew Point Temp° (C/F)	°	°	°	°
Wind Direction/Speed				
Weather Conditions:				

Application

Start Time : Finish Time : Est. Sq/ft.

☐ Primer ☐ Intermediate ☐ Topcoat ☐ Touch-up

Generic Type:	Qty Mixed:
Manuf.:	Mix Ratio:
Prod Name:	Mix Method:
Prod #:	Strain/Screen:
Color:	Material Temp: °F
Kit Sz/Cond.:	Sweat-in Time: Min/Hrs
Shelf Life:	Pot Life: Min/Hrs

Batch #'s

(A)	Reducer #:
(B)	Qty Added: Pt/Qt/Gal
(C)	% by Vol: %
Reducer:	Specified WFT Avg: Mils
	Achieved WFT Avg: Mils

☐ Airless/Conv. Spray ☐ Brush ☐ Roller ☐ Other _____

Pump Pot	Hose Dia.	Air Check
Ratio/Size	Hose Lng.	SEP/Trap
GPM/CFM	Spray Gun	Filter
PSI	Tip Sz.	Agitator

Inspector's Signature Date

(NO TEXT THIS PAGE)

SECTION 13 34 20 - POST-FRAME WOOD BUILDING SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 GENERAL DESCRIPTION OF BUILDING SYSTEM

A. Primary Framing:
   1. Posts attached to cast-in-place concrete post foundations; connection of posts is to be designed by post-frame wood building system designer.
   2. Roof trusses in main span.

B. Post-Frame Type:
   1. Clear span post-frame with trusses connected directly to posts.

C. Primary dimensions:
   1. As indicated in Construction Documents.

D. Metal Roofing.

E. Metal Wall Panels, Hardy Plank or Smart Wood (Or Equivalent) Wall Panels

F. Metal Liner Panels for soffits, ceilings and wall applications as indicated.

G. Gutters, Downspouts, metal trim, flashing

H. Roof and wall insulation including radiant barriers, vapor barriers and building wrap.

1.3 REFERENCES

A. AWC (NDS)- National Design Specification for Wood Construction

B. IBC-International Building Code with Indiana Administrative Code Amendments.

C. ANSI/ASCE 7 — Minimum Loads for Buildings and Other Structures.

D. ANSI/TPI 1 - National Design Standard for Metal Plate Connected Wood Truss Construction.

E. APA- Engineered Wood Construction Guide.

F. APA PDS 04-Panel Design Specification.

G. APA-Roof Sheathing Fastening Schedules for Wind Uplift.

H. ASAE EP 484 Diaphragm Design of Metal-Clad, Post-Frame Rectangular Buildings. ASABE Standards. St. Joseph, MI.

I. ASTM A 123-Specification for Zinc (Hot-dip Galvanized) Coating on Iron and Steel Products

J. ASTM A 153-Specification for Zinc (Hot-dip Galvanized) Coating on Iron and Steel Hardware.

K. ASTM A 653/A 653M —Specification for Steel Sheet, Zinc-coated Galvanized or Zinc-iron alloy-coated Galvanealed by the Hot-dip Process

L. ASTM F 1667 — Specification for Driven Fasteners: Nails, Spikes and Staples.

M. AWPA Ul - USE CATEGORY SYSTEM: User Specification for Treated Wood Products.

N. BCSI. Building Component Safety Information. Guide for Good Practice for Handling, Installing, Restraining & Bracing of Metal Plate Connected Wood Trusses.

O. ANSI/AITC A 190.1 — Structural Glued Laminated Timber

P. NFBA - Accepted Practices for Post Frame Building Construction: Framing Tolerances.

Q. NFBA Accepted Practices for Post-Frame Building Construction: Metal Panel and Trim Installation Tolerances

R. ACI 318- Building Code Requirements for Structural Concrete.

1.4 POST-FRAME WOOD BUILDING SYSTEM PERFORMANCE

A. The building shall be designed by the Post-Frame Wood Building System supplier's Designer of Record as a complete system. All structural members and connections shall be the responsibility of the Designer of Record. All components of the system shall be specified by the Designer of Record. This includes, but is not limited to, components such as post connections to foundations, post concrete foundations, primary framing, secondary framing, and lateral bracing.

B. Delegated Design: Design post-frame building system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

C. Structural Performance: Post-frame building systems shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated according to procedures in referenced Building Code and associated standards.

1. Design Loads: As required by 2014 Indiana Building Code (2012 International Building Code with Indiana Amendments).

2. Deflection Limits: Design post-frame building system assemblies to withstand design loads with detections no greater than the following:
    a. Purlins: Vertical deflection of 1/240 of the span.
    b. Girts: Horizontal deflection of 1/240 of the span.
    c. Metal Roof Panels: Vertical deflection of 1/240 of the span.
    d. Metal Wall Panels: Horizontal deflection of 1/240 of the span.
    e. Design secondary-framing system to accommodate deflection of primary framing and construction tolerances, and to maintain clearances at openings.
3. Drift Limits: Engineer building structure to withstand design loads with drift limits no greater than the following:
    a. Lateral Drift: Maximum of 1/500 of the building height.
4. Metal panel assemblies shall withstand the efforts of gravity loads and stresses within limits and under conditions indicated according to ASTM E 1592.

D. Seismic Performance: Post-frame building systems shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

E. Thermal Movements: Allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

F. Air Infiltration for Metal Wall Panels: Air leakage through assembly of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. in) of wall area when tested according to ASTM E 283 at the following test-pressure difference.
1. Test-Pressure Difference: 1.57 lbf/sq. ft. (75 Pa).

G. Water Penetration for Metal Roof Panels: No water penetration when tested according to ASTM E 1646 at the following test-pressure difference:
1. Positive Preload Test-Pressure Difference: Greater than or equal to 6.4 lbf/sq. ft. (307 Pa) and the greater of 75 percent of building live load or 50 percent of building design positive wind-pressure difference.

H. Water Penetration for Metal Wall Panels under Static Pressure: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:
1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa).

I. Water Penetration for Metal Wall Panels under Dynamic Pressure: No evidence of water leakage when tested according to AAMA 501.1 under dynamic pressure equal to 20 percent of inward-acting, wind-load design pressure of not less than 6.24 lbf/sq. ft. (300 Pa) and not more than 12 lbf/sq. ft. (575 Pa).
1. Water Leakage: Uncontrolled water infiltrating the system or appearing on systems normally exposed interior surfaces from sources other than

condensation. Water controlled by flashing and gutters that is drained back to the exterior and cannot damage adjacent materials or finishes is not water leakage.

J. Minimum Net Free Area: Provide Soffit vents for this project that will provide a minimum of 1/600 of free net area of the floor area below the attic separation walls

K. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.
1. Uplift Rating: UL 90.

L. Thermal Performance: See the drawings for the required R values.

1.5 ACTION SUBMITTALS

A. Shop Drawings: For the following post-framed building system components. Include plans, elevations, sections, details, and attachments to other work.
1. Structural-Framing Drawings: Show complete erection of primary and secondary framing; include provisions for openings. Indicate all connections. Include transverse cross-sections.
2. Show fabrication and installation details for trusses.
a. Show location, pitch, span, camber, configuration, and spacing for each type of truss required.
b. Indicate sizes, stress grades, and species of lumber.
c. Indicate locations of permanent bracing required to prevent buckling of individual truss members due to design loads.
d. Indicate locations, sizes, and materials for permanent bracing required to prevent buckling of individual truss members due to design loads.
e. Indicate type, size, material, finish, design values, orientation, and location of metal connector plates.
f. Show splice details and bearing details.
3. Metal Roof and Wall Panel Layout Drawings: Show layouts of metal panels including methods of support. Include details of edge conditions, joints, panel profiles, corners, anchorages, trim, flashings, closures, and special details. Distinguish between factory- and field-assembled work; show locations of exposed fasteners.
a. Show roof-mounted items, equipment supports, pipe supports and penetrations and lighting fixtures.
b. Show wall-mounted items including doors, windows, louvers, and lighting fixtures.
4. Accessory Drawings: Include details of the following items, at a scale of not less than 1- 1/2 inches per 12 inches (1 :8):
a. Flashing and trim
b. Gutters.
c. Downspouts.
d. Louvers.

B. Product Data: For wood-preservative-treated lumber, metal-plate connectors, metal truss accessories, and fasteners. For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
   1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
   2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
   3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.
   4. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
      a. Structural-steel-framing system.
      b. Metal roof panels.
      c. Metal wall panels.
      d. Metal liner panels - Pre-finished (Wall and Ceiling)
      e. Insulation and vapor retarder facings.
      f. Flashing and trim.
      g. Accessories.

C. Samples for Verification: For each type of exposed finish required, prepared on Samples of sizes indicated below:
   1. Metal Panels: Nominal 12 inches (300 mm) long by actual panel width. Include fasteners, closures, colors and other exposed panel accessories.
   2. Flashing and Trim: Nominal 12 inches (300 mm) long. Include color, fasteners and other exposed accessories.
   3. Vapor-Retarder Facings: Nominal 6-inch- (150-mm-) square Samples.
   4. Accessories: Nominal 12-inch- (300-min-) long Samples for each type and color of accessory.

D. Delegated-Design Submittal: For post-framed building systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer licensed in the State of Indiana responsible for their preparation.
   1. Indicate assembly dimensions, locations of structural members, connections, attachments, openings, cambers and loads; wall and roof system dimensions, panel layout, general construction details, anchorages and method of anchorage, installation and; framing anchor bolt settings, sizes, and locations from datum and foundation loads.
   2. For metal-plate-connected wood trusses indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

E. Field quality-control reports.

F. Material Test Reports: For each of the following products:
1. Structural steel including chemical and physical properties.
2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
3. Tension-control, high-strength, bolt-nut-washer assemblies.
4. Shop primers.

G. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for insulation and vapor-retarder facings. Include reports for thermal resistance, fire-test-response characteristics, water-vapor transmission, and water absorption.

H. Evaluation Reports: For the following, from ICC-ES:
1. Wood-preservative-treated lumber.
2. Metal-plate connectors.

I. Qualification Data: For qualified builder and professional engineer

J. Maintenance Data: For metal panel finishes to include in maintenance manuals.

K. Warranties: Sample of special warranties.

1.6 QUALITY ASSURANCE

A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with quality-control procedures in TPI 1 for manufacture of connector plates.
1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

B. Fabricator Qualifications: Shop that participates in a recognized quality-assurance program that complies with quality-control procedures in TPI 1 and that involves third-party inspection by an independent testing and inspecting agency acceptable to Architect and authorities having jurisdiction.

C. Testing Agency Qualifications: For testing agency providing classification marking for fire- retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

D. Post-framed building systems designer:
1. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

E. The builder shall have specialized experience in the construction of post-frame building systems for a period of at least 5 years.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Metal-plate connected wood trusses:
   1. Handle and store trusses to comply with recommendations in TPI BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."
      a. Store trusses flat, off of ground, and adequately supported to prevent lateral bending.
      b. Protect trusses from weather by covering with waterproof sheeting, securely anchored.
      c. Provide for air circulation around stacks and under coverings.
   2. Inspect trusses showing discoloration, corrosion, or other evidence of deterioration. Discard and replace trusses that are damaged or defective.

B. Lumber:
   1. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings

C. Metal Panels:
   1. Deliver components, sheets, panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
   2. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
   3. Stack metal panels horizontally on platforms or pallets, covered with suitable weather tight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

1.8 WARRANTY

A. The post-frame contractor shall provide a workmanship warranty of 2 year(s) for prevention of roof leaks, and other water infiltration.

B. Component installation shall be warranted by the installer for 20 year(s).

C. Material suppliers shall provide manufacturers’ standard material warranties.

PART 2 PRODUCTS

2.1 POSTS:

A. Wall posts may be Solid sawn or Glued-laminated structural wood products.

B. Portions of wood posts less than 8 in. above grade must be:
1. Protected with pressure preservative chemical treatments to retention levels for Use Category UC4B or better per AWPA-U1.

C. All connection hardware below grade and 8 in. or less above grade shall be hot dipped galvanized per ASTM 153 to meet requirements of preservative chemical treatments applied to lumber.

2.2 WALL GIRTS:

A. Wall girts are solid sawn products.

B. Wall girls shall satisfy the wind load requirements of Section 1 .4.H plus any additional lateral loadings exerted by stored materials acting directly on the wall sheathing.

C. All wall girts less than 8 in. above grade must be pressure preservative treated with preservative chemical treatments and to retention levels for Use Category UC4B or better per AWPA-U1.

D. Wall girts are placed directly on the outside face of wall columns.

E. Wall gins are attached to the posts with fastener schedules specified by the post-framed building system designer.

F. All connection hardware 8 in. or less above grade shall be hot dipped galvanized per ASTM 153 to meet requirements of preservative chemical treatments applied to lumber.

2.3 WALL SHEATHING:

A. General: Provide factory-formed metal wall panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners and factory-applied sealant in side laps. Include accessories required for weather tight installation.

B. Exterior Wall System: Tapered-Rib-Profile, Exposed-Fastener Metal Wall Panels: Formed with raised, trapezoidal major ribs an intermediate stiffening ribs symmetrically space between major ribs.
1. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, 1 9((Z75) coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.

a. Nominal Thickness: 29 gauge, minimum.
b. Exterior Finish: Factory applied polyvinylidene fluoride finish. The coating shall be a nominal 0.050 mm (2 mil) thickness consisting of a baked-on topcoat of not less than 0.018 mm 0.7 mil dry film thickness and the paint manufacturer's recommended primer of not less than 0.025 mm (1.0 mil) thickness.
1) Color: As selected by the Architect.
c. Interior Finish: The interior color finish shall consist of a 0.5 mil (0.013 mm) thick prime coat, color: white.

2. Panel Profile: G-Rib
3. Panel Coverage: 36 inches.
4. Panel Height: 0.75 inches.

C. Wall sheathing shall satisfy the wind load requirements of Section 1 .4.H plus any additional lateral loadings exerted by materials acting directly on the wall sheathing.

D. Wall sheathing consists of ribbed steel panels attached to outside edge of wall girts in accordance with manufacturer's specifications and post-frame building systems designer.

E. Interior Wall and Ceiling System: Corrugated or Tapered-Rib-Profile, Exposed-Fastener Metal Wall Panels on MR 5/8" Gyp. Bd.

1. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, I "I() (Z275) coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class .47.30 (Class AZM 150) coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
a. Nominal Thickness: 29 gauge, minimum.
b. Exterior Finish: Factory applied polyvinylidene fluoride finish. The coating shall be a nominal 0.050 mm (2 mil) thickness consisting of a baked-on topcoat of not less than 0.018 mm 0.7 mil dry film thickness and the paint manufacturer's recommended primer of not less than 0.025 mm (1.0 mil) thickness.
1) Color: As selected by the Architect.
c. Interior Finish: The interior color finish shall consist of a 0.5 mil (0.013 mm) thick prime coat, color: white.

2. Panel Profile: Corrugated or G-Rib
3. Panel Coverage: 36 inches.
4. Panel Height: 0.75 inches.

2.4 PRIMARY ROOF FRAMING:

A. All roof framing shall satisfy the load requirements of Section 1.4.C through 1.4.I except dead load for purlins only includes contributions from the purlins and sheathing and other roof coverings.

B. The primary roof framing shall consist of metal-plate-connected wood trusses capable of withstanding design loads within limits and under conditions indicated. Comply with requirements in TPI 1 unless more stringent requirements are specified below.
   1. Design Loads: As indicated
   2. Maximum Deflection Under Design Loads:
      a. Roof Trusses: Vertical detection of 1/240 of span.

C. Comply with applicable requirements and recommendations of the following publications.
   1. TPI 1, "National Design Standard for Metal Plate Connected Wood Truss Construction."
   2. TPI DSB, "Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses."
   3. TPI BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."
   4. D. Wood Structural Design Standard: Comply with applicable requirements in AF&PA's "National Design Specifications for Wood Construction" and it's "Supplement."

2.5 ROOF PURLINS:

A. Roof purlins shall satisfy the load requirements of Section 1.4.C through 1.4.H except dead load for purlins includes only the contributions from the purlins, sheathing, and other roof coverings.

B. Roof purlins shall be Solid sawn structural wood products.

C. Roof purlins shall be placed directly on the top of trusses with strong axis oriented per shop drawings.

D. Roof purlins shall be attached to the truss with fastener types and schedules per the designer of record.

2.6 ROOF SHEATHING:

A. Roof System: Manufacturer's standard metal roof panels.

B. All roof sheathing shall satisfy the load requirements of Section 1.4.C through 1 .4.H except dead load only includes contributions from the sheathing and other sheathing coverings.
   1. Uplift Rating: UL 90.

C. Metal Roof Panels. Tapered-Rib-Profile, Exposed-Fastener Metal Wall Panels: Formed with raised, trapezoidal major ribs an intermediate stiffening ribs symmetrically space between major ribs.

1. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, *I *)t)* (Z275) coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, t / las.s .A 50 (Class AZM 1 50) coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
   a. Nominal Thickness: 29 gauge, minimum.
   b. Exterior Finish: Factory applied polyvinylidene fluoride finish. The coating shall be a nominal 0.050 mm (2 mil) thickness consisting of a baked-on topcoat of not less than 0.018 mm 0.7 mil dry film thickness and the paint manufacturer's recommended primer of not less than 0.025 mm (I .0 mil) thickness.
      1) Color: As selected by the Architect.
   c. Interior Finish: The interior color finish shall consist of a 0.5 mil (0.013 mm) thick prime coat, color: white.
2. Panel Profile: G-Rib
3. Panel Coverage: 36 inches.
4. Panel Height: 0.75 inches.

2.7 GLASS-FIBER BLANKET INSULATION

A. Kraft-Faced, Glass-Fiber Blanket Insulation: ASTM C 665, Type II (non-reflective faced), Class C (faced surface not rated for flame propagation); Category I (membrane is a vapor barrier).
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. CertainTeed Corporation.
      b. Guardian Building Products, Inc.
      c. Johns Manville.
      d. Knauf Insulation.
      e. Owens Corning.

B. Reinforced-Foil-Faced, Glass-fiber Blanket Insulation: ASTM C 665, Type III (reflective faced), Class A (faced surface with a Same-spread index of 25 or less); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.

2.8 LOOSE-FILL INSULATION

A. Glass-Fiber Loose-Fill Insulation: ASTM C 764, Type I for pneumatic application; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E 84.

B. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide cross ventilation between insulated attic spaces and vented eaves.

2.9 RADIANT BARRIERS

A. Radiant Barriers: ASTM C 1313 and as follows:
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. EcoFoil; Foil-Single Bubble-Foil.
      b. Innovative Insulation, Inc.; TempShield Single Bubble Foil.
      c. RadiantGuard; Reflex-Air Single Bubble.
   2. Sheet Construction: One layer of a bubble wrap insulation material laminated between two layers of metalized film providing a minimum thermal resistance of R1.0.
   3. Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indexes of 5 and 10, respectively.
   4. Tear Resistance (ASTM D882): 80.4 lb/in width, machine direction.
   5. Water-Vapor Transmission: 5 perms or greater.

2.10 WATER-RESISTIVE BARRIER

A. Building Wrap: ASTM E 1677, Type I air barrier; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested according to ASTM E 84; UV stabilized; and acceptable to authorities having jurisdiction.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. Dow Chemical Company (The); Styrofoam Weathermate Plus Brand Housewrap.
      b. DuPont (E.I. du Pont de Nemours and Company); Tyvek CommercialWrap.
      c. Ludlow Coated Products; Barricade Building Wrap.
      d. Pactiv, Inc.; GreenGuard Classic Wrap.
      e. Raven Industries Inc.; Fortress Pro Weather Protective Barrier.
      f. Reemay, Inc.; Typar HouseWrap.
   2. Water-Vapor Permeance: Not less than 75 perms (4300 ng•/Pa x s x sq. m) per ASTM E 96/E 96M, Desiccant Method (Procedure A).
   3. Allowable UV Exposure Time: Not less than three months.

B. Building-Wrap Tape: Pressure-sensitive plastic tape recommended by building-wrap manufacturer for sealing joints and penetrations in building wrap.

2.11 VAPOR RETARDERS

A. Reinforced-Polyethylene Vapor Retarders: Two outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either nylon cord or polyester scrim and weighing not less than 25 lb/ I I)()() .sq. ft, (12 k N 1 00 sq. na), with maximum permeance rating of II.05(J 7 Jan-in (2.9 u g Pa x s x sq. in).
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Raven Industries Inc.; DURA-SKRIM 6WW.
b. Reef Industries, Inc.; Griffolyn T-65.

2. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

2.12 DOORS AND FRAMES

A. See Specifications under Division 8.

2.13 WINDOWS

A. See Specifications under Division 8.

2.14 ACCESSORIES

A. General: Provide accessories as standard with post-framed building system manufacturer and as specified. Fabricate and finish accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes. Comply with indicated profiles and with dimensional and structural requirements.
1. Form exposed sheet metal accessories that are without excessive oil-canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.

B. Roof Panel Accessories: Provide components required for a complete metal roof panel assembly including copings, fasciae, corner units, ridge vents, ridge closures, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal roof panels unless otherwise indicated.
1. Closures: Provide closures at eaves and ridges, fabricated of same material as metal roof panels.
2. Clips: Manufacturer's standard, formed from stainless-steel sheet, designed to withstand negative-load requirements.
3. Cleats: Manufacturer's standard, mechanically seamed cleats formed from stainless-steel sheet.
4. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
5. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum l -inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal roof panel profile. Provide closure strips where indicated or necessary to ensure weather tight construction.
6. Thermal Spacer Blocks: Where metal panels attach directly to purlins, provide thermal spacer blocks of thickness required to provide I-inch (25-mm) standoff; fabricated from extruded polystyrene.

C. Wall Panel Accessories: Provide components required for a complete metal wall panel assembly including copings, fasciae, mullions, silks, comer units, clips, sealants, gaskets,

fillers, closure strips, and similar items. Match material and finish of metal wall panels unless otherwise indicated.

1. Closures: Provide closures at eaves and rakes, fabricated of same material as metal wall panels.
2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-min-) thick, flexible closure strips; cut or premolded to match metal wall panel profile. Provide closure strips where indicated or necessary to ensure weather tight construction.

D. Flashing and Trim: Formed from minimum 22 gauge metallic-coated steel sheet or aluminum- zinc alloy-coated steel sheet prepainted with coil coating; finished to match adjacent metal panels.

1. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, comers, bases, framed openings, ridges, fasciae, and fillers.
2. Opening Trim: Formed from minimum 22 gauge, metallic-coated steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating. Trim head and jamb of door openings, and head, jamb, and sill of other openings.

E. Gutters: Formed from minimum 22 gauge, metallic-coated. steel sheet or aluminum-zinc alloy- coated steel sheet prepainted with coil coating; finished to match roof fascia and rake trim. Match profile of gable trim, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch- (2438-min-) long sections, sized according to SMACNA's "Architectural Sheet Metal Manual."

1. Gutter Supports: Fabricated from same material and finish as gutters.
2. Strainers: Bronze, copper, or aluminum wire ball type at outlets.

F. Downspouts: Formed from same material as roof panels and finished to match metal wall panels. Fabricate in minimum 10-foot- (3-m-) long sections, complete with formed elbows and offsets.

1. Mounting Straps: Fabricated from same material and finish as gutters.

G. Pipe Flashing: Premolded, EPDM pipe collar with flexible aluminum ring bonded to base.

H. Materials:

1. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide fasteners with heads matching color of materials being fastened by means of plastic caps or factory-applied coating.
    a. Fasteners for Metal Roof Panels: Self-drilling or self-tapping, zinc-plated, hex- head carbon-steel screws, with a stainless-steel cap or zinc-aluminum-alloy head and EPDM sealing washer.

b. Fasteners for Metal Wall Panels: Self-drilling or self-tapping, zinc-plated, hex- head carbon-steel screws, with EPDM sealing washers bearing on weather side of metal panels.
c. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws with hex washer head.
d. Blind Fasteners: High-strength aluminum or stainless-steel rivets.

2. Corrosion-Resistant Coating: Cold-applied asphalt mastic, compounded for 15-mil (0.4- mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
3. Metal Panel Sealants:
   a. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene- compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape of manufacturer's standard size.
   b. Joint Sealant: ASTM C 920; one-part elastomeric polyurethane or polysulfide; of type, grade, class. and use classifications required to seal joints in metal panels and remain weather tight; and as recommended by metal building system manufacturer.

2.15 FABRICATION

A. General: Design components and field connections required for erection to permit easy assembly.
   1. Mark each piece and part of the assembly to correspond with previously prepared erection drawings, diagrams, and instruction manuals.

B. Metal Panels: Fabricate and finish metal panels at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements. Comply with indicated profiles and with dimensional and structural requirements.
   1. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of metal panel.

PART 3 EXECUTION

3.1 EXAMINATION

A. Inspection: Before start of installation, contractor shall carefully inspect installed Work of other trades affecting construction of the post frame building. Verify that all such work is complete to the point where installation of the post-frame building may properly commence.
   1. Verify that the work of this section may be installed in accordance with all applicable codes and regulations, and with original design as shown and indicated on the shop drawings approved by the designer of record.

B. Discrepancies: In the event of a discrepancy, installer shall immediately notify the designer of record. Installation shall not proceed until discrepancies and/or unsatisfactory conditions have been fully resolved and/or approved as agreed by the designer of record and the installer.

3.2 PREPARATION:

A. Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition.

B. Provide temporary shores, guys, braces, and other supports during erection to keep structural framing secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural framing, connections, and bracing are in place unless otherwise indicated.

3.3 ERECTION:

A. General: Work shall proceed in accordance with contractor’s current, written instructions and as per design specifications and reviewed shop drawings for erection of post-frame building systems.

B. Install all roof and wall structural elements, building components, and accessories as shown in the reviewed design shop drawings or in component supplier instruction sheets
   1. Install all connections between indicated structural components per shop drawings.

C. Install purlins and wall girts in the orientation shown in the shop drawings.

D. Handle, install and brace all trusses during construction according to TPI’s, HIB-Post Frame document.

E. Install required roof bracing as shown on the shop drawings

F. If applicable, install individual web member permanent lateral restraint at the locations shown on the sealed truss shop drawings.

G. If applicable, install diagonal bracing to appropriate individual web members for permanent lateral restraint as specified by post-framed building designer.

H. Install permanent wind bracing in the wall system as shown on the shop drawings.

I. Install all framing components to within tolerances recommended in the NFBA Framing Tolerances standard, “Accepted Practices for Post Frame Building Construction: Framing Tolerances.”

J. Provide temporary wall bracing during construction as recommended by the post-framed building designer

K. Do not field cut or modify structural members without approval of the post-framed building designer or the Architect

3.4 METAL PANEL INSTALLATION, GENERAL:

A. Examination: Examine primary and secondary framing to verify that structural-panel support members and anchorages have been installed within alignment tolerances required by manufacturer.
   1. Examine roughing-in for components and systems penetrating metal panels, to verify actual locations of penetrations relative to seams before metal panel installation.

B. General: Install all metal panel and metal trim components to within tolerances recommended in NFBA's Cladding Tolerances standard, "Accepted Practices for Post-Frame Building Construction: Metal Panel and Trim Installation Tolerances."
   1. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
   2. Field cut metal panels as required for doors, windows, and other openings. Cut openings as small as possible, neatly to size required, and without damage to adjacent metal panel finishes.
      a. Field cutting of metal panels by torch is not permitted unless approved in writing by manufacturer.
   3. Install metal panels perpendicular to structural supports unless otherwise indicated.
   4. Flash and seal metal panels with weather closures at perimeter of openings and similar elements. Fasten with self-tapping screws.
   5. Locate and space fastenings in uniform vertical and horizontal alignment.
   6. Locate metal panel splices over, but not attached to, structural supports with end laps in alignment.
   7. Lap metal dashing over metal panels to allow moisture to run over and off the material.
   8. Fasteners: Use stainless-steel fasteners.
   9. Watertight Installation:
      a. Apply a continuous ribbon of sealant or tape to seal lapped joints of metal panels, using sealant or tape as recommend by manufacturer on side laps of nesting-type panels; and elsewhere as needed to make panels watertight.
      b. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
      c. At panel splices, nest panels with minimum 6-inch (152-mm) end lap, sealed with sealant and fastened together by interlocking clamping plates.

10. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal roof panel manufacturer.
11. Joint Seaters: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal panel assemblies. Provide types of gaskets, fillers, and sealants indicated; or, if not indicated, provide types recommended by metal panel manufacturer.
    a. Seal metal panel end laps with double beads of tape or sealant the full width of panel. Seal side joints where recommended by metal panel manufacturer.
    b. Prepare joints and apply sealants to comply with requirements in Section 079200"Joint Sealants."

3.5 METAL ROOF PANEL INSTALLATION:

A. General: Provide metal roof panels of full length from eave to ridge unless otherwise indicated or restricted by shipping limitations.
   1. Install ridge caps as metal roof panel work proceeds.
   2. Flash and seal metal roof panels with weather closures at eaves and rakes. Fasten with self-tapping screws.

B. Tapered-Rib-Profile, Exposed-Fastener Metal Roof Panels: Formed with raised, trapezoidal major ribs and intermediate stiffening ribs symmetrically spaced between major ribs.
   1. Install pressure plates at locations indicated in manufacturer's written installation instructions.
   2. Rigidly fasten eave end of metal roof panels and allow ridge end free movement due to thermal expansion and contraction. Predrill panels for fasteners.
   3. Provide metal closures at rake edges and each side of ridge caps.
   4. Metal Roof Panel Installation Tolerances: Shim and align metal roof panels within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines as indicated and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

C. Metal Fascia Panels: Align bottom of metal panels and fasten with blind rivets, bolts, or self- drilling or self-tapping screws. Flash and seal metal panels with weather closures where fasciae meet soffits, along lower panel edges, and at perimeter of all openings.

3.6 METAL WALL PANEL INSTALLATION

A. General: Install metal wall panels in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts, extending full height of building, unless otherwise indicated. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Unless otherwise indicated, begin metal panel installation at corners with center of rib lined up with line of framing.
2. Shim or otherwise plumb substrates receiving metal wall panels.
3. When two rows of metal panels are required, lap panels 4 inches (102 mm) minimum.
4. When building height requires two rows of metal panels at gable ends, align lap of gable panels over metal wall panels at eave height.
5. Rigidly fasten base end of metal wall panels and allow eave end free movement due to thermal expansion and contraction. Predrill panels.
6. Flash and seal metal wall panels with weather closures at eaves, rakes, and at perimeter of all openings. Fasten with self-tapping screws.
7. Install screw fasteners in predrilled holes.
8. Install flashing and trim as metal wall panel work proceeds.
9. Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete, and elsewhere as indicated; or, if not indicated, as necessary for waterproofing.
10. Align bottom of metal wall panels and fasten with blind rivets, bolts, or self-drilling or self-tapping screws.
11. Provide weatherproof escutcheons for pipe and conduit penetrating exterior walls.

B. Lap-Seam Metal Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.
1. Lap ribbed or fluted sheets one full rib. Apply panels and associated items true to line for neat and weathertight enclosure.
2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.
3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
5. Flash and seal panels with weather closures at perimeter of all openings.

C. Installation Tolerances: Shim and align metal wall panels within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 in), nonaccumulative, on level, plumb, and on location lines as indicated, and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.7 THERMAL INSULATION INSTALLATION

A. General: Comply with insulation manufacturer's written instructions applicable to products and applications indicated.
1. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

2. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
3. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

B. Glass-Fiber Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
3. Maintain 3-init (76-rms) clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
4. Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.
5. For wood-framed construction. install blankets according to ASTM C 1320 and as follows:
    1) With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.
    2) b. Concealed Installation: Kraft-faced, glass-fiber blanket insulation may be used in concealed spaces where insulation is installed behind and in substantial contact with the unexposed surface of the wall finish.
    3) Exposed Installation: Reinforced-foil-faced, glass-fiber blanket insulation with a flame-spread index of 25 or less must be used where insulation will be left exposed above and below the ceiling.

C. Loose-Fill Insulation: Apply according to ASTM C 1015 and manufacturer's written instructions. Level horizontal applications to uniform thickness as indicated, lightly settle to uniform density, but do not compact excessively.

D. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
1. Loose-Fill Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 I b/C rl. Il. (40 k CPI. 1T1).

3.8 INSTALLATION OF RADIANT BARRIERS

A. Install sheet radiant barriers according to ASTM C 1158.

3.9 WATER-RESISTIVE BARRIER INSTALLATION

A. Building Wrap: Comply with manufacturer's written instructions.
   1. Seal seams, edges, fasteners, and penetrations with tape.
   2. Extend into jambs of openings and seal corners with tape.

3.10 INSTALLATION OF VAPOR RETARDERS

A. Place vapor retarders on side of construction indicated on Drawings. Extend vapor retarders to extremities of areas to protect from vapor transmission. Secure vapor retarders in place with adhesives or other anchorage system as indicated. Extend vapor retarders to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.

B. Seal vertical joints in vapor retarders over framing by lapping no fewer than two studs.
   1. Fasten vapor retarders to wood framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners 16 inches (406 mm) o.c.

C. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarders.

D. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarders.

3.11 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weather tight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
   1. Install components required for a complete metal roof panel assembly, including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
   2. Install components for a complete metal wall panel assembly, including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
   3. Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by manufacturer.
   4. All roof and wall accessories to be installed weather tight.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible and set units true to line and level as indicated.

Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

1. Install exposed flashing and trim that is without excessive oil-canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (600 mm) of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

C. Gutters: Join sections with riveted-and-soldered or lapped-and-sealed joints. Attach gutters to eave with gutter hangers spaced as required for gutter size, but not more than 36 inches (914 mm) o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.

D. Downspouts: Join sections with 1-1/2-inch (38-mm) telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch (25 mm) away from walls; locate fasteners at top and bottom and at approximately 60 inches (1524 mm) o.c. in between

1. Provide elbows at base of downspouts to direct water away from building.
2. Tie downspouts to underground drainage system indicated.
3. Downspouts to utilize splash blocks or underground drainage system as indicated on the drawings

E. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to panel as recommended by manufacturer.

3.12 CLEANING AND PROTECTION

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Touchup Painting: After erection, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted structural framing and accessories.

1. Clean and prepare surfaces by SSPC-SP 2, "Hand Tool Cleaning," or by SSPC-SP 3, "Power Tool Cleaning."
2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

C. Metal Panels: Remove temporary protective coverings and strippable films, if any, as metal panels are installed. On completion of metal panel installation, clean finished

surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

1. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures

END OF SECTION 13 34 20

(NO TEXT THIS PAGE)

SECTION 23 00 00 - HEATING, VENTILATING & AIR CONDITIONING (HVAC)

PART 1 - GENERAL

1.01 SECTION INLCUDES

A. The work covered in this Section consists of furnishing all labor, equipment, and materials required to install building HVAC systems.

1.02 RELATED SECTIONS

A. Section 01 30 00 – Administrative Requirements

1.03 REFERENCE STANDARDS

A. Applicable codes and standards shall include, but not be limited to, the most recent edition with the latest revisions, supplements, and amendments of the applicable codes and standards of the following:

1. Build America, Buy America Act (BABA)
2. Local Ordinances and Statutes
3. National Fire Protection Association (NFPA)
4. Indiana Building Code (IBC)
5. Indiana Mechanical Code (IMC)
6. Indiana Energy Conservation Code (IECC)
7. American Society of Heating Refrigerating and Air Conditioning Engineers (ASHRAE)
8. Sheet Metal and Air Conditioning Contractors National Association (SMACNA)
9. Underwriters Laboratories (UL)

1.04 SUBMITTALS

A. The Contractor shall furnish the manufacturer's certification that the equipment and materials proposed for use are in compliance with the specification requirements and include copies of supporting tests and previous use documentation.

B. Shop drawings shall be submitted for the following equipment:

1. Air Distribution Devices
2. Air Conditioning Equipment (Fan coils and Condensing units)
3. Exhaust Fans
4. Air Balance Report
5. Sheet Metal Duct Shop Drawings
6. Duct Insulation / Pipe insulation

C. All submittals shall conform to the requirements of Division 01 specifications

1.05 CONTRACTOR QUALIFICATIONS

A. The subcontractor used on this project shall furnish information in the form of a notarized letter on company letterhead stating that the firm has successfully been installing sheet metal air conditioning and ventilation systems for at least 2 years prior, to ordering equipment and beginning work. The information provided shall contain the cost and size of project along with dates, persons to contact, and telephone numbers.

PART 2 - PRODUCTS

2.01 GENERAL

A. All materials shall be new and free from defects and shall be of the best quality available in each specified grade or class. Materials shall be installed in strict accordance with the manufacturer's recommendations.

B. All materials and manufactured products shall be in compliance with the Build America, Buy America Act (BABA). All construction materials used shall be produced in the United States. Additionally, manufactured products shall be produced in the United States with at least 55% of internal components (by cost) shall be produced domestically.

1. Obtaining any necessary waivers shall be the responsibility of the contractor.
2. Where specific equipment suppliers are mentioned on drawings and specifications, the contractor shall still be responsible for confirming BABA compliance of the final ordered product including associated trim and options.

C. All products to be provided with a minimum of a 1 year labor/workmanship warranty and a 5 year parts/material warranty at minimum.

2.02 GALVANIZED DUCTWORK

A. All ducts shall be fabricated from lock forming quality galvanized sheet steel with 1-1/2 oz. of zinc total per square foot unless indicated or specified otherwise.

B. Construction shall be to the standards outlined in the latest edition of SMACNA Duct Construction Standards.

C. Duct metal gauges shall be to the standards listed above except where indicated otherwise on the drawings, and acceptable to the Engineer for the location and support characteristics.

D. Duct panels over 12-inches wide shall be cross-broken or beaded on 12-inch centers. Cross-breaking shall be outward on positive pressure ducts and inward on negative pressure ducts.

E. All duct panels shall be braced or reinforced as necessary, in addition to the minimum requirements in SMACNA, to eliminate vibration and noise and to prevent deflection from the indicated shapes and dimensions.

F. Duct joints and seams shall be as follows:

1. Longitudinal seams shall be Pittsburgh Lock, button punch, snap, lock or grooved.
2. Transverse joints shall be in accordance with the Specified SMACNA Standards.

3. Drive Slips: Use on the short side up to 18-inch dimensions. Gauge shall be at least same gauge as duct. Bend drive slip over at least 3/4-inch at corners.
4. Corner closures shall be as required to provide for minimum leakage.

G. Elbows and tees shall be as follows: Long radius vaned, with throat radius equal to the width of duct and full heel radius, or:

1. Square with single thickness turning vanes, one nominal gauge heavier than duct elbow, size and spacing as shown in the "Low Pressure Duct Construction Standards".

2. Provide the type indicated on Drawings or required by field conditions.

3. Provide specific elbows or tees fabricated per details where indicated.

H. Transformations, rises, and drops: Fabricate with a horizontal or vertical slope not exceeding 1-inch in 7-inches.

1. Connections to equipment shall be straight and leak tight.

2. Provide as required to make connection to equipment, louvers, grilles or duct collars.

I. Hanger materials shall be galvanized steel bands where approved by the Engineer or galvanized steel rods to supporting angles.

1. One-inch x 1/8-inch bands or approved alternate for ducts up to 36-inches wide, and trapeze type with rods for larger ducts. Spacing consistent with SMACNA Duct Construction Standards

2. Coordinate with the hangers for ceilings, light fixtures, etc.

2.03 AIR DISTRIBUTION DEVICES

A. Select grilles, diffusers, and registers with neck velocities and noise ratings equal to or less than those used for design.

B. All supply air devices shall be designed to diffuse the specified air quantities uniformly throughout the conditioned space with a 25 °F cooling temperature differential between average room temperature and supply air temperature.

C. Shall be aluminum with anodized aluminum finish.

D. Provide duct adapters as required for indicated duct sizes.

E. Manufacturers:
1. Titus
2. Price

3. Krueger
4. Hart & Cooley
5. Approved Equals

2.04 DUCTWORK INSULATION

A. Insulate with 2 inch flexible blanket external duct insulation, with vapor barrier. Insulate continuously and seal all joints.

B. Insulation shall be rigid fiberglass, 1.5 pcf density, Johns-Manville "Microlite", or approved equal, where exposed in mechanical rooms. Maximum thermal conductivity (k): 0.15 at 75 °F mean temperature.

C. Secure to bottom of rectangular ducts 18-inches wide and larger with Graham welded mechanical pins and tin coated metal discs spaced on not more than 12-inch centers.

D. Vapor barrier: UL approved reinforced aluminum foil and fire resistant Kraft paper. All parts of the indoor supply ductwork and its supports and attachments, that are subject to moisture condensation, shall be protected with external insulation with vapor barrier.

E. Finish shall be continuous. Lap all seams in joints 2-inches and cement tight or cover seams with 4-inch strips of like facing material adhered in place with vapor barrier adhesive.

F. Exterior duct shall be fully coated with United McGill Duct Seal or approved equal.

2.05 PTAC UNITS

A. Unit to be wall mounted packaged DX cooling with electric heating. Unit to have hot gas reheat for dehumidification.

B. Equipment by Bard or approved equal.

C. System components to match the performance scheduled on drawings and include all options and accessories indicated on drawings, schedules, and required by local codes.

D. Split systems to be provided with a combination thermostat/humidistat located where shown on plans.

E. Provide 5 year compressor warranty.

F. Provide factory mounted disconnect.

G. Install unit per manufacturer guidelines.

2.06 MINI-SPLIT AC UNITS

A. System to be a mini-split heat pump / AC system with a wall mounted fan coil unit.

B. Equipment by:

1. LG
2. Carrier
3. Daikin
4. Samsung
5. Trane
6. Approved Equal

C. System components to match the performance scheduled on drawings and include all options and accessories indicated on drawings, schedules, and required by local codes.

D. Split systems to be provided with a combination thermostat/humidistat located on the wall within the room.

E. Provide 5 year compressor warranty.

F. Provide factory mounted disconnect for outdoor unit. Indoor unit to be powered through outdoor unit.

2.07 EXHAUST FANS

A. Exhaust fans to be wall mounted axial fans with performance, options, and accessories as scheduled.

B. Fans to be direct drive, spark resistant type B minimum, with an explosion proof motor.

C. Provide exhaust fans by:
1. Greenheck
2. Jenco
3. Loren Cook
4. ACME
5. Twin City Fan
6. Approved Equal

PART 3 - EXECUTION

3.01 GENERAL

A. Prior to commencing work, verify all measurements at the building site. Submit all discrepancies for clarification before proceeding with the work.

B. All work shall be in accordance with equipment manufacturer guidelines and all local codes and regulations.

C. All work shall be performed with a level of workmanship consistent with industry standard performance and expectations.

D. Furnish all common and skilled labor, tools, rigging equipment, scaffolding shims, dowels,

and all other materials and equipment necessary to make a complete installation of the material and equipment specified and indicated, including but not limited to the following:

1. Examine equipment and material for concealed damage and report any damage to the Engineer.
2. Be responsible for the safety and protection from loss or damage of all equipment and material.
3. Learn of the design loadings of the various floors or roofs in the buildings and avoid overloading.
4. Protect all equipment and material during storage and prior to start-up which shall include the covering of all openings, protection against rust and other damage, etc. Equipment may be stored outdoors only when approved.
5. Furnish and install grout, shim material and the miscellaneous steel necessary for brackets, anchors, or supports required in the installation of the equipment.
6. Spot paint all equipment where the shop paint has been damaged.
7. Furnish all bolts, studs, nuts and gaskets for make-up of all connections to the equipment and replace any manhole or other gaskets damaged during storage, inspection, cleaning or placing into service.
8. Lubricate apparatus before start-up.
9. Field check for clearances and interferences before fabrication or installation and relocate material and equipment furnished as required to eliminate interferences.
10. Install systems as indicated; however, because of the small scale, all offsets, fittings, reducers, duct transition sections, etc., and accessories that may be required are not indicated. Coordinate any deviation with the Engineer, verbally as a minimum, prior to re- routing.
11. Installation shall equal or exceed the minimum requirements of the applicable codes and these specifications; however, where the local codes and ordinances are more stringent, they shall govern.
12. Include offsets, duct transitions, piping, fittings and accessories required to eliminate interferences.
13. Include all material, labor and changes occasioned by the Contractor's choice of equipment.
14. Assemble all shipped sections and pieces of equipment as received from the manufacturer.
15. Install piping, duct work, equipment, etc., at times as required to meet the construction schedule, and as necessary to move equipment into place without delaying erection of structures.
16. Disassemble and reassemble any parts of sections of equipment made necessary by obstructions or other limitations encountered in moving equipment to the final location indicated.
17. All construction methods and tools shall comply with local ordinances, applicable codes and standards and commonly accepted standards for safety and health of personnel engaged on construction work.

3.02 AIR CONDITIONING SYSTEM INSTALLATION

A. Install AC systems per manufacturer guidelines.

B. Route refrigerant piping per manufacturer guidelines. Refrigerant piping shall be manufacturer provided pre-charged line set or brazed ACR copper field fabricated line set. Refrigerant piping shall be insulated with 1” thick flexible elastomeric insulation.

C. Route PVC condensate discharge through wall to outside or to floor drain approved by owner.

D. Contractor shall be responsible for any change in duct work or arrangement of equipment due to a change in type of equipment furnished.

E. All changes in layout or arrangement of equipment shall be approved by the Engineer prior to beginning work.

F. Verify all elevations and make all routing and elevations changed required to avoid conflicts, including rises, drops, transitions, and offsets as necessary.

G. Place in satisfactory final operation all systems and equipment, including all systems modified or reworked as part of this contract.

H. Install all items which require operation, adjustment, or periodic maintenance in an accessible location. Provide access for all dampers, controls, and other items requiring maintenance or adjustment.

3.03 CUTTING AND PATCHING

A. Cut and patch as necessary for the installation of this work. Seal all openings in walls, ceiling and roof. Work shall be performed by a tradesman for whom specific finish has been cut or damaged (i.e., stucco repairs performed by a stucco tradesman).

3.04 ACCESSIBILITY

A. Be informed regarding the peculiarities and limitations of space available for installation of all materials and equipment under this contract. See that filters, controls, dampers, and other apparatuses shall be easily accessible. The foregoing shall also apply to all parts of the system that must be reached for maintenance.

3.05 COORDINATION

A. Coordinate the installation of the AC unit with other discipline and building elements. Adjust air distribution and return devices as required to accommodate the establishment of a proper and uniform grid for the ceiling tile provided.

3.06 TESTING AND BALANCING

A. Engage a qualified (AABC certified) testing and balancing professional to test/balance fan systems and airflow openings.

B. Test Data: Include the following data in the Systems Test and Balance Report:

1. Fans:
2. Manufacturer
3. Model or Serial number, BI or Air Foil - number of blades.
4. Rated CFM, measured CFM.
5. Rated RPM, measured RPM.

6. Measured pressures - Inlet and Outlet Static Pressure.
7. Pulley size, type and manufacturer.
8. Belt size and quantity.
9. Rated TSP.
10. Operating TSP & operating ESP (at discharge side of Supply Fan or suction side of Exhaust/Return Fan).
11. Air Systems (including inlets and outlets):
12. Provide single line diagrammatic plan locating each air inlet and outlet and its reference number.
13. Grille or diffuser reference number and manufacturer.
14. Grille or diffuser location.
15. Design velocity.
16. Design CFM.
17. Effective area factor and size.
18. Measured velocity.
19. Measured CFM.

END OF SECTION

SECTION 25 13 00 - INSTRUMENTATION AND CONTROLS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This specification covers the technical requirements for the fabrication, installation, engineering, wiring, adjustment, testing, start-up, commissioning, and training for the instrumentation and control (I&C) systems required for the project.

B. The instrumentation and control systems shall include all work and materials necessary to perform the control functions as illustrated on the electrical drawings as specified in the Division 25 Specifications.

C. The Systems Integrator subcontractor shall be responsible for work of Division 25. Work related to the RAS/WAS PLC pump control panel, new main SCADA control panel, new desktop SCADA computer, actuator control panel, and new sludge screw press control panel. The existing lift station control panels shall be integrated with new SCADA control panel by System Integrator (SI).

D. All software program licenses, software programs, and passwords shall be turned over to the Owner at the end of the project and placed in the Owner's name. All programming copies to owner shall be documented.

1.2 SCOPE OF WORK

A. This project includes the installation of a new control panels at targeted lift stations and waste water treatment plant. The Systems Integrator shall be responsible for but not limited to the following for this project:

1. Furnish and Program New WAS/WAS Pump PLC Control Panel.
2. Furnish and Program New Main SCADA Control Panel (MSCP).
3. Furnish and Program New Main Office SCADA Desktop Computer.
4. Furnish and Program New Electric Actuator Central Main Power and Control Panel (ACMCP).
5. Furnish and Install new LTE 5G Cell Modems at Kelly, Short Street, Eagle Drive and Bank Lift Stations.
6. Furnish and Install new Fiber Switches at Kelly, Short Street, Eagle Drive and Bank Lift Stations, and at the New RAS/WAS Pump PLC Control Panel, at the MSCP, at the ACMCP, at the New Main Office SCADA Desktop Computer, at the Existing Blower Control Panel, and at the New Sludge Screw Press.
7. All local instrumentation and control equipment and calibrations.
8. Furnishing, Installing, and Configuring all network functionality between remote sites and local equipment.
9. All local PLC programming and HMI graphics development, miscellaneous status monitoring and alarms.
10. Fiber Optic connectivity to main SCADA system.

1.3 QUALITY ASSURANCE

A. All work and materials specified herein shall be furnished by a single Systems Integrator (SI). The SI shall be an experienced and reputable firm, which has been engaged in the business of providing instrumentation and control systems for water and wastewater treatment facilities for at least five years.

B. Drawings and specifications shown are intended to convey information required for a complete functioning system for the purposes specified. The Systems Integrator shall be responsible for all details which may be necessary to properly install, adjust, and place in operation a complete and working system, including all mechanical and electrical installations, final wiring diagrams, connections, and the final layout, sizes and quantities of conduit and wiring communicated to the Electrical Contractor and other trades.

C. To achieve standardization in appearance, operation, maintenance, and spare parts, similar equipment provided under this contract shall be the end products of a single manufacturer.

D. Codes, specifications, and standards referred to by number of titles shall form a part of this specification to the extent required by the references thereto.

1.4 PRE-CONSTRUCTION SUBMITTALS

A. Submittals shall be as specified in the General Conditions and as further described below:

B. Submit the following:

1. Project schedule, which shall represent the Contractor's and System Integrator's best projections of when activities listed below will occur. Project schedules shall be updated at the Engineer's request, when major changes in the schedule occur. The activities shall include, but not be limited to, the following:

    a. Coordination and loop review meetings
    b. Shop drawing submittals for each group of equipment
    c. Shop drawing approvals for each group of equipment
    d. Equipment manufacturing/panel fabrication
    e. Equipment delivery
    f. Equipment installation
    g. System testing and calibration
    h. Operational testing and demonstration.
    i. As-built submittals
    j. Operation and Maintenance Manual submittals
    k. Operator training
    l. Follow-up Operator training at six months after substantial completion.

2. Manufacturer's certification of compliance with the referenced specifications and standards.
3. Certified copies of reports of factory tests specified herein and required by the referenced standards.
4. Shop drawings, indicating performance and physical data of the equipment specified herein.

5. Manufacturer's installation instructions.
6. Provide mounting details for field mounted equipment.
7. Manufacturer's operation and maintenance instructions.
8. If available, digital file transfer, USB driver, DVD and CD ROM media produced by the equipment manufacturer, which contain demonstrations of operation and maintenance procedures for the equipment specified herein.

C. Physical requirements of submittals shall be as follows:

1. Submittals shall be submitted as media on clear (not scanned) pdf documentation.
2. Submittals shall be organized and divided into logical division by means of tagged tabs. Each type of equipment shall be given a separate tab division.
3. Provide an index sheet for the submittals.
4. Drawings shall be on media converted to pdf and printable as 11 by 17 landscape format.
5. All text material shall at minimum be typewritten. Handwritten material is not acceptable.
6. Telecopied (FAX) documents or photocopies of faxed documents shall not be included in submittals. Submittals containing telecopied documents will be rejected and returned immediately.
7. All submitted equipment shall have highlighted features and clear part number designated.

D. Shop drawings shall include, but not be limited to, the following:

1. Instrument index, which shall include instrument tag numbers, instrument description and instrument calibrated ranges.
2. Typewritten specification sheets or pdf version, which shall include manufacturer's names and complete catalog numbers.
3. Detailed calculations as applicable, which shall include, but not be limited to, the following:

    a. Power supply sizing calculations
    b. Thermal loading (heat dissipation) calculations

4. Cut sheets and catalog information, which shall contain equipment specifications, dimensions, wiring and piping drawings, and installation and mounting details.
5. Loop drawings, which shall contain, but not be limited to, the following information:

    a. Loop numbers and instrument tag numbers
    b. Individual loop component locations
    c. Actual equipment wiring terminal designations, point to point wiring, and cable shield terminations
    d. Wire type, size and identification number
    e. Signal types (e.g., 120 Volt AC, 4-20 mA DC, pulse frequency, 3-15 psig, etc.)
    f. Contact orientations (e.g., normally open, normally closed, etc.)
    g. Equipment grounding requirements
    h. Sources of loop power, or power supply identifications
    i. Signal boosters, interposing relays and shunt resistors

        1) Reserve output capacity

6. Instrument and control panel layout drawings, which shall include, but not be limited to, the following:

    a. Bill of materials
    b. Front panel layout drawings
    c. Swing-out panel layout drawings
    d. Internal panel layout drawings
    e. Internal wiring diagrams, including wire type, size and identification number
    f. Terminal block layout drawings
    g. Nameplate lists
    h. Color schedules and samples

7. Elementary control diagrams.
8. Other descriptive information that will assist the Engineer with approval.

1.5 RECORD DRAWINGS (AS-BUILT) SUBMITTALS

A. Record drawings (as-built) submittals shall be as specified in the General Conditions, further described below:

B. The record drawings submittals shall consist of, but not be limited to, the following:

1. Submit one set to the Engineer and one set to the owner of corrected contract documents by digital file transfer or on a USB drive formatted and organized in pdf files. The original contract documents shall be marked to reflect 'as-built' conditions. Corrections shall be made in red.
2. Submit one set to the Engineer and one set to the owner of corrected loop description. The original loop description shall be marked to reflect 'as-built' conditions. Corrections shall be made in red.
3. Submit one set to the Engineer and one set to the Owner printer outputs of the final configuration or programs of all programmable controller-based equipment.
4. Where applicable, submit to the Owner standard magnetic storage devices, such as digital file transfer, CD/DVD disks, of all programmable controller-based equipment software and programs.
5. Submit original licensed copies and original documentation for all software. All software licenses shall be in Owner's name.
6. Where applicable, submit to the Owner two sets of pre-configured Read-only Memory Modules, such as EEPROMS or UVPROMS, of all programmable microprocessor-based equipment. Each memory module shall be submitted in an anti-static zippered polybag, which shall be clearly labeled and identified.

1.6 OPERATION AND MAINTENANCE MANUALS

A. The Systems Integrator shall prepare and furnish Operation and Maintenance Manuals of the system, which shall be submitted to the Engineer prior to operator training described below. Provide four (4) bound hard copy sets and one (1) USB drives or digital file transfer with complete electronic copy in pdf format.

B. The Operation and Maintenance Manuals shall include, but not be limited to, the following:

1. Approved shop drawings amended by approved change orders and as-built conditions.
2. Manufacturer supplied operating and installation manuals.
3. Detailed procedures and instructions on the operation, removal, installation, adjustment, calibration, and maintenance of each component provided under this contract.
4. As-built control panel and enclosure drawings, including termination drawings, PLC input/output (I/O) wiring diagrams, and panel bill of materials.
5. List of recommended spare parts, which shall include complete catalog numbers
6. List of local or the nearest manufacturer approved repair and service centers.

1.7 OPERATOR TRAINING

A. The System Integrator shall provide operation and maintenance training of the Owner's personnel. This training shall include, but not be limited to, the following:

1. The review of the Operation and Maintenance Manuals prepared and furnished by the System Integrator.
2. The review of 'as-built' panel layout drawings and wiring diagrams.
3. Hands-on training in the operation of each instrument and each loop.
4. Hands-on training in the maintenance, removal, and reinstallation of each instrument and each loop.
5. Hands-on training in the programming or configuration of all programmable microprocessor-based instruments. This does not include the PLC system.

B. For bidding purposes, the System Integrator shall include a minimum training period of one day, at eight hours per day, for up to five persons.

C. The System Integrator shall bear all expenses associated with the operator training activities, including labor, transportation and material costs.

PART 2 PROCESS DESCRIPTION

2.1 GENERAL

A. Where indicated, each pump or actuator will have the following pilot and control devices:

1. HAND-OFF-AUTO selector switch.

a. In HAND the equipment shall run.
b. In OFF the equipment shall remain off.
c. In AUTO, the equipment shall be controlled by the PLC

2. Green LED RUN/OPEN light.
3. Amber ALARM light.
4. Elapsed time meter (ETM) only for motors.

B. The new main PLC control panel, RTU panels, HMI, and VFD units shall communicate via Ethernet/IP networking protocol. The HMI shall display all parts of the system functionality and alarming. Text only information is not acceptable. Graphically represent all functions of the system with an easy-to-use menu system. Graphics that do not represent proper operation, process functionality, ease of use and operator interface shall be rejected.

C. All provided variable frequency drives (VFD) shall have Ethernet/IP connectivity to the PLC for monitoring only. Hard wired control and monitoring shall be as shown on drawings. Each VFD shall have a soft programmed Auto/Manual in the PLC that can be selected by the operator. When in Auto, the VFD shall follow commands from the PLC as described below. In Manual, the operator shall have the ability to manually start/stop each motor and provide a speed setpoint (100% as default) from the HMI and SCADA system.

1. VFD information to be monitored at a minimum via the Ethernet connection (this information shall be available as a popup when a VFD or motor symbol on the display is pressed):

    a. VFD and Motor info
    b. Run status
    c. Fault status (included parameter and a lookup table so operator can easily identify drive fault problem)
    d. Motor torque
    e. Frequency and percentage (drive speed)
    f. Voltage (each leg)
    g. Current (each leg)
    h. Overload status

D. All provided electric actuators shall have hardwired control and monitoring as shown on drawings. Each actuator shall have a soft programmed Auto/Manual in the PLC that can be selected by the operator. When in Auto, the actuator shall follow the commands of the PLC as described herein. When in Manual, the operator shall be able to force valve opened or closed and if it is a positional type of actuator, set the position from closed to 100% open.

E. The new main PLC control panel HMI shall have trending for all flows, levels, temperatures and pressures of the system.

F. The HMI shall have an alarm summary screen.

G. The HMI shall have pop-up screens for all pump, actuators and other equipment controls.

H. All plant HMI graphics shall be duplicated on the MSC panel and the main office SCADA desktop computer to be located at the proposed electrical/controls room. Interconnect the MSC panel with the aforementioned proposed instrumentation improvements (lift station and WWPT) via utilization of the Sierra Wireless RV50X cell modem.

I. Flow rates shall have the following and be represented on HMI and SCADA graphics:

1. Current Flow Rate in GPM
2. Total Accumulated Flow in MGD
3. Current Hour Total in Gallons

4. Previous Hour Total in Gallons
5. Current Day Total in MGD
6. Previous Day Total in MGD
7. Current Week Total in MGD
8. Previous Week Total in MGD
9. Current Month Total in MGD
10. Previous Month Total in MGD
11. Current Year Total in MGD
12. Previous Year Total in MGD

2.2 PROCESS CONTROL AND MONITORING DESCRIPTIONS

A. New RAS/WAS Pump PLC Control Panel

1. The new RAS/WAS Pump PLC Control Panel shall be utilized for all input/output signals and local control and monitoring of the RAS/WAS wet well and valve vault. The existing RAS/WAS wet well and valve vault shall be modified to incorporate the proposed improvements to maintain operation utilizing the RAS/WAS Pump PLC Control Panel as an extension of itself. Network connections and communications shall be required to all remote PLC's and other Ethernet enabled devices as indicated on the contract drawings.

2. For reference to integrate the existing RAS/WAS wet well and valve vault, see drawings I100-I110A for details.

B. New Main SCADA Control Panel (MSCP)

1. The new Main SCADA Control Panel shall be utilized for all input/output signals and local control and monitoring of the wastewater treatment plant and lift station operations, including the existing blower control panel and existing UV system control panel. Network connections and communications shall be required to all remote PLC's and other Ethernet enabled devices as indicated on the contract drawings.

2. For reference to integrate the existing RAS/WAS wet well and valve vault, see drawings I100-I110A for details.

C. Main Office SCADA Desktop Computer

1. The new main office SCADA desktop computer shall mirror all operations from the MSCP. Network connections and communications shall be required to all remote PLC's and other Ethernet enabled devices as indicated on the contract drawings.

2. For reference to integrate the existing RAS/WAS wet well and valve vault, see drawings I100-I110A for details.

D. Electric Actuator Central Main Power and Control Panel (ACMCP)

1. The new electric actuator central main power and control panel shall be utilized for all input/output signals and local control for valve actuating at the RAS/WAS wet well and valve vault, pipe valving at the aerators and digestors. Network connections and communications

shall be required to all remote PLC's and other Ethernet enabled devices as indicated on the contract drawings.

2. For reference to integrate the existing RAS/WAS wet well and valve vault, see drawings I100-I110A for details.

E. Cell Modems

1. The new cell modem at Kelly Drive, Short Street, Eagle Drive and Bank Lift Stations, and the new main SCADA control panel shall be primarily to interconnect the new MSCP at the plant.

2. For reference to integrate the existing RAS/WAS wet well and valve vault, see drawings I100-I110A for details.

F. Fiber Switches

1. The new fiber switches at the new sludge screw press, existing blower control panel, ACMCP, new RAS/WAS pump PLC control panel, MSCP, and the main office SCADA desktop computer shall be used to maintain network connections. Network connections and communications shall be required to all remote PLC's and other Ethernet enabled devices as indicated on the contract drawings.

2. For reference to integrate the existing RAS/WAS wet well and valve vault, see drawings I100-I110A for details.

2.1 GRAPHIC DESCRIPTIONS

A. General graphics descriptions for Main PLC HMI and for existing SCADA Software Package.

1. Provide all necessary graphic screens for a complete SCADA system for new project scope. Screens shall be developed as required to achieve control systems as described in Division 25 and as shown on contract drawings. Develop new screens to cover all new functionalities at the WWTP and lift stations. This includes graphics for systems as provided by other manufacturers such as the sludge screw press.
2. Graphic screens shall comply with standards presented below or similar as approved by the Engineer. Match existing graphic characteristics. These shall include but not limited to:

   a. Standard color convention
   b. Standard security levels and schemes
   c. Standard screen navigation and pop-up windows
   d. Standard display screen design

3. Animation: In general, minimize unnecessary animation. Standard animation includes the following:

   a. Animate variable signal bar graphs and tank levels.
   b. Animate wet well water levels.
   c. Unacknowledged alarm shall flash.
   d. Change piping colors from light gray on no-flow condition, to process colors as described

herein, on positive flow condition.
e. Change equipment status indication color as necessary and as described herein.
f. All animated level or flow indication will also include a digital dynamic value of that variable.
g. Flow direction by arrow movement (incremental flash)

8. Motor Control Pop-Up Window.

a. Provide a motor control pop-up window for each motor controlled piece of equipment. Double-clicking equipment symbol shall open associated motor control pop-up window.
b. Pop-up for VFDs: Pop-up shall have Start/Stop Pushbutton, Manual/Auto Operation Pushbutton, Speed Control Variable Setpoint, Speed Reference Feedback, VFD Fault Indication and Total Runtime Hours. On/Off Status indication will be shown here as well as on the overview screen. Include all data as provided via the Ethernet connection.
c. Pop-up for Standard ACL Starters: Pop-up shall have Start/Stop Pushbutton, Manual/Auto Operation Pushbutton, Fault Indication and Total Runtime Hours. On/Off Status indication will be shown here as well as on the overview screen.
d. Valve Control Pop-Up Window. Provide valve control pop-up window for every actuated process valve. Double-clicking valve symbol shall open associated control pop-up window. Pop-up shall have Open/Close function when in manual and a Manual/Auto Pushbutton. Open and Closed statuses will be shown on the pop-up as well as the overview screen.

9. Bitmap Images: In general, minimize unnecessary bitmap images (*.bmp, *.gif, *.jpg, etc.). Bitmap images may be used only if they are helpful and useful to the users.

10. Provide new screens for monitoring Generator and ATS switch position status. The following minimum Generator status signals shall be monitored on the SCADA system via Ethernet:

a. Run Status
b. Prewarning for low oil pressure
c. Prewarning for high coolant temperature
d. Low oil pressure shutdown
e. High coolant temperature shutdown
f. Over crank shutdown
g. Overspeed shutdown
h. Switch off/not in automatic start mode
i. Low coolant temperature
j. High battery voltage
k. Low battery voltage
l. Normal battery voltage
m. Fuel leak detection status
n. Unit ON-OFF-AUTO controls
o. Low Fuel

B. Descriptions of these screens are only for bidding purposes. It will be the responsibility of the Systems Integrator (for PLC and HMI and SCADA Software) to provide all necessary screens to cover all operations of this facility and make the usage of a SCADA system as simple and easy to use for all operators of the utility company. All displays, graphical and other, shall be complete, organized, easy to read and completely tested to assure that all signals are linked correctly.

C. Include in bid up to four hours for a virtual meeting with Engineer to review Display Screens and requirements.

PART 3 EXECUTION

3.1 GENERAL

A. The System Integrator shall provide all materials and work necessary for a complete and functioning I&C system and shall have full coordination responsibility of the electrical, mechanical, and structural work as specified herein and as shown on the drawings. The System Integrator shall ensure that the instrumentation and control systems work is properly interfaced with equipment and other work furnished under other divisions of the contract documents.

B. The System Integrator shall install, make final connections to, adjust, test, and start-up the complete instrumentation and control system utilizing the technical service and advice of the various equipment and instrument manufacturers.

3.2 COORDINATION MEETINGS

A. Coordination and control loop review meetings shall be attended by representatives of the Contractor and the Systems Integrator, and the owner may be invited. The meetings shall be held at the Engineer's office periodically during the course of the project. The purpose of these meetings shall be to document the compatibility of the mechanical and electrical work as described in Article 3.01, paragraph A. above.

B. For bidding purposes, the Contractor and the Systems Integrator shall include cost for participation in no less than two (2) coordination and control loop review meetings. Each meeting shall require at least one-half working day.

3.3 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Materials and equipment shall be delivered to the job site at a maximum of ten days prior to installation and not before.

B. All instruments containing electronics components shall be stored off the ground in weathertight enclosures. They shall be kept dry at all times. All plug-in equipment which can be removed from panels without the necessity of disconnecting any wire terminations shall be removed from its panel before shipping. They shall be shipped in separate shipping containers.

C. All equipment covered by this specification shall be shipped in a thoroughly clean condition, free from sand, oil, grit or grease (except when required for lubrication), weld splatter, or other foreign materials. All panel openings shall be capped.

3.4 INSTALLATION

A. General

1. Installation shall be in strict compliance with individual equipment manufacturer's instructions.

2. All gages and indicators shall be mounted in the upright position.
3. Provide sufficient space around the equipment for maintenance and removal.
4. Cover front panels, gages and indicators, during construction for protection from weld and paint splatter.
5. Unless otherwise impractical, support instruments independent of process piping.

B. Installation Hardware

1. All nuts and bolts shall be stainless steel.
2. Support channels shall be stainless steel unistrut channels with stainless steel hardware.
3. Do not mount equipment directly to masonry or concrete walls. Provide unistrut channels on wall.
4. All equipment mounting plates shall be of 0.25-inch thick minimum stainless steel.
5. All contact surfaces between dissimilar metals shall be gasketed to prevent galvanic reaction.

C. Weather Protection

1. Unless noted otherwise or impractical, all externally located instruments shall be installed to face north.
2. All externally located instruments, indicators, totalizers, control panels and control stations shall be mounted on a panel or mounting plate, which shall be provided with an aluminum or stainless steel weathershield to protect the instruments from direct exposure to the sun and weather. This weathershield shall be 3” wider at each end and have a 6” overhang in front of the instrument. All edges shall be smooth and rounded.

3.5 EQUIPMENT IDENTIFICATION AND TAG NUMBERS

A. All apparatus, control equipment, and instruments, both panel and field mounted, shall be plainly identified, using the following methods:

1. Pipe-mounted instruments shall be provided with embossed stainless steel tags, which shall be attached to the instruments by means of stainless steel wire or tie wrap.
2. Wall, plate, or panel mounted instruments shall be provided with engraved laminated plastic tags, which shall be mounted above, or below instruments. The plastic tags shall be mounted at eye level and shall be visible from a minimum distance of 20 feet. Lettering shall be black on white background.

B. Tag numbers and engraved or embossed text shall be as shown on the drawings, or as approved by the Engineer during shop drawing approval.

C. Tag numbers shall conform to the current Instrument Society of America (ISA) Standards, unless otherwise noted, which shall consist of a multi-character prefix, followed by a loop number. Tag numbers shall be as indicated on the drawings.

3.6 TESTING AND CALIBRATION

A. Test all analog loop zeroes and spans by disconnecting wiring at each transmitter and substituting an approved 4-20madc generator. Adjust the indicators and receiving instruments to indicate the correct value, correlated to the simulated current signal.

B. Test all annunciator points by placing jumpers across normally open contact inputs, or by disconnecting wiring on normally closed contact inputs.

C. Submit testing and calibration reports for all instruments to the Engineer.

3.7 COMMISSIONING

A. This activity shall consist of individual loop/instrument tests, overall systems test, and Operator training. Each test shall be witnessed by representatives of the Contractor, Systems Integrator, Owner, and Engineer.

1. Loop Operation Test: The objective is to demonstrate that the instrumentation and control system individual instruments are ready to be placed into permanent operation. Each loop shall be tested and demonstrated.
2. Control Function Test: The objective of this test is to demonstrate that all local and remote-control panels, control stations, MCC, and Operator interface functions are ready to place into permanent operation. All features of the MSCP, RAS/WAS pump PLC control panel, main office SCADA desktop computer and HMI shall be demonstrated.
3. The Contractor shall prepare an agenda for the commissioning and submit to Engineer as part of the shop drawing submittal package.
4. The Contractor shall conduct training as specified.
5. Substantial completion of the system shall not be approved until satisfactory completion of the above commissioning tasks.

3.8 WARRANTY

A. The Instrumentation and Control System shall be fully warranted and guaranteed from defect for a one-year time period, beginning at the date of substantial completion.

B. During the warranty period adjust, recalibrate, repair, replace and otherwise place back into service any instrument and any item(s) that may require service, including software, at no additional cost to the Owner for any reason.

C. During the warranty service, provide unlimited on-site software and operation support, at no additional cost to the Owner for any reason.

D. Respond to a call for service within 24 hours.

E. At approximately six months completion of the warranty period, visit the plant and perform routine diagnostics and tests to determine on-going operation and performance of the I & C system within the project requirements. Make any and all repairs and adjustments necessary at no additional cost to the Owner for any reason. Conduct additional “follow-up training” to assist the Owner in operation of the plant and to address any operational concerns that may have become known after six months of operation.

END OF SECTION

SECTION 25 30 00 - FIELD MOUNTED INSTRUMENTS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. The work required under this section includes the provision, installation, start-up, testing and calibration of all field mounted instruments required for this project.

B. This section covers field mounted instruments provided separately from a manufactured system or process equipment package, to be used on the various portions of the project, and the Contractor shall meet the requirements of these Specifications wherever applicable.

C. The types of field mounted instruments required for this project include the following:

1. Magnetic Flow Meter
2. Float Switches
3. Radar Level Transmitters
4. For VFD units in control panels, see Division 26

1.2 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in manufacture of field mounted instruments and systems of types and sizes required, whose products have been in satisfactory use in similar service, and whose products meet all requirements specified herein.

B. Installer: Qualified with successful installation experience on projects with field instrument work similar to that required for this project.

1. It is intended that an experienced electronic systems/instrumentation and control systems subcontractor shall be in responsible charge of all field instrument work.

C. ISA Compliance: Comply with applicable Standards and Practices for Instrumentation published by the Instrument Society of America pertaining to field mounted instruments and related installations.

D. UL Compliance and Labeling: Comply with provisions of UL safety standards pertaining to electrical systems, and provide products and components which have been UL-listed and labeled whenever such UL listed products are available.

E. NEC Compliance: Comply with requirements as applicable to construction and installation of field mounted instruments and installations.

1.3 SUBMITTALS

A. Prepare and submit shop drawings and descriptive data for each instrument and information regarding field installation of each instrument.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Ship instruments and accessories properly protected and packaged.

B. Handle instruments and accessories carefully to prevent damage and protect from weather.

PART 2 - PRODUCT

2.1 GENERAL

A. For each field mounted instrument, provide a complete assembly with all required components, enclosures suitable for the environment and location, fittings, mounting brackets, and other components and accessories as needed to form a complete system.

B. Provide conduit, raceway accessories, wiring and connections necessary to place the instruments into service and necessary to interface the instruments to other equipment control panels, programmable controllers, SCADA system, and similar installations as required for the project.

C. Include TVSS units as specified per the contract documents.

2.2 RADAR LEVEL TRANSMITTER (used for level and flow rate where shown)

A. General This section describes the requirements for a 2-wire Radar level measuring system. Under this item, the contractor shall furnish and install the level measuring system, and all associated equipment and accessories as indicated on the plans and as herein specified.

B. The microprocessor based high performance loop powered 2-wire Radar level transmitter shall employ microwave pulse ranging technology operating on 6.3 GHz to determine the distance to the monitored surface(s), as a basis for display, output, and digital communication. The unit should be configurable using remote and local interface.

C. The level system shall consist of a transmitter/receiver, a rod antenna and a signal processor for continuous measurement of material levels of liquids and slurries in open or closed tanks or in stilling wells or in standpipes, without contacting the medium. Where shown on drawings, radar shall be installed within stilling tubes.

D. The radar level transmitter shall:

1. Measure level, distance, space, and volume of the medium in the vessel
2. Apply 11-point linearization to ensure accurate measurement in non-standard vessels.
3. Be 2-wire loop powered.
4. Create a digitized echo profile, and apply patented Sonic Intelligence echo- processing techniques to select and verify the echo representing the reflective surface monitored.
5. Process signal using advanced echo-processing techniques such as Auto False- Echo Suppression, and Agitator discrimination for maximum verification of the measurement, display and outputs.

6. Be NEMA 4x and FM approved for Class I Division 1 areas Groups A,B,C,D with Intrinsically Safe Barrier.
7. Have a Polybutylene Terephthalate enclosure with a Polyether Imide lid.
8. Have a single material for rod antenna and integrated threaded connection
9. Compact electronics mounted in a rotating head.
10. Provide user interface via local multi-graphic display with bar graph for readout & entry, and via analog current output.
11. Communicate digitally by HART as a built-in standard.
12. Be commissioned without opening the lid, using intrinsically safe Infrared hand held programmer locally, or remotely using HART hand held unit or Simatic PDM software package.

E. Product Specification

1. Service: As noted
2. Fluid: As noted, turbulent surface
3. Operating Pressure: As noted
4. Process Temperature: minus 40 to 80^{o}C (minus 4°F to 176°F)
5. Humidity: 10 to 90%
6. Installation Drawing: As noted
7. Application: Level and volume monitoring in Closed tanks / Open Wet wells

F. Performance

1. Range: 0.3 to 20 m (1.3 to 65’)
2. Accuracy: +/- 10 mm or +/- 0.1% of the range, whichever is greater
3. Repeatability: +/- 5 mm
4. Fail-safe: mA and “reading” programmable high, low or hold, or user selectable upon Loss of Echo **(**LOE**)** condition.

G. Sensor

1. Measuring Principle: Pulse-based microwave
2. Frequency: 6.3 GHz

H. Warranty

1. In the event of component failure during the warranty period, the manufacturer shall promptly replace the unit at no cost to the Owner.

I. Acceptable Manufacturers

1. Manufacturer shall be an ISO 9000 rated facility. The unit shall be as manufactured by the following:

    a. Vega VegaPuls and Vegamet 861 Controller
    b. Endress & Hauser FMR67
    c. Siemens Sitrans Probe LR200
    d. Or equal.

J. Installation

1. Each piece of equipment shall be rated for the location it will be mounted.
2. The unit shall be installed according to the manufacturer's recommendations.
3. Mount the sensor to insure a clear path to the surface being measured.
4. Provide stainless steel or FRP mounting brackets as required.

2.3 MAGNETIC FLOW METERS

A. Acceptable Manufacturer:

1. E&H Promag W400 with remote electronics
2. Krohne Optiflux 4000 and IFC-300 Convertor
3. or approved equal

B. METER:

1. Meter shall be provided with zero upstream and downstream pipe diameter requirement.
2. Shall be a velocity sensing electromagnetic type flanged tube meter with sealed housing for 150 PSI working pressure. The meters shall be sized accordingly as shown on the contract documents.
3. Meters shall have a digital indicator having a range as shown below, shall be equipped with a 9 digit digital totalizer reading in units of US gallons, and shall be accurate within 0.5% of actual flow.
4. The indicator display shall be direct reading. The system shall be designed for an ambient temperature range of -4o F to 125o F and a 120 VAC 60 Hertz power supply. The system power consumption shall be approximately 5 watts per inch diameter. The meter assembly shall operate within a range of 0.2 FPS to 32 FPS and be constructed as described herein.
5. The sensors have a rugged, robust construction to ensure a long, maintenance-free life under the arduous conditions experienced in the wastewater industry. The sensors shall be inherently submersible (IP68, NEMA 6P), thus ensuring suitability for installation in chambers and metering pits that are susceptible to flooding. The meters shall be designed for the measuring the material (MLSS and sludge) for which they are being specified.

D. METER TUBE (SENSOR):

1. Shall be fabricated stainless steel pipe and use 150 lb. AWWA Class "D" flat face steel flanges (UM06) or 300 lb. AWWA Class "F" raised face steel flanges (UM08). The internal and external of the meter tube shall be blasted and lined with a NSF approved fusion bonded epoxy UltraLiner™, applied by the fluidized bed method.
2. Meter tubes shall have a constant nominal inside diameter offering no obstruction to the flow. Electrodes shall be 316 stainless steel.

E. MAG SHIELD:

1. Shall be welded to the tube providing a completely sealed environment for all coils, electrode connections and wiring harness capable of NEMA 6P/IP68 operation.

F. SIGNAL CONVERTER:

1. Shall be pulsed DC coil excitation type with auto zeroing. The converter shall indicate direction of flow and provide a flow rate indication and a totalization of flow volume for both forward and reverse directions. Both forward and reverse totalizers shall be electronically resettable.
2. The flow meter converter shall be microprocessor based with a keypad for instrument set up and LCD displays for totalized flow, flow rate engineering units and velocity.
3. The converter shall power the flow sensing element and provide galvanically isolated dual 4-20mA outputs. 4-20 mA outputs shall be capable of system integration with a central terminal unit or a PLC. It shall be possible, in the test mode, to easily set the converter outputs to any desired value within the range. The 4-20mA scaling, time constants, pipe size, flow proportional output, engineering units and test mode values shall be easily set via the keypad and display.
4. Four separate fully programmable alarm outputs shall be provided to indicate empty pipe, forward/reverse polarity (normally open/close), analog over-range, fault conditions, high/low flow rates, percent of range and pulse cutoff.
5. The converter shall periodically perform self-diagnostics and display and resulting error messages. All set up and data and totalizer values may be protected by a password.
6. The converter shall be remotely mounted up to 500 feet from the sensor, and shall be supplied in a sealed IP67 rated enclosure. Calibration will be completed at the manufacturer's location in accordance with customer supplied application-based requirements.

G. GROUNDING RINGS:

1. Shall be 316 stainless steel and shall be supplied with the meter tube. Exception: On sensor models which use grounding electrodes, grounding rings are optional. For best performance, grounding rings are recommended for all sizes.

H. POWER AND SIGNAL ISOLATION:

1. The power supplied between the converter and the meter tube (sensor) and signal between the meter tube and the converter shall be isolated and placed in separate submersible cables.

I. SERVICE & SUPPORT:

1. Supplier must have flow calibration laboratories and personnel to perform testing and certify calibration. Personnel must also provide instruction or training as required assuring meters are supported and maintained throughout the guarantee period.

J. VOLUMETRIC TESTING:

1. All meters must be performed and approved prior to shipment. The complete meter assembly and signal converter must be wet accuracy tested and calibrated. The test facility must be rigorously traceable to an accuracy of ±0.15% with the National Institute of Standards and Technology. If desired, the test shall be witnessed by the customer or their selected agent. A copy of the certified accuracy test record must be furnished at no charge to the Owner.

2.2 FLOAT SWITCHES

A. Float switches to be used for backup level control and/or primary control as indicated on drawings.

B. Operating Principle

1. Direct acting, non-mercury float switch, encased in an ellipse shaped molded plastic float, connected to a factory installed cable. Float cable length to be determined by Contractor.
2. The float shall be either pipe-mounted, or suspended by its cable by means of a weight kit, as indicated in the equipment data.

C. Specifications

1. Construction

a. Float material: High impact styrene
b. Mounting: 3/16" SS aircraft cable attached to a 10 pound concrete weight or similar coated boat anchor.
c. Strap float cables individually with PVC cable ties to aircraft cable. This shall allow removal of one float without affecting the other floats.
d. See Drawings for float switching elevations.

2. Electrical

a. The switch contacts shall be normally open or normally closed as indicated in the equipment data.
b. The switch contacts shall be rated 6 amperes, non-inductive at 120 Volts AC. Switches shall be normally closed unless noted otherwise.
c. The cable shall be two fine-stranded AWG #18 conductors in heavy-duty type SJO- W Neoprene jacketing. Standard length of the cables shall be 40 feet.

3. Performance

a. The switch shall make and break over a 1-inch level change.

4. Manufacturer

a. Dura float
b. Approved equal

PART 3 - EXECUTION

3.1 INSTALLATION - GENERAL

A. Each instrument or system shall be installed, wired, calibrated, and tested in strict compliance with the manufacturer's instruction. Calibrate for operational range required for this project.

B. Installation Hardware

1. All nuts and bolts shall be stainless steel.
2. Support channels mount externally, or mounted in a corrosive atmosphere, shall be stainless steel unistrut channels.
3. Do not mount equipment directly to masonry or concrete walls. Provide unistrut channels on wall.
4. All equipment mounting plates shall be of 0.25-inch thick minimum stainless steel.
5. All contact surfaces between dissimilar metals shall be gasketed to prevent galvanic reaction.

C. All test instruments used for field calibrations shall have a minimum accuracy of 3 times greater than that of the instrument being calibrated. Test instruments shall have been calibrated to National Bureau of Standards requirements within 6 months of their use on this project. Provide evidence of such calibration upon request by the Owner of Engineer.

D. Final conduit connection to the instruments shall be through watertight flexible conduit. Where noted, final connection shall be by extra hard service cable rated for wet location. Use explosion-proof or liquid-tight flexible conduit where required.

E. Line powered units shall receive 120-volt AC supply through a disconnect switch and surge protector, see division 26 for more information.

3.2 ENVIRONMENTAL PROTECTION

A. Transmitters and similar items located outdoors or in unheated or untreated spaces must be manufactured for the environment to be encountered. If not suitable for the environment where located, the Contractor shall provide a heated and insulated and exhaust fan ventilated enclosure suitable for the environment, to protect the transmitter or instrument.

B. All transmitters and local control stations shall have aluminum sheet metal sun shields/weather shields.

3.3 CALIBRATION

A. In addition to the above requirements, calibrate each system as follows:

1. Each system, including its complete instrument loop, shall be calibrated. Reading on the remote receiving instruments shall be equal to reading at the converter indicator.
2. Provide a written loop-calibration report for each system, which shall include but shall not be limited to the following:

    a. Date & time the final calibration was completed.
    b. Atmospheric conditions when the final calibration was performed.
    c. Comparison of readings at the converter with readings at the remote receiving instruments.
    d. Provide a table showing calculated and measured values at 0%, 25%, 50%, 75% & 100%.
    e. Verification of accuracy of the outputs, including those at the receiving instruments.

f. Verification of operation of all contact outp8uts, including those at the receiving instruments.
g. Description of method of calibration.
h. The names and signatures of personnel performing the calibration. Provide room for 2 names.
i. The names and signatures of engineer's field representatives. Provide room for 2 names.
j. Special comments or notes, including "as left" conditions.
k. This report may be 2 pages if required for each instrument.

END OF SECTION

SECTION 25 30 10 - INSTRUMENT PANEL CONSTRUCTION

PART 1 - GENERAL

1.1 DESCRIPTION

A. This specification covers the technical requirements for the fabrication, engineering, wiring and installation for instrument panels and enclosures.

B. The instrument panels shall be as shown on the drawings. They shall include, but shall not be limited to the following:

1. Furnish and Program New Main SCADA Control Panel (MSCP) with HMI
2. Furnish and Program New RAS/WAS Pump PLC Control Panel
3. Furnish and Program New Electric Actuator Control Main Power and Control Panel (ACMCP)

1.2 SUBMITTALS

A. Submittals shall be as specified in the appropriate sections.

B. Each panel submittal shall have a complete layout drawing of all equipment and a parts list.

PART 2 - PRODUCTS

2.1 GENERAL

A. The instrument panels and enclosures shall be as follows:

1. Located in environmentally controlled (heated and ventilated) rooms, shall be steel rated NEMA 12.
2. General instrumentation and control panels located outdoors or in non-air-conditioned areas shall be stainless steel rated NEMA 4X.
3. For Class 1, Division 2 areas, devices shall either be explosion proof type, or all contacts and other items which may arc or spark shall be hermetically sealed

B. NEMA 12 enclosures shall be painted electro-statically, prior to equipment installation:

C. The exterior surfaces of a NEMA 4X stainless steel enclosure shall not be painted. The finish shall be sandblasted, roughened or chemically etched to reduce gloss, reflections & glare.

D. Conduit knockouts on the enclosure shall be made prior to installation of any equipment within the enclosure. The size and the number of conduit knockouts shall be as required. Provide malleable iron watertight conduit hubs for all NEMA 4X enclosures.

E. All enclosures exposed to weather conditions shall be provided with sun shields to protect the enclosure from direct exposure from the sun and rain.

2.2 PANEL CONSTRUCTION

A. General

1. Stiffening members shall be provided for strength and stiffness as required.
2. Seamless welded construction shall be used throughout. All exposed seams shall be continuously welded and ground smooth.
3. Lifting rings shall be provided for panels in excess of 100 pounds.
4. Subpanels shall e provided as required, with mounting designed for easy removal. The subpanels shall be finished with 2 coats if white enamel paint.
5. Print pockets shall be attached to the interior side of each door.
6. Hinges shall be stainless steel piano type.

B. NEMA 12 Enclosures

1. NEMA 12 enclosures shall be fabricated from 12 gauge cold rolled sheet steel or better.
2. Double doors shall be of the flush type construction with continuous hinge and gasket.
3. Doors shall be equipped with three-point latching mechanism and door locks.
4. Corrosion inhibitors shall be furnished for corrosion control inside the panel.

C. NEMA 4X Enclosures

1. Nema 4X enclosures shall be fabricated from 14 gauge stainless steel or better.
2. Enclosure door shall be provided with neoprene gasket, which shall be attached to the enclosure with oil-resistant adhesive, and held in place with stainless steel retaining strips.
3. Door clamps shall be provided on three sides of the enclosure door.
4. A hasp and staple shall be provided for padlocking.
5. Panel heaters, corrosion inhibitors and breather drains shall be furnished for condensation and corrosion control inside the panel. Panel heaters shall be of the forced air types, provided with integral thermostat control.

D. PANEL GROUNDING

1. Where noted or specified, provide a ground bus tied to the facility grounding system.

2. The ground busbars shall be of nickel-plated copper, rated for at least 100 amperes.
3. The busbar shall be provided with two (2) screw clamp terminal blocks, which shall be capable of accepting conductors up to #2 AWG.
4. The busbar shall be provided with a minimum of twenty (20) screw clamp terminal blocks, which shall be capable of accepting conductors up to #10 AWG.

2.3 PANEL WIRING

A. Wiring within the enclosure shall be continuous and shall be terminated only at terminal blocks or equipment terminals.

B. Not more than two wires shall be terminated at any terminal.

C. Wiring splices and wire nuts will not be permitted within the enclosure.

D. Wiring within the enclosure shall be protected as follows:

1. In general, all wiring within the enclosure shall be put in plastic wiring ducts. Wiring ducts shall be sized to include 100% (percent) spare capacity.
2. Wiring outside of the ducts shall be restrained by means of plastic ties.
3. Wiring passing a door hinge shall be grouped and wrapped in a protective wire harness.
4. Provide abrasion protection for any wire bundles passing through holes or across sheet metal edges.

E. In general, wiring within the enclosure shall be as follows:

1. 120VAC control wiring within and external to the enclosure shall be #14 AWG stranded.
2. DC control wiring within the enclosure shall be #16 AWG stranded.
3. Wiring for long distance DC signals shall be #14 AWG stranded.
4. Wiring for 4-20 mA DC analog signals shall be #16 AWG twisted shielded pair.

F. In general, wiring within the enclosure shall follow the following color convention to comply with NFPA 79 (1994), part 16.

G. AC and DC wiring shall be separated from each other. Where AC and DC wire runs parallel, the minimum separation between them shall be four (4) inches. Where AC and DC wire runs cross, they shall cross at 90o. Provide separate wiring duct for AC and DC wiring.

H. Equipment and signal ground wiring, as well as Neutral wiring, shall not be daisy-chained; they shall each be terminated at isolated, bussed terminal blocks.

I. Each conductor end shall be terminated at a terminal block or at an equipment wiring terminal. Each terminal block shall have a unique identification number. The terminal blocks shall be arranged and numbered in consecutive order, based on standard alpha-numeric order.

J. Terminal blocks within each enclosure shall be grouped for the voltage and type of circuit connected.

K. Provide 25% spare terminal blocks (minimum of six) for each type used in each enclosure.

2.4 TERMINAL BLOCKS

A. Terminal blocks within enclosures shall be of the high-density modular types, constructed of nylon material, suitable for mounting on standard DIN rails. Termination type shall be tubular screw with serrated pressure plate. The terminal block system shall be manufactured by Phoenix Contact, Weidmuller, or pre-approved equal.

B. All current carrying parts (metal bodies) shall be made of nickel/tin-plated copper.

C. Ground terminals shall be color coded in accordance with international standard, which shall be yellow/green.

D. Matching jumper bridges shall be color coded to the wiring colors.

E. Panel power distribution fused terminal blocks shall be provided with disconnect lever puller mechanism and illuminated indication.

2.5 PANEL ACCESSORIES

A. The Systems Integrator/enclosure fabricator shall be responsible for all accessories, including interposing relays, analog signal isolators, terminal blocks, power distribution blocks, grounding blocks, fuse blocks and fuses, circuit breakers, duplex receptacle, heaters, exhaust fans, louvers and filters, DIN mounting rails, plastic wiring channels, hardware, wire tags, engraved nameplates, and all such accessories needed for a professional class panel fabrication.
B. Panels shall have the appropriate cooling and heating equipment. Panels located indoors with climate control shall require proper cooling and exhaust fan units when VFD units are installed. Panels with VFD units located outside shall have a properly sized air conditioning and heating unit.
C. Panels located outdoors shall include corrosion inhibitors for environment protection.

2.6 PILOT AND CONTROL DEVICES

A. Pilot Devices: Pushbuttons, selector switches, and indicating lights shall be rated heavy-duty, oiltight or watertight and corrosion resistant as required. All units shall be furnished with standard size legend plates with legends as indicated on the project Drawings.

B. For Class 1, Division 2 areas, devices shall either be explosion proof type, or all contacts and other items which may arc or spark shall be hermetically sealed. Hermetically sealed contacts and devices shall meet the current and voltage ratings required for the circuit.

C. Selector switches shall have the number of positions, switching arrangement, number and type of contact blocks indicated on the project Drawings.

D. Contact blocks shall have a minimum continuous current rating of 10 amperes at 240 VAC. Contact blocks shall have screw type connection terminals.

E. Indicating lights shall be LED type only. Provide flashing type lights where indicated.

F. Pilot lights shall be 120VAC, push-to-test (PTT) 30mm type.

G. Pilot device manufacturers shall be:

1. Square D, Class 9001, Type K
2. Allen-Bradley Bulletin 800H or 800T
3. IDEC
4. Approved Equal

H. Control relays shall be plug-in type with sockets and hold-in clips. Sockets shall have screw terminals, compression terminals not acceptable. Contacts shall be silver-cadmium, rated 10 amperes at 240 VAC. Relays shall have as a minimum two pole, double throw contacts (2PDT). Relays shall have a manual operator and miniature pilot light. Coil voltages shall be 120 VAC, or as noted on the project Drawings. Relays shall be as manufactured by Allen-Bradley Bulletin 700, Type HA or HB, Square D, Idec, or approved equal.

I. PLC digital output isolation relays shall be SPDT type with minimum 6A rated contacts. Coil voltage to match PLC output card. Phoenix Contact or equal.

J. Latching relays shall be similar to the control relays. Relay position shall be magnetically held, and shall be the single coil type.

K. Timing relays shall be solid sate, plug-in type with screw terminal sockets. Each relay shall have 5 adjustable timing ranges, switch selectable, and 4 timing modes, switch selectable. Timing ranges shall allow from 0.05 seconds to 999 minutes timing. Timing modes shall be ON delay, OFF delay, ONE SHOT, and REPEAT CYCLE. Output contacts shall be DPDT, rated 10 amperes at 240 VAC. Timing setting shall be by thumbwheel switches. Coil voltages shall be 120VAC, or as noted on the project Drawings.

L. Elapsed Time Totalizers (ETT's) shall be the synchronous motor driven type with digital readout to indicate the total time a piece of equipment is energized. Totalizer shall have a minimum of six-digit wheels including a 1/10-digit wheel to provide the range of time measured in hours, unless noted otherwise. Units shall be non-resettable, and operate on 120V, 1 phase, 60 Hz. Elapsed Time Meter (ETM) shall be considered synonymous with Elapsed Time Totalizer (ETT).

2.7 EQUIPMENT IDENTIFICATION AND WIRE TAGGING

A. All equipment and wiring identifications shall conform to and be compatible with the Owner's current labeling system, and shall be completed prior to final acceptance of the work. It is the responsibility of the Contractor to coordinate with the Owner's Engineer, to obtain from him or her, all labeling standards and documentation.

B. All control wiring shall be identified by means of computer-generated, heat shrink type wire marker. Wire numbers shall be as shown on the drawings.

C. Each major component mounted within the enclosure shall be provided with equipment identification. Equipment and device nameplates or identification shall be of engraved laminated plastic, with black lettering on white background. Nameplates shall be as listed herein or as shown on the project Drawings.

D. The enclosure vendor shall be responsible for providing and sizing all instrument loop power supplies. The instrument loop power supplies shall be sized to include at least 100% spare capacity. The enclosure vendor shall submit power supply load calculations with the panel shop drawings.

2.8 REGULATED POWER SUPPLY

A. When DC power supply is required for PLC discrete inputs, and 2-wire analog loops, provide at least

two redundant 24 V DC regulated power supplies. A redundancy module with alarm contacts shall be provided for auto-switching of power supplies and power supply failure notification.

B. The power supply shall be sized to include 100% spare capacity.

C. Acceptable power supply manufacturers:

1. Phoenix Contact
2. SOLA
3. IDEC
4. Approved equal

2.9 UNINTERRUPTIBLE 120VAC POWER SUPPLY

A. When panels include a programmable controller or computer, provide an uninterruptible power supply to condition incoming power and ride-through utility power interruptions. UPS shall be 1500VA minimum unless otherwise noted.

B. This location has generator backup system; therefore, all UPS units shall be of dual conversion type confirmed by manufacturer to work properly with generators.

C. Acceptable power supply manufacturers:

1. APC SRT series
2. or approved equal

PART 3 - EXECUTION

3.1 GENERAL

A. All panels shall be installed level and plumb.

B. Installation Hardware

1. All nuts and bolts shall be stainless steel.
2. Support channels mount externally, or mounted in a corrosive atmosphere, shall be either reinforced fiberglass or stainless steel unistrut channels. All cuts and holes on fiberglass unistrut channels shall be coated with appropriate resin coating to protect them from deterioration.
3. Do not mount equipment directly to masonry or concrete walls. Provide unistrut channels on wall.
4. All equipment mounting plates shall be of 0.25-inch thick minimum clear anodized aluminum.
5. All contact surfaces between dissimilar metals shall be gasketed to prevent galvanic reaction.

C. Touch up all nicks, scratches, etc. with materials as recommended by the enclosure manufacturer.

END OF SECTION

SECTION 25 30 20 - PROCESS CONTROLLERS AND COMPUTER SYSTEMS

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

A. The work required under this section includes the provision, installation, start-up, testing and calibration of all PLCs, HMIs, SCADA software updates and networking required for this project.

B. The Systems Integrator shall be responsible for work of this division. Contractor for this project will have scope of work associated with Division 25; see Electrical drawings and Process drawings for associated information.

C. Provide Owner with original licenses for all copies of all software, for all equipment and systems provided in Division 25. Provide the Owner with software version and printed documentation of all documented programs, as part of Record Documents and Operation and Maintenance Manuals. Provide the Owner with all passwords required for full program access for all levels of PLC, PC, HMI, LAN and VPN network programming. The Owner shall have full legal right to use without restriction, and modify if they choose at their own risk, all programs, screens and reports prepared for this project, for their use in operating, maintaining, and managing their facilities.

1.2 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in the startup and commissioning of SCADA and similar systems of types and sizes to this project, whose products have been in satisfactory use in similar service, and whose products meet all requirements specified herein.

B. Installer: Qualified with successful installation experience on projects with field instrument work similar to that required for this project.

1. It is intended that an experienced electronic systems/instrumentation and control systems subcontractor shall be in responsible charge of all field instrument work.

C. ISA Compliance: Comply with applicable Standards and Practices for Instrumentation published by the Instrument Society of America pertaining to field mounted instruments and related installations.

D. UL Compliance and Labeling: Comply with provisions of UL safety standards pertaining to electrical systems, and provide products and components which have been UL-listed and labeled whenever such UL listed products are available.

E. NEC Compliance: Comply with requirements as applicable to construction and installation of field mounted instruments and installations.

1.3 SUBMITTALS

A. Provide submittals in accordance with Section 25 13 00.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Ship instruments and accessories properly protected and packaged.

B. Handle instruments and accessories carefully to prevent damage and protect from weather.

PART 2 PRODUCT

2.1 GENERAL

A. For each system, provide a complete assembly with all required components, enclosures suitable for the environment and location, fittings, mounting brackets, and other components and accessories as needed to form a complete system.

B. Provide conduit, raceway accessories, wiring and connections necessary to place the systems into service and necessary to interface the instruments to other equipment control panels, programmable controllers, SCADA system, and similar installations as required for the project.

2.2 DESKTOP SCADA PC

A. Refer to Section 25 13 00 for computers and basic configuration of display screens.

2.3 NETWORKING

A. Provide all necessary network setup and hardware to create a complete networked system between PLCs and SCADA computers.

B. Minimum requirements:

1. Provide in each specified PLC control panel an Ethernet switch with multiple ports to accommodate all equipment requiring Ethernet connection. The switch will be 10/100Mbs with auto-switching capabilities. Redlion or equal.
2. A spare Ethernet port will be available for future connection and troubleshooting.
3. Provide and setup a VPN connection to Main SCADA computer for Operator and Superintendent Connectivity over internet. Coordinate with town's IT personnel.

2.4 PROCESS CONTROLLERS

A. MANUFACTURERS

1. Allen-Bradley CompactLogix 5370 or 5380 Series.
2. Or Approved Equal.

B. GENERAL

1. Perform stand-alone monitoring and control and include following as minimum.

    a. Microprocessor based controller (PLC processor) to execute program instructions, store data, and control data transfer.
    b. PLC memory.
    c. I/O subsystem interfaces.
    d. Power supply, including power conditioning and surge protection.
    e. Communication interfaces.
    f. Programming interface.

2. Must integrate with any existing network of PLCs, ASDs, LOIs and HMIs.
3. Utilized as Main SCADA PLC networked to local panel mounted PC and HMI software. See drawings for list of IO and connectivity to field instruments and devices.

C. PLC PROCESSORS - COMPACTLOGIX 1769-L33ERM (System's Integrator may submit alternate AB CompactLogix unit for approval).

D.

1. Features:

    a. 10/100Mbps, RJ-45, Ethernet I/P Communication Interface Card mounted in one of the two available Communication Card Slots in processor chassis.
    b. Ladder, sequential function chart (SFC), structured text, and function block programming ready.

2. Provide orderly shutdown on power failure, saving register contents with automatic restart on power restoration.
3. Interface to programmer unit for maintenance and troubleshooting. Continually update display when data requested. Provide capability to monitor or change following.

    a. Discrete I/O.
    b. Analog I/O.
    c. Pulsed I/O.
    d. Communication parameters.
    e. Configuration data.
    f. Internal program data values.

E. PLC POWER SUPPLY - P4

1. 85-264 VAC.
2. Sizing is responsibility of System Supplier.

F. I/O MODULES

1. I/O modules specifically designed for interfacing of I/O signals to PLC processor. Screw-type

removable wiring arms required for each I/O module are responsibility of System Supplier.

2. Include sufficient I/O modules to accommodate I/O with provisions for 20% spare I/O prewired to terminal strips. Where no I/O of a listed type (digital input, digital output, analog input, analog output) is shown, provide one spare prewired module. Each processor or I/O chassis must contain a minimum of one spare slot, beyond the required spare I/O. Provide 1769-N2 filler strips for all empty slots in processor and I/O chassis.

3. 120VAC Digital Input 1769-IA16

    a. 120 VAC individually isolated as required by application.
    b. 16 points per module.
    c. LED indication of on/off status of each point.

4. 120 VAC Digital Output 1769-OA16

    a. 120 VAC non-isolated as required by application.
    b. 16 points per module.
    c. LED indication of on/off status of each point.
    d. Interposing relay for each output point required.

5. Analog Input 1769-IF4I

    a. Individually isolated.
    b. 6 points per module.
    c. Accept 4-20 mAdc or 1-5 vdc inputs as required by application.

6. Analog Output 1769-OF4I

    a. Individually isolated.
    b. 6 points per module.
    c. Transmit 4-20 mAdc.

G. ETHERNET ADAPTER 1769-ENBT

1. Provides connectivity between SCADA system and PLC processers on Ethernet data highway.

2. 10/100 auto-switching.

H. COMMUNICATIONS SOFTWARE

1. Communication software and configuration shall meet monitoring and control requirements of each process in accordance with functional descriptions.
2. Within each hardware unit communicating over data highway, include executive routines or traffic controller to control and coordinate activities on communication links. Use integrated, standard products for communication software to manage transmission protocols, line error detection, and message switching.
3. Interface software for transfer of data from one location to another.
4. Expandable systems shall accommodate addition of future equipment as specified elsewhere.

5. Diagnostic facilities to check performance of communication links and communications interface portion of devices on data highway.
6. Include routines to detect transmission errors. Perform automatic re-interrogations and retransmissions before alarm is sounded. Generate system alarms.

END OF SECTION

(NO TEXT FOR THIS PAGE)

SECTION 26 05 00 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions apply to work of this section.

B. The Sweetser WWTP is a pre-existing facility and as such, not all components of the facility will be part of this project. Due to the nature of this facility, an enclosed WWTP, the area under roof is considered a classified area and shall follow NFPA 820 guidelines for all new equipment and work.

1.02 DESCRIPTION OF WORK

A. The Common Work Results for Electrical apply to all electrical materials, equipment, installations, and services supplied under any portion of the work. The Contractor shall coordinate the Common Work Results for Electrical as applicable to any equipment, installations, and services of an electrical nature.

B. It is the intention of this Division of the Specifications and the accompanying drawings to describe and provide for the furnishing, installing, testing and placing in satisfactory and successful operation all equipment, materials, devices and necessary appurtenances to provide a complete electrical system, together with such other miscellaneous installations and equipment hereinafter specified and/or shown on the plans. The work shall include all materials, appliances and apparatus not specifically mentioned herein or noted on the plans, but which are necessary to provide a complete working installation of all electrical systems shown on the plans or described herein. Equipment and devices furnished and installed under other Divisions of this specification (or by the Owner) shall be connected under this Division. The drawings and specifications are complementary and what is called for in either, is binding as if called for in both.

C. The contract drawings indicate the extent and the general location and arrangement of equipment, conduit and wiring. The contractor shall study plans and details and shall cooperate with all other trades to prevent conflict and interference as to space requirements. Fixtures, equipment and outlets shall be located to avoid interference with mechanical or structural features. Lighting fixtures shall be symmetrically located according to the room arrangement. Raceways, junction and outlet boxes, lighting fixtures, and all other electrical equipment shall be properly supported to comply with applicable codes and good work practices.

D. The Electrical Contractor is responsible for installation of a complete and operating electrical system in accordance with the intent of the drawings and specifications.

E. The scale of drawings cannot show all necessary transitions, offsets, changes in direction, etc. It shall be the responsibility of the Electrical Contractor to provide all pull boxes, elbows, fittings,

supports, etc. necessary to install his work to conform to structures, to preserve headroom and to keep openings and passageways clear.

F. Electrical diagrams are schematic and diagrammatic only, not necessarily to scale, and do not necessarily show physical arrangement of equipment. Electrical diagrams and plans are complementary and what is shown on either is the same as if shown on both.

G. The horsepower of motors and equipment wattages indicated on the plans are based on information made available to the Engineer and field notes of existing installation, and are as accurate as practical; however, there may be discrepancies. All wiring, switches, circuit breakers, and magnetic motor starters shall be of size and capacity to suit the horsepower of the motors and equipment actually furnished, and actually being connected; however, in no case shall wiring, switches, circuit breakers and magnetic motor starters be of smaller capacity or size than those indicated on the drawings or specified unless approved, in writing, by the Engineer.

H. Any minor changes in the location of all equipment, switchboards, panelboards, starters, fixtures, conduits, outlets, etc. from those shown on the plans shall be made without extra charge if so directed by the Engineer or Owner before installation.
    1. Minor changes in location shall be defined as within 15 feet in any direction, horizontally or vertically, from the location indicated on the drawings.

I. Make detailed arrangements with the Owner for selected electrical service work and any/all shutdowns required.
    2. Provide temporary services when required: The Contractor shall be responsible for, and bear the cost of, all temporary service or equipment feeders which may be required.
    3. All shutdown and power transfer work must be closely scheduled with the Owner, approved in advance by the Owner, and at the convenience of the Owner; and shall be performed only with the Owner present and/or under direct/indirect supervision of the Owner.
    4. Power shutdowns and transfers must be scheduled with the Owner and all such shutdowns and transfers shall be scheduled at the Owner’s convenience. At the Owner's discretion, work may be required to be performed on holidays, weekends, evenings, early mornings, and during similar non-standard work periods, without additional cost to the Owner.
        a. The above requirement for performing work during non-standard work periods also applies to any work that can only be safely performed during a power shutdown.

1.03 PERMITS AND FEES

A. This work shall include the procurement of, and payment for, all permits and fees required for the performance of the electrical work.

1.04 COORDINATION OF ELECTRICAL WORK

A. Contract documents are diagrammatic in showing certain physical relationships, which must be established; such establishment and the final physical relationship is the exclusive responsibility of the Contractor.

1. Arrange electrical work in a neat, well-organized manner with conduit and similar services running parallel with primary lines of structures, and which shall maximize overhead clearance.
2. Locate operating and control equipment and arrange entire electrical work with adequate access for operation and maintenance, and in accordance with all applicable governing codes.
3. Advise other trades of openings required in their work, and scheduling cooperation required, for the subsequent move-in of large units of electrical work (equipment, conduits, pull boxes, etc.).
4. Coordination with equipment manufacturer for mounting, mounting components and installation procedures.

1.05 COORDINATION OF OPTION, SUBSTITUTIONS, AND ARRANGEMENT

A. Where the contract documents permit the selection from several product options, and where it becomes necessary to authorize a substitution, do not proceed with purchasing until coordination of interface requirements has been checked and satisfactorily established.

B. The Contractor will not be paid for cutting, patching, retrofitting, and finishing required for relocation of work installed due to interference and improperly located equipment.

1.06 QUALITY ASSURANCE

A. In case of difference between building codes, state laws and federal laws, local ordinances, industry standards and utility regulations and the Contract Documents, the most stringent shall govern. The Contractor shall promptly notify the Engineer in writing of any such difference.

1.07 NON-COMPLIANCE

A. Should the Contractor perform any work that does not comply with the requirements of the applicable building codes, state and federal laws, local ordinances, industry standards and utility regulations, they shall bear all costs in correcting all deficiencies.

B. Applicable codes and standards shall include all the state laws, local ordinances, utility company regulations and the applicable requirements of the following nationally accepted codes and standards. All of the following codes shall apply to the equipment, and equipment installation, where applicable. All equipment shall bear U.L. labels where labeled equipment is available.

C. Industry Standards, Codes and Specifications
   1. NEC National Electrical Code (NFPA No. 70) with State Amendments
   2. UBC International Building Code with State Amendments
   3. ANSI C2 National Electrical Safety Code.
   4. IEEE Institute of Electrical and Electronics Engineers.
   5. ASTM American Society of Testing Materials.
   6. IPCEA Insulated Power Cable Engineers Association.
   7. NEMA National Electrical Manufacturers Association.
   8. NFPA National Fire Protection Association.

9. UL Underwriters Laboratories.
10. NECA Standard of Installation, National Electrical Contractor's Association.
11. NFPA No. 101 Life Safety Code.
12. FM Factory Mutual
13. ADA Americans with Disabilities Act

D. All electric materials shall be new, in original cartons, bundles, or shipping crates and shall have a U.L. label whenever available.

E. Nothing in these drawings and specifications shall be construed to permit work not conforming to governing codes; and shall not be construed as relieving the Contractor from complying with any requirements of the plans or specifications which may exceed requirements of the above-mentioned governing codes and rules and not contrary to same.

1.08 MANUFACTURERS

A. Firms regularly engaged in the manufacture of the equipment specified of the types and capacities required, whose products have been in satisfactory use in similar service for not less than 5 years, unless specified otherwise.

1.09 INSTALLERS

A. A firm with at least 5 years of successful installation experience on projects with electrical work similar to that required for the project, unless specified otherwise.

1.10 SUBMITTALS

A. General: Provide submittals, shop drawings and descriptive data for selected items, and obtain Engineer's approval of same prior to proceeding with work.

B. Submittals shall include, but not be limited to, information on the following materials:
1. Disconnect Switches.
2. Circuit Breakers.
3. Lighting Fixtures.
4. Ventilated Wireways and Splice Boxes.
5. Motor Starters.
6. Variable Frequency Drives.
7. Conduit Seal Fittings.
8. Wiring and Cables.
9. Heat Tracing.
10. Automatic/Manual Transfer Switches.
11. Equipment Mounting Racks.
12. Generator Connection Devices.
13. Mounting Channels.

C. Submittals shall comply with the following:

1. Include complete catalog information such as construction, ratings, and insulating systems, as applicable.
2. For any material specified to meet U.L. or trade standards, furnish manufacturer's or vendor's certification that material furnished for work does in fact equal or exceed Specifications.
3. Shop drawings shall be submitted in complete groups of material (i.e., all fixtures or all switchgear, panels, etc.), and each item of material submitted shall have Contractor's stamp and be initialed by Contractor as verification that submittal has been reviewed in detail and is in fact Contractor's choice of materials. Bind catalog cuts, descriptive bulletins, and drawings, 11" x 17" or smaller, in sets with covers showing titles. Contractor shall verify dimensions of equipment and be satisfied as to code compliance for fit prior to submitting shop drawings for approval. Departure from the above noted procedure would result in rejection of the submittal and the requirement that the Contractor revise and resubmit the information. Any costs associated with delays arising out of such resubmittal process shall be the sole responsibility of the Contractor.

1.11 O&M MANUALS

A. Submit three sets of Operation and Maintenance Manuals.

1.12 WARRANTIES

A. All new equipment shall have a warranty of one (1) year, including all parts and labor.

END OF SECTION

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SECTION 26 05 19 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

2.01 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for conductors and cables, including detailed information on materials, construction, ratings, listings, and available sizes, configurations, and stranding.

B. Field Quality Control Test Reports.

2.02 QUALITY ASSURANCE

A. Comply with requirements of:

B. NFPA 70.

C. NEC (latest version per Indiana standards).

D. NFPA 820.

PART 2 PRODUCTS

3.01 CONDUCTOR AND CABLE APPLICATIONS

A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.

B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.

1. Exceptions:

a. Use variable-frequency drive cable for connection between variable-frequency motor controllers and associated motors.

C. Nonmetallic-sheathed cable is not permitted.

D. Underground feeder and branch-circuit cable is not permitted.

E. Service entrance cable is not permitted.

F. Armored cable is not permitted.

G. Metal-clad cable is not permitted.

H. Manufactured wiring systems are not permitted.

3.02 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

A. Provide products that comply with requirements of NFPA 70.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.

D. Comply with NEMA WC 70.

E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.

F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.

G. Conductor Material:

1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
3. Tinned Copper Conductors: Comply with ASTM B33.

H. Minimum Conductor Size:
1. Branch Circuits: 12 AWG.
a. Exceptions:
1) 20 A, 120 V circuits longer than 75 feet: 10 AWG, for voltage drop.
2) 20 A, 120 V circuits longer than 150 feet: 8 AWG, for voltage drop.
2. Control Circuits: 14 AWG.

I. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

J. Conductor Color Coding:
1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
2. Color Coding Method: Integrally colored insulation.
3. Color Code:
a. 240/120 V, 1 Phase, 3 Wire System:
1) Phase A: Black.
2) Phase B: Red.
3) Neutral/Grounded: White.
b. Equipment Ground, All Systems: Green.
c. For control circuits, comply with manufacturer's recommended color code.

3.03 SINGLE CONDUCTOR BUILDING WIRE

A. Description: Single conductor insulated wire.

B. Conductor Stranding:
1. Feeders and Branch Circuits:
a. Size 10 AWG and Smaller: Solid or stranded.
b. Size 8 AWG and Larger: Stranded.

C. Insulation Voltage Rating: 600 V.

D. Insulation:
1. Copper Building Wire: Type THHN/THWN, THHN/THWN-2, or XHHW-2.

3.04 VARIABLE-FREQUENCY DRIVE CABLE

A. Description: Flexible motor supply cable listed and labeled as complying with UL 2277 in accordance with NFPA 79; specifically designed for use with variable frequency drives and associated nonlinear power distortions.

B. Conductor Stranding: Stranded.

C. Insulation Voltage Rating: 1000 V.

D. Insulation: Use only thermoset insulation types; thermoplastic insulation types are not permitted.

E. Grounding: Full-size integral equipment grounding conductor or symmetrical arrangement of multiple conductors of equivalent size.

F. Provide metallic shielding.

G. Jacket: PVC or Chlorinated Polyethylene (CPE).

3.05 WIRING CONNECTORS

A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.

B. Wiring Connectors for Splices and Taps:
   1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors, mechanical connectors, or compression connectors.
   2. Copper Conductors Size 6 AWG and Larger: Use compression connectors.

C. Wiring Connectors for Terminations:
   1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
   2. Copper Conductors Size 8 AWG and Larger: Use mechanical connectors or compression connectors where connectors are required.
   3. Stranded Conductors Size 10 AWG and Smaller: Use crimped terminals for connections to terminal screws.
   4. Conductors for Control Circuits: Use crimped terminals for all connections.

D. Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.

E. Do not use push-in wire connectors as a substitute for twist-on insulated spring connectors.

F. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F for standard applications and 302 degrees F for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.

G. Mechanical Connectors: Provide bolted type or set-screw type.

H. Compression Connectors: Provide circumferential type or hex type crimp configuration.

I. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.

3.06 ACCESSORIES

A. Electrical Tape:
   1. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F and suitable for continuous temperature environment up to 221 degrees F.
   2. Rubber Splicing Electrical Tape: Ethylene Propylene Rubber (EPR) tape, complying with ASTM D4388; minimum thickness of 30 mil; suitable for continuous temperature environment up to 194 degrees F and short-term 266 degrees F overload service.
   3. Electrical Filler Tape: Rubber-based insulating moldable putty, minimum thickness of 125 mil; suitable for continuous temperature environment up to 176 degrees F.

4. Varnished Cambric Electrical Tape: Cotton cambric fabric tape, with or without adhesive, oil-primed and coated with high-grade insulating varnish; minimum thickness of 7 mil; suitable for continuous temperature environment up to 221 degrees F.

B. Heat Shrink Tubing: Heavy-wall, split-resistant, with factory-applied adhesive; rated 600 V; suitable for direct burial applications; listed as complying with UL 486D.

C. Wire Pulling Lubricant:
1. Listed and labeled as complying with UL 267.
2. Suitable for use with conductors/cables and associated insulation/jackets to be installed; approved by conductor/cable manufacturer.
3. Suitable for use at installation temperature.

D. Cable Ties: Material and tensile strength rating suitable for application.

E. Sealing Systems for Roof Penetrations: Premanufactured components and accessories as required to preserve integrity of roofing system and maintain roof warranty; suitable for cables and roofing system to be installed; designed to accommodate existing penetrations where applicable.

PART 3 EXECUTION

4.01 INSTALLATION

A. Circuiting Requirements:
1. Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in accordance with NFPA 70.
2. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are indicated as separate, combining them together in a single raceway is permitted, under the following conditions:
a. Provide no more than six current-carrying conductors in a single raceway. Dedicated neutral conductors are considered current-carrying conductors.
b. Size raceways, boxes, etc. to accommodate conductors.
3. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among up to three single phase branch circuits of different phases installed in the same raceway is not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.

B. Install products in accordance with manufacturer's instructions.

C. Perform work in accordance with NECA 1 (general workmanship).

D. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.

E. Variable-Frequency Drive Cable: Terminate shielding at both variable-frequency motor controller and associated motor using glands or termination kits recommended by manufacturer.

F. Install conductors with a minimum of 12 inches of slack at each outlet.

G. Make wiring connections using specified wiring connectors.

H. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to non-spliced conductors.

I. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.

J. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

END OF SECTION

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SECTION 16124 - INSTRUMENTATION CABLES

PART 1 GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall provide all labor, materials, equipment, and incidentals as shown, specified and required to furnish and install instrumentation cable. The types of cable include the following:
      a. Shielded Instrument Cable.

1.2 SUBMITTALS

A. Shop Drawings: Submit for approval the following:
   1. Manufacturer's technical information for instrumentation cable proposed for use.

PART 2 PRODUCTS

2.1 MATERIALS

A. Single Shielded Pair Instrument Cable:
   1. Tinned copper, polyethylene insulated, stranded conductors, No. 16 AWG minimum, twisted with aluminum-polyester shield, stranded tinned 18 AWG copper drain wire and overall chrome PVC jacket. Rated for 600 volts minimum.
   2. Manufacturer: Provide one of the following:
      a. Belden 8719
      b. Okonite Company.
      c. Dekoron Wire and Cable Company.
      d. Or equal.

B. Multi-paired Shielded Instrument Cable:
   1. Tinned copper, 7 strand XLPE insulated conductors, No. 18 AWG minimum, twisted in pairs with aluminum-mylar shield over each pair, silicone rubber fiberglass fire barrier tape, tinned copper drain wire, aluminum mylar overall shield, outer jacket.
   2. Manufacturer: Provide one of the following:
      a. Belden Company
      b. Okonite Company.
      c. Dekoron Wire and Cable Company.
      d. Or equal.

C. Multi-conductor Shielded Instrument Cable:
   1. Tinned copper, stranded conductors, No. 18 AWG minimum, with overall aluminum-polyester shield with 85 percent tinned copper braid shield and overall teflon jacket.
   2. Manufacturer: Provide one of the following:
      a. Belden Company.
      b. Okonite Company.

c. Dekoron Wire and Cable Company.
d. Or equal.

D. Cable Terminals:
1. Fork type copper compression terminals with nylon insulation for termination of cable at all terminal blocks.
2. Product and Manufacturer: Provide one of the following:
a. T&B Sta-Kon.
b. Burndy Insulug.
c. Or equal.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install all cable complete with proper terminations at both ends.
B. Install in conduit separate from power and control cables unless otherwise noted.
C. Ground shield on shielded cables at one end only and as recommended by instrument manufacturer.
D. Identify all conductors in accordance with Section 16047, Electrical Identification.
E. Install and terminate vendor furnished cable in accordance with vendor equipment requirements and cable manufacturer's specific recommendations.
F. Install in conformance with the National Electrical Code.

3.2 TESTING

A. Test shielded instrumentation cable shields with an ohmmeter for continuity along the full length of the cable and for shield continuity to ground.
B. Connect shielded instrumentation cables to a calibrated 4-20 milliamp DC signal transmitter and receiver. Test at 4, 12, and 20 milliamp transmitter settings.
C. Any cable which fails any test or when used under full load conditions shall be replaced with a new cable for full length.

END OF SECTION

SECTION 26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for grounding and bonding system components.

1.02 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

PART 2 PRODUCTS

2.01 GROUNDING AND BONDING REQUIREMENTS

A. Do not use products for applications other than as permitted by NFPA 70 and product listing.

B. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.

C. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

D. Grounding Electrode System:
   1. Provide connection to required and supplemental grounding electrodes indicated to form grounding electrode system.
      a. Provide continuous grounding electrode conductors without splice or joint.
      b. Install grounding electrode conductors in raceway where exposed to physical damage. Bond grounding electrode conductor to metallic raceways at each end with bonding jumper.
   2. Metal Underground Water Pipe(s):
      a. Provide connection to underground metal domestic and fire protection (where present) water service pipe(s) that are in direct contact with earth for at least 10 feet at an accessible location not more than 5 feet from the point of entrance to the building.
      b. Provide bonding jumper(s) around insulating joints/pipes as required to make pipe electrically continuous.
      c. Provide bonding jumper around water meter of sufficient length to permit removal of meter without disconnecting jumper.
   3. Metal In-Ground Support Structure:
      a. Provide connection to metal in-ground support structure that is in direct contact with earth in accordance with NFPA 70.
   4. Concrete-Encased Electrode:
      a. Provide connection to concrete-encased electrode consisting of not less than 20 feet of either steel reinforcing bars or bare copper conductor not smaller than 4 AWG embedded within concrete foundation or footing that is in direct contact with earth in accordance with NFPA 70.
   5. Ground Rod Electrode(s):
      a. Provide two electrodes unless otherwise indicated or required.

b. Space electrodes not less than 10 feet from each other and any other ground electrode.
c. Where location is not indicated, locate electrode(s) at least 5 feet outside building perimeter foundation as near as possible to electrical service entrance; where possible, locate in softscape (uncovered) area.

E. Service-Supplied System Grounding:
1. For each service disconnect, provide grounding electrode conductor to connect neutral (grounded) service conductor to grounding electrode system. Unless otherwise indicated, make connection at neutral (grounded) bus in service disconnect enclosure.
2. For each service disconnect, provide main bonding jumper to connect neutral (grounded) bus to equipment ground bus where not factory-installed. Do not make any other connections between neutral (grounded) conductors and ground on load side of service disconnect.

F. Grounding for Separate Building or Structure Supplied by Feeder(s) or Branch Circuits:
1. Provide grounding electrode system for each separate building or structure.
2. Provide equipment grounding conductor routed with supply conductors.
3. For each disconnecting means, provide grounding electrode conductor to connect equipment ground bus to grounding electrode system.
4. Do not make any connections and remove any factory-installed jumpers between neutral (grounded) conductors and ground.

G. Bonding and Equipment Grounding:
1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.

2.02 GROUNDING AND BONDING COMPONENTS

A. General Requirements:
1. Provide products listed, classified, and labeled as suitable for the purpose intended.
2. Provide products listed and labeled as complying with UL 467 where applicable.

B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 26 05 26:
1. Use insulated copper conductors unless otherwise indicated.
a. Exceptions:

1) Use bare copper conductors where installed underground in direct contact with earth.
2) Use bare copper conductors where directly encased in concrete (not in raceway).

C. Connectors for Grounding and Bonding:
1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
2. Unless otherwise indicated, use exothermic welded connections or compression connectors for underground, concealed and other inaccessible connections.
3. Unless otherwise indicated, use mechanical connectors, compression connectors, or exothermic welded connections for accessible connections.

D. Ground Rod Electrodes:
1. Comply with NEMA GR 1.
2. Material: Copper-bonded (copper-clad) steel.
3. Size: 5/8 inch diameter by 8 feet length, unless otherwise indicated.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Ground Rod Electrodes: Unless otherwise indicated, install ground rod electrodes vertically. Where encountered rock prohibits vertical installation, install at 45 degree angle or bury horizontally in trench at least 30 inches (750 mm) deep in accordance with NFPA 70 or provide ground plates.
1. Outdoor Installations: Unless otherwise indicated, install with top of rod 6 inches below finished grade.

D. Make grounding and bonding connections using specified connectors.
1. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.

END OF SECTION

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SECTION 26 05 29 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for channel/strut framing systems.
   1. Fiberglass Channel/Strut Framing Systems: Include requirements for strength derating according to ambient temperature.

PART 2 PRODUCTS

2.01 SUPPORT AND ATTACHMENT COMPONENTS

A. General Requirements:
   1. Comply with the following. Where requirements differ, comply with most stringent.
      a. NFPA 70.
      b. Requirements of authorities having jurisdiction.
   2. Provide required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for complete installation of electrical work.
   3. Provide products listed, classified, and labeled as suitable for purpose intended, where applicable.
   4. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for load to be supported. Include consideration for vibration, equipment operation, and shock loads where applicable.
   5. Do not use products for applications other than as permitted by NFPA 70 and product listing.
   6. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.
   7. Steel Components: Use corrosion-resistant materials suitable for environment where installed.
      a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
      b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel, stainless steel, or approved equivalent unless otherwise indicated.
      c. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
      d. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.

B. Conduit and Cable Supports: Straps and clamps suitable for conduit or cable to be supported.
   1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
   2. Conduit Clamps: Bolted type unless otherwise indicated.

C. Outlet Box Supports: Hangers and brackets suitable for boxes to be supported.

D. Metal Channel/Strut Framing Systems:
   1. Description: Factory-fabricated, continuous-slot, metal channel/strut and associated fittings, accessories, and hardware required for field assembly of supports.
   2. Comply with MFMA-4.

3. Channel Material:
    a. Indoor Dry Locations: Use painted steel, zinc-plated steel, or galvanized steel.
    b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel.
4. Minimum Channel Thickness: Steel sheet, 14 gauge, 0.0747 inch.
5. Minimum Channel Dimensions: 1-5/8 inch wide by 13/16 inch high.

E. Fiberglass Channel/Strut Framing Systems:
1. Description: Factory-fabricated, continuous-slot, fiberglass channel/strut and associated fittings, accessories, and hardware required for field assembly of supports.
2. Channel Material: Use polyester resin or vinyl ester resin.
3. Minimum Channel Dimensions: 1-5/8 inch wide by 1 inch high.
4. Flammability: Fire retardant with NFPA 101, Class A flame spread index, maximum of 25, when tested in accordance with ASTM E84; self extinguishing in accordance with ASTM D635.

F. Hanger Rods: Threaded, zinc-plated steel unless otherwise indicated.
1. Minimum Size, Unless Otherwise Indicated or Required:
    a. Single Conduit up to 1-inch (27 mm) Trade Size: 1/4-inch diameter.
    b. Single Conduit Larger than 1-inch (27 mm) Trade Size: 3/8-inch diameter.
    c. Trapeze Support for Multiple Conduits: 3/8-inch diameter.
    d. Outlet Boxes: 1/4-inch diameter.
    e. Luminaires: 1/4-inch diameter.

G. Anchors and Fasteners:
1. Unless otherwise indicated and where not otherwise restricted, use anchor and fastener types indicated for specified applications.
2. Concrete: Use expansion anchors or screw anchors.
3. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.
4. Hollow Masonry: Use toggle bolts.
5. Hollow Stud Walls: Use toggle bolts.
6. Steel: Use beam clamps, machine bolts, or welded threaded studs.
7. Sheet Metal: Use sheet metal screws.
8. Plastic and lead anchors are not permitted.
9. Powder-actuated fasteners are not permitted.
10. Hammer-driven anchors and fasteners are not permitted.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install hangers and supports in accordance with NECA 1.

C. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.

D. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.

E. Unless specifically indicated or approved by Architect, do not provide support from roof deck.

F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.

G. Equipment Support and Attachment:
   1. Use metal, fabricated supports or supports assembled from metal channel/strut to support equipment as required.
   2. Use metal channel/strut secured to studs to support equipment surface mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
   3. Use metal channel/strut to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
   4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.

END OF SECTION

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SECTION 26 05 33.13 - CONDUIT FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.

B. All conduit within the enclosed WWTP shall be fiberglass type. This area within the plant shall be considered rated as C1D2 area and all new equipment shall comply with this rating.

PART 2 PRODUCTS

2.01 CONDUIT APPLICATIONS

A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and meet ratings as required by NFPA 820, manufacturer's instructions, and product listing.

B. Unless otherwise indicated and where not otherwise restricted, use conduit types indicated for specified applications. Where more than one listed application applies, comply with most restrictive requirements. Where conduit type for particular application is not specified, use galvanized steel rigid metal conduit.

C. Underground:
   1. Under Slab on Grade: Use galvanized steel rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), or rigid Sch 80 PVC conduit.
   2. Exterior, Direct-Buried: Use galvanized steel rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), rigid Sch 80 PVC conduit, or high-density polyethylene (HDPE) conduit.
   3. Where rigid polyvinyl chloride (PVC) conduit or high-density polyethylene (HDPE) conduit is provided, transition to galvanized steel rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), galvanized steel electrical metallic tubing (EMT), or schedule 80 rigid PVC conduit where emerging from underground.
   4. Where galvanized steel rigid metal conduit (RMC) or galvanized steel intermediate metal conduit (IMC) is installed in direct contact with earth where soil has resistivity of less than 2000 ohm-centimeters or is characterized as severely corrosive based on soils report or local experience, use corrosion protection tape, factory-applied corrosion protection coating, or field-applied corrosion protection compound acceptable to authorities having jurisdiction to provide supplementary corrosion protection.
   5. Where galvanized rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), or galvanized steel electrical metallic tubing (EMT) emerges from concrete into soil, use corrosion protection tape, factory-applied corrosion protection coating, or field-applied corrosion protection compound acceptable to authorities having jurisdiction to provide supplementary corrosion protection for minimum of 4 inches on either side of where conduit emerges.
   6. Where highly corrosive, explosive gasses are present with area ratings of C1D1 or C1D2, use fiberglass conduit (RTRC) above grade to all equipment.

D. Embedded Within Concrete:
   1. Within Slab on Grade: Not permitted.

E. Concealed Within Masonry Walls: Use galvanized steel rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), or galvanized steel electrical metallic tubing (EMT).

F. Interior, Damp or Wet Locations: Use galvanized steel rigid metal conduit (RMC), aluminum rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), or galvanized steel electrical metallic tubing (EMT).

G. Exposed, Interior, Not Subject to Physical Damage: Use galvanized steel rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), or galvanized steel electrical metallic tubing (EMT).

H. Exposed, Exterior, Not Subject to Severe Physical Damage: Use galvanized steel rigid metal conduit (RMC) or galvanized steel intermediate metal conduit (IMC).

I. Corrosive Locations Above Ground: Use aluminum rigid metal conduit (RMC) or reinforced thermosetting resin conduit (RTRC).
   1. Corrosive locations include, but are not limited to:
      a. Chemical storage areas.

J. Flexible Connections to Vibrating Equipment:
   1. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit (LFMC).
   2. Maximum Length: 6 feet unless otherwise indicated.
   3. Vibrating equipment includes, but is not limited to:
      a. Motors.

2.02 CONDUIT - GENERAL REQUIREMENTS

A. Comply with NFPA 70.

B. Provide conduit, fittings, supports, and accessories required for complete raceway system.

C. Provide products listed, classified, and labeled as suitable for purpose intended.

D. Minimum Conduit Size, Unless Otherwise Indicated:
   1. Branch Circuits: 3/4-inch trade size.
   2. Branch Circuit Homeruns: 3/4-inch trade size.
   3. Underground, Interior: 3/4-inch trade size.
   4. Underground, Exterior: 1-inch trade size.

E. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.03 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.

B. Fittings:
   1. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 6.
   2. Material: Use steel or malleable iron.
      a. Do not use die cast zinc fittings.
   3. Connectors and Couplings: Use threaded type fittings only. Threadless fittings, including set screw and compression/gland types, are not permitted.

2.04 ALUMINUM RIGID METAL CONDUIT (RMC)

A. Description: NFPA 70, Type RMC aluminum rigid metal conduit complying with ANSI C80.5 and listed and labeled as complying with UL 6A.

B. Fittings:
   1. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 6A.
   2. Material: Use aluminum.
   3. Connectors and Couplings: Use threaded type fittings only. Threadless fittings, including set screw and compression/gland types, are not permitted.

2.05 GALVANIZED STEEL INTERMEDIATE METAL CONDUIT (IMC)

A. Description: NFPA 70, Type IMC galvanized steel intermediate metal conduit complying with ANSI C80.6 and listed and labeled as complying with UL 1242.

B. Fittings:
   1. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 1242.
   2. Material: Use steel or malleable iron.
   3. Connectors and Couplings: Use threaded type fittings only. Threadless fittings, including set screw and compression/gland types, are not permitted.

2.06 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

A. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.

B. Fittings:
   1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   2. Material: Use steel or malleable iron.
      a. Do not use die cast zinc fittings.

2.07 GALVANIZED STEEL ELECTRICAL METALLIC TUBING (EMT)

A. Description: NFPA 70, Type EMT galvanized steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.

B. Fittings:
   1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   2. Material: Use steel or malleable iron.
      a. Do not use die cast zinc fittings.
   3. Connectors and Couplings: Use compression/gland or set-screw type.
      a. Do not use indenter type connectors and couplings.
   4. Damp or Wet Locations, Where Permitted: Use fittings listed for use in wet locations.
   5. Embedded Within Concrete, Where Permitted: Use fittings listed as concrete-tight. Fittings that require taping to be concrete-tight are acceptable.

2.08 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT

A. Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 40 unless otherwise indicated,

Schedule 80 where subject to physical damage; rated for use with conductors rated 90 degrees C.

B. Fittings:
   1. Manufacturer: Same as manufacturer of conduit to be connected.
   2. Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.

2.09 REINFORCED THERMOSETTING RESIN CONDUIT (RTRC)

A. Description: NFPA 70, Type RTRC reinforced thermosetting resin conduit complying with NEMA TC 14 (SERIES).

B. Supports: As recommended by manufacturer.

C. Fittings: Same type and manufacturer as conduit to be connected.

2.10 HIGH-DENSITY POLYETHYLENE (HDPE) CONDUIT

A. Description: NFPA 70, Type HDPE high-density polyethylene solid-wall conduit complying with ASTM F2160 and NEMA TC 7; list and label as complying with UL 651A; Schedule 40 unless otherwise indicated.

B. Mechanical Fittings: Comply with ASTM F2176; list and label as complying with UL 651A.

2.11 ACCESSORIES

A. Corrosion Protection Tape: PVC-based, minimum thickness of 20 mil, 0.020 inch.

B. Conduit Joint Compound: Corrosion-resistant, electrically conductive compound listed as complying with UL 2419; suitable for use with conduit to be installed.

C. Pull Strings: Use nylon or polyester tape with average breaking strength of not less than 1,250 lbf.

D. Foam Conduit Sealant:
   1. Removable, two-part, closed-cell foam, specifically designed for sealing conduit openings against water, moisture, gases, and dust.
   2. Suitable for use with conductors/cables and associated insulation/jackets to be installed.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install conduit in accordance with NECA 1.

C. Galvanized Steel Rigid Metal Conduit (RMC): Install in accordance with NECA 101.

D. Aluminum Rigid Metal Conduit (RMC): Install in accordance with NECA 102.

E. Intermediate Metal Conduit (IMC): Install in accordance with NECA 101.

F. Rigid Polyvinyl Chloride (PVC) Conduit: Install in accordance with NECA 111.

G. Conduit Routing:
   1. Conduits in the following areas may be exposed, unless otherwise indicated:
      a. Electrical rooms.
      b. Mechanical equipment rooms.
   2. Unless otherwise approved, do not route exposed conduits:
      a. Across floors.

b. Across roofs.
c. Across building exterior surfaces.

3. Arrange conduit to provide no more than equivalent of four 90-degree bends between pull points.
4. Route conduits above water and drain piping where possible.
5. Maintain minimum clearance of 6 inches between conduits and piping for other systems.

H. Conduit Support:
1. Secure and support conduits in accordance with NFPA 70 using suitable supports and methods approved by authorities having jurisdiction; see Section 26 05 29.
2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
3. Use conduit strap to support single surface-mounted conduit.
a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.
4. Use metal channel/strut with accessory conduit clamps to support multiple parallel surface-mounted conduits.
5. Use conduit clamp to support single conduit from beam clamp or threaded rod.
6. Use trapeze hangers assembled from threaded rods and metal channel/strut with accessory conduit clamps to support multiple parallel suspended conduits.
7. Use of spring steel conduit clips for support of conduits is not permitted.
8. Use of wire for support of conduits is not permitted.

I. Connections and Terminations:
1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
3. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
4. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
5. Where spare conduits stub up through concrete floors and are not terminated in box or enclosure, provide threaded couplings equipped with threaded plugs set flush with finished floor.
6. Provide insulating bushings, insulated throats, or listed metal fittings with smooth, rounded edges at conduit terminations to protect conductors.

J. Penetrations:
1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
2. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
3. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
4. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty.

5. Install firestopping to preserve fire resistance rating of partitions and other elements; see Section 07 84 00.

K. Underground Installation:
   1. Minimum Cover, Unless Otherwise Indicated or Required:
      a. Underground, Exterior: 18 inches.
      b. Under Slab on Grade: 12 inches to bottom of slab.

L. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
   1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
   2. Where calculated in accordance with NFPA 70 for rigid polyvinyl chloride (PVC) conduit installed above ground to compensate for thermal expansion and contraction.
   3. Where calculated in accordance with NFPA 70 for reinforced thermosetting resin conduit (RTRC) conduit installed above ground to compensate for thermal expansion and contraction.
   4. Where conduits are subject to earth movement by settlement or frost.

M. Conduit Sealing:
   1. Use foam conduit sealant to prevent entry of moisture and gases. This includes, but is not limited to:
      a. Where conduits enter building from outside.
      b. Where service conduits enter building from underground distribution system.
      c. Where conduits enter building from underground.
      d. Where conduits may transport moisture to contact live parts.
   2. Where conduits cross barriers between areas of potential substantial temperature differential, use foam conduit sealant at accessible point near penetration to prevent condensation. This includes, but is not limited to:
      a. Where conduits pass from outdoors into conditioned interior spaces.
      b. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.

N. Provide pull string in each empty conduit and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12 inches at each end.

END OF SECTION

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SECTION 26 05 33.16 - BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for cabinets and enclosures and underground boxes/enclosures.

1.02 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70 and 820.

B. Comply with requirements of NEC.

PART 2 PRODUCTS

2.01 BOXES

A. General Requirements:
   1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
   2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
   3. Provide products listed, classified, and labeled as suitable for the purpose intended.
   4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
   5. Provide grounding terminals within boxes where equipment grounding conductors terminate.

B. Outlet and Device Boxes Up to 100 cubic inches, Including Those Used as Junction and Pull Boxes:
   1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
   2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
   3. Use cast iron boxes or cast aluminum boxes where exposed galvanized steel rigid metal conduit or exposed intermediate metal conduit (IMC) is used.
   4. Use cast aluminum boxes where aluminum rigid metal conduit is used.
   5. Use nonmetallic boxes where exposed rigid PVC conduit is used.
   6. Use suitable concrete type boxes where flush-mounted in concrete.
   7. Use suitable masonry type boxes where flush-mounted in masonry walls.
   8. Use raised covers suitable for the type of wall construction and device configuration where required.
   9. Use shallow boxes where required by the type of wall construction.
   10. Do not use "through-wall" boxes designed for access from both sides of wall.
   11. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
   12. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
   13. Nonmetallic Boxes: Comply with NEMA OS 2, and list and label as complying with UL 514C.

14. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
15. Boxes for Ganged Devices: Use multi-gang boxes of single-piece construction. Do not use field-connected gangable boxes unless specifically indicated or permitted.

C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches:
1. Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
2. Junction and Pull Boxes Larger Than 100 cubic inches:
a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.

D. Underground Boxes/Enclosures:
1. Description: In-ground, open bottom boxes furnished with flush, non-skid covers with legend indicating type of service and stainless steel tamper resistant cover bolts.
2. Size: As indicated on drawings.
3. Depth: As required to extend below frost line to prevent frost upheaval, but not less than 12 inches.
4. Provide logo on cover to indicate type of service.
5. Applications:
a. Sidewalks and Landscaped Areas Subject Only to Occasional Nondeliberate Vehicular Traffic: Use polymer concrete enclosures, with minimum SCTE 77 Tier 8 load rating.
b. Do not use polymer concrete enclosures in areas subject to deliberate vehicular traffic.
6. Polymer Concrete Underground Boxes/Enclosures: Comply with SCTE 77.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install boxes in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Unless otherwise indicated, boxes may be surface-mounted where exposed conduits are indicated or permitted.

E. Box Supports:
1. Secure and support boxes in accordance with NFPA 70 and Section 26 05 29 using suitable supports and methods approved by the authority having jurisdiction.
2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.

F. Install boxes as required to preserve insulation integrity.

G. Underground Boxes/Enclosures:
1. Install enclosure on gravel base, minimum 6 inches deep.

2. Mount enclosures located in landscaped areas with top at 1 inch above finished grade.
3. Provide cast-in-place concrete collar constructed in accordance with Section 03 30 00, minimum 10 inches wide by 12 inches deep, around enclosures that are not located in concrete areas.
4. Install additional bracing inside enclosures in accordance with manufacturer's instructions to minimize box sidewall deflections during backfilling. Backfill with cover bolted in place.

H. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

I. Install firestopping to preserve fire resistance rating of partitions and other elements.

END OF SECTION

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SECTION 26 05 53 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

PART 2 PRODUCTS

2.01 IDENTIFICATION REQUIREMENTS

A. Identification for Equipment:
   1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
      a. Panelboards:
         1) Identify power source and circuit number. Include location when not within sight of equipment.
         2) Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces using pencil.
         3) For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.
      b. Enclosed switches, circuit breakers, and motor controllers:
      c. Transfer Switches:
         1) Identify short circuit current rating based on the specific overcurrent protective device type and settings protecting the transfer switch.
   2. Service Equipment:
      a. Use identification nameplate to identify each service disconnecting means.
   3. Available Fault Current Documentation: Use identification label to identify the available fault current and date calculations were performed at locations requiring documentation by NFPA 70 including but not limited to the following.
      a. Service equipment.
      b. Industrial control panels.
      c. Motor control centers.
      d. Elevator control panels.
      e. Industrial machinery.

B. Identification for Conductors and Cables:
   1. Color Coding for Power Conductors 600 V and Less: Comply with Section 26 05 19.
   2. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.
   3. Use wire and cable markers to identify circuit number or other designation indicated for power, control, and instrumentation conductors and cables at the following locations:
      a. At each source and load connection.

C. Identification for Boxes:
   1. Use identification labels or handwritten text using indelible marker to identify circuits enclosed.

2.02 IDENTIFICATION NAMEPLATES AND LABELS

A. Identification Nameplates:
   1. Materials:
      a. Indoor Clean, Dry Locations: Use plastic nameplates.
   2. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch; engraved text.

B. Identification Labels:
   1. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
   2. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.

2.03 WIRE AND CABLE MARKERS

A. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.

B. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.

C. Legend: Power source and circuit number or other designation indicated.

D. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.

E. Minimum Text Height: 1/8 inch.

F. Color: Black text on white background unless otherwise indicated.

2.04 WARNING SIGNS AND LABELS

A. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.

B. Warning Signs:
   1. Materials:
   2. Minimum Size: 7 by 10 inches unless otherwise indicated.

C. Warning Labels:
   1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.
   2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.
   3. Minimum Size: 2 by 4 inches unless otherwise indicated.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.

END OF SECTION

(NO TEXT THIS PAGE)

SECTION 26 24 16 - PANELBOARDS

PART 1 GENERAL

1.01 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for panelboards, enclosures, overcurrent protective devices, and other installed components and accessories.

B. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, overcurrent protective device arrangement and sizes, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.

C. All panelboards shall be mounted in non-classified spaces. Mounting withing the plant area is not allowed.

1.02 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70 and 820.

B. NEC Code.

PART 2 PRODUCTS

2.01 PANELBOARDS - GENERAL REQUIREMENTS

A. Provide products listed, classified, and labeled as suitable for the purpose intended.

B. Short Circuit Current Rating:
   1. Provide panelboards with listed short circuit current rating as indicated on the drawings.
   2. Listed series ratings are not acceptable.

C. Mains: Configure for top or bottom incoming feed as indicated or as required for the installation.

D. Bussing: Sized in accordance with UL 67 temperature rise requirements.
   1. Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.

E. Conductor Terminations: Suitable for use with the conductors to be installed.

F. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
   1. Boxes: Galvanized steel unless otherwise indicated.
      a. Provide wiring gutters sized to accommodate the conductors to be installed.
   2. Fronts:
   3. Lockable Doors: All locks keyed alike unless otherwise indicated.

G. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.

2.02 LIGHTING AND APPLIANCE PANELBOARDS

A. Description: Panelboards complying with NEMA PB 1, lighting and appliance branch circuit type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.

B. Conductor Terminations:

1. Main and Neutral Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
2. Main and Neutral Lug Type: Mechanical.

C. Bussing:
1. Phase and Neutral Bus Material: Aluminum.
2. Ground Bus Material: Aluminum.

D. Circuit Breakers: Thermal magnetic bolt-on type unless otherwise indicated.

E. Enclosures:
1. Provide surface-mounted or flush-mounted enclosures as indicated.
2. Fronts: Provide lockable hinged door with concealed hinges for access to overcurrent protective device handles without exposing live parts.
3. Provide clear plastic circuit directory holder mounted on inside of door.

2.03 OVERCURRENT PROTECTIVE DEVICES

A. Fusible Switches:
1. Description: Quick-make, quick-break, dead-front fusible switch units complying with NEMA KS 1, and listed and labeled as complying with UL 98; ratings, configurations, and features as indicated on the drawings.
2. Fuse Clips: As required to accept indicated fuses.
3. Provide externally operable handle with means for locking in the OFF position. Provide means for locking switch cover in the closed position. Provide safety interlock to prevent opening the cover with the switch in the ON position with capability of overriding interlock for testing purposes.

B. Molded Case Circuit Breakers:
1. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.
2. Interrupting Capacity:
a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:
1) 10,000 rms symmetrical amperes at 240 VAC or 208 VAC.
b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.
3. Conductor Terminations:
a. Provide mechanical lugs unless otherwise indicated.
b. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
4. Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.
5. Do not use tandem circuit breakers.
6. Do not use handle ties in lieu of multi-pole circuit breakers.

PART 3 EXECUTION

3.01 INSTALLATION

A. Perform work in accordance with NECA 1 (general workmanship).

B. Install products in accordance with manufacturer's instructions.

C. Install panelboards in accordance with NECA 407 and NEMA PB 1.1.

D. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

E. Provide required support and attachment in accordance with Section 26 05 29.

F. Mount panelboards such that the highest position of any operating handle for circuit breakers or switches does not exceed 79 inches above the floor or working platform.

G. Provide minimum of six spare 1 inch trade size conduits out of each flush-mounted panelboard stubbed into accessible space above ceiling and below floor.

H. Provide grounding and bonding in accordance with Section 26 05 26.

I. Provide fuses complying with Section 26 28 13 for fusible switches as indicated.

J. Provide filler plates to cover unused spaces in panelboards.

END OF SECTION

(NO TEXT THIS PAGE)

26 27 16 – ELECTRICAL ENCLOSURES AND CONTROLS

PART 1 – GENERAL

1.1 DESCRIPTION

A. This specification covers the technical requirements for the engineering, fabrication, wiring and installation for control panels and enclosures.

B. The Contractor shall be responsible for adjustments and commissioning of the control panel necessary to place the control panel into service, including proper pump protective device adjustments and programming.

C. For this project, custom motor control panel, pump control panels, PLC panels, and manufacturer control panels will be fabricated and furnished by the Division 25 Contractor, Pump and Equipment Suppliers. These control panels shall be installed by the Division 26 Contractor per this specification section 26 27 16. Input and output control wiring and power wiring and conduits shall be by the Division 26 Contractor. The Division 25, 26, and Pump and Equipment Suppliers shall work together for testing and commissioning. Refer to Division 25 specification sections and details on the drawings for more information.

D. For enclosures and control panels not fabricated and furnished by other trades, the Division 26 Contractor shall furnish, fabricate, install, test and commission those enclosures, controls, motor starters, and accessories per this specification section.

E. The Division 26 Contractor is encouraged to communicate with the General Contractor regarding Scope of Supply and Installation.

1.2 QUALITY ASSURANCE

A. Equipment specified herein shall meet applicable standards of the following agencies and associations:

1. Underwriters' Laboratories, UL.
2. National Electrical Manufacturers Association, NEMA.
3. National Electrical Code (NEC).
4. NFPA 70 and 820 where applicable.

    a. Wire sizes inside the control panel shall comply with the NEC, for 60° C operation.

PART 2 – PRODUCTS

2.1 GENERAL

A. The instrument panels and enclosures shall be as follows:

1. Freestanding or rack mounted outdoor enclosures shall be rated NEMA 4X, stainless steel, provided with accessories and components as shown on the drawings and detailed in the project specifications.
2. Enclosures, pullboxes and junction boxes within WWTP area shall be NEMA7 to comply with C1D2 rating.
3. See drawings for additional enclosure type.

B. Provide conduit accessories as needed for conduits terminating at control panels, including water tight conduit hubs, conduit seals for explosion-proof wiring applications, and manufactured moisture seals for non-hazardous applications. Sealing putty is not acceptable.

2.2 PANEL CONSTRUCTION

A. General

1. Stiffening members shall be provided for strength and stiffness as required.
2. Seamless welded construction shall be used throughout. All exposed seams shall be continuously welded and ground smooth.
3. Lifting rings shall be provided.
4. Sub panels shall be provided as required, with mounting designed for easy removal. The subpanels shall be finished with 2 coats of white enamel paint.
5. Print pockets shall be attached to the interior side of each door.
6. Hinges shall be stainless steel piano continuous hinge type.
7. Provide 3-point door latching mechanisms with handles on front of panel door(s).
8. Provide gasketing if required for rating.

2.3 PANEL GROUNDING

A. Provide an equipment grounding bus bar or terminal block.

1. The ground busbars shall be of nickel-plated copper, rated for 100 amperes.
2. The bus bar shall be provided with two (2) screw clamp terminal blocks, which shall be capable of accepting conductors up to #1 AWG.
3. The bus bar shall be provided with a minimum of twenty (20) screw clamp terminal blocks, which shall be capable of accepting conductors up to #4 AWG.

2.4 PANEL WIRING

A. Wiring within the enclosure shall be continuous and shall be terminated only at terminal blocks or equipment terminals.

B. Not more than two wires shall be terminated at any terminal.

C. Wiring splices and wire nuts will not be permitted within the enclosure.

D. Wiring within the enclosure shall be protected as follows:

1. In general, all wiring within the enclosure shall be routed in plastic wiring ducts. Wiring

ducts shall be sized to include 100% (percent) spare capacity.
2. Wiring outside of the ducts shall be restrained by means of plastic ties.
3. Wiring passing a door hinge shall be grouped and wrapped in a protective wire harness.
4. Provide abrasion protection for wire bundles passing through holes or across metal edges.

E. In general, wiring within the enclosure shall be as follows:

1. Control wiring within the enclosure shall be #14 AWG minimum, stranded, type MTW, 600V.
2. Wiring for 4-20 mA DC analog signals shall be #18 AWG twisted shielded pair.

    a. Cables shall meet the following criteria:

        1). U.L. Listed Subject 1277
        2). Pass IEEE 383 or UL 1581 Flame Test
        3). OSHA Acceptable
        4). Pall UL VW-1 Flame Test
        5). #18 AWG conductors, 7 strand, bare copper
        6). 100% aluminum/polyester foil shield
        7). 600 volt 90 degrees C rated insulation
        8). Each conductor shall be numbered and color-coded.
        9). Comply with NEC articles #318, #340 and #501, for power limited tray cable (PLTC)
        10). Nominal 2” lay
        11). PVC insulation, with ripcord and nylon jacket
        12). Suitable for use in wet locations

    b. The manufacturer of the cables shall be an ISO 9001 certified facility.

F. In general, wiring within the enclosure shall follow the following color convention to comply with NFPA 79 (1994), part 16:

1. Neutral conductors shall be white.
2. Line, load and control conductors shall be black.
3. Grounding conductors shall be green.
4. Foreign voltage control conductors shall be yellow or orange.
5. Low voltage (below 50 volts) AC conductors shall be red.
6. Low voltage neutral (grounded) conductors shall be white with a red stripe.
7. DC control conductors shall be blue.
8. DC (+) power conductors shall be blue with a white stripe or purple.
9. DC (-) (grounded) power conductors shall be white with a blue stripe.
10. Wiring with multi-conductor cables shall be color-coded.

    Note: Foreign voltage means all control circuits that may remain energized when the main disconnecting means is in the OFF position. Interlocking conductors shall be yellow or orange throughout the entire circuit, including wiring in the control panel and the external field wiring.

G. AC and DC wiring shall be separated from each other. Where AC and DC wire runs parallel,

the minimum separation between them shall be four (4) inches. Where AC and DC wire runs cross, they shall cross at 90 degrees C. Provide separate wiring duct for AC and DC wiring.

H. Equipment and signal ground wiring, as well as Neutral wiring, shall not be daisy-chained; they shall each be terminated at isolated, bussed terminal blocks.

I. Each conductor end shall be terminated at a terminal block or at an equipment-wiring terminal. Each terminal block shall have a unique identification number. The terminal blocks shall be arranged and numbered in consecutive order, based on standard alphanumeric order.

J. Terminal blocks within enclosure shall be grouped as follows:

1. 480 Volts AC power.
2. 120 Volts AC power.
3. 120 Volts AC control wiring.
4. AC isolated Neutral.
5. 24 Volts DC power.
6. 24 Volts DC control wiring for discrete signals
7. 24 Volts DC Common.
8. Analog signal wiring (for 4-20 mA DC signals).
9. Grounding.

K. Provide 25% spare terminal blocks (minimum of six) for each type used in each enclosure.

2.5 TERMINAL BLOCKS

A. Except for incoming power terminal blocks, terminal blocks within enclosures shall be of the high-density modular types, constructed of nylon material, suitable for mounting on standard DIN rails. Termination type shall be tubular screw with serrated pressure plate. The terminal block system shall be manufactured by Phoenix Contact, Weidmuller, or equal.

B. All current carrying parts (metal bodies) shall be made of nickel/tin-plated copper.

C. Ground terminals shall be color coded in accordance with international standard, which shall be yellow/green.

D. Matching jumper bridges shall be color coded to the wiring colors.

E. Panel power distribution fused terminal blocks shall be provided with disconnect lever puller mechanism and illuminated indication.

1. Fused shall be standard ¼" by 1-¼", and shall be sized as shown on the drawings.
2. The terminal blocks shall be able to accept up to number 8 AWG conductor.
3. Terminal blocks shall be rated for 15 amps at 250 VAC.
4. Terminal blocks shall be Phoenix Contact type UK 6.3-HESiLA-250, Weidmuller type 6/2, or equal.

F. Terminal blocks for discrete inputs and outputs shall be two-level types:

1. Both levels shall be of the feed through types.
2. Terminals shall be rated for up to 20 amperes at 300 VAC, and shall be able to accept up to #12 stranded conductors.
3. Terminal blocks shall be Phoenix Contact type UKKB-3, Weidmuller WDK 2.5, or equal.

G. Terminal blocks for analog inputs and outputs shall be three-level types:

1. The top and center terminations shall be feed through types.
2. The bottom termination shall be grounded through the railing.
3. The terminal blocks shall be rated for up to 10 amperes at 300 VAC, and shall be able to accept up to #12 AWG stranded conductors.
4. The terminal blocks shall be Phoenix Contact type SLKK-5, Weidmuller type DLD 2.5/PE or equal.

H. Terminal blocks for foreign voltage “hot” conductors shall be single level disconnecting type:

1. Blocks shall be orange or yellow to match control wiring per Part 2.04, F.
2. The terminal blocks shall be rated for 10 amperes at 300 VAC, and shall be able to accept #22 thru #12 AWG conductors.
3. The terminal blocks shall be lever type with clear indication of open/close status.
4. The terminal blocks shall be Weidmullller type WRT 2.5, Phoenix Contact or equal.

2.6 PANEL ACCESSORIES

A. Provide (furnish and install) interposing relays to interface all field-mounted equipment with power limited electronic control and communication equipment. Use intrinsically safe relays where field devices are located in hazardous areas.

B. Provide thermostatically controlled heater.

1. Hoffman or approved equal

C. Provide thermostatically controlled ventilation fan, louvers, filters, and screens, designed and manufactured for the application.

1. Hoffman or approved equal

2.7 PANEL INSTRUMENTS

A. Provide all analog signal boosters and isolators necessary to interface all field mounted equipment with control system equipment.

B. Provide audible alarm signaling devices. The device shall be as manufactured by Edwards, Federal Signal, Benjamin, or equal. The unit shall incorporate the following:

1. Flush panel mounting.
2. Weather and vandal resistant

3. Internal gain control for output adjustment (80 dba maximum at 15 feet)
4. UL listed
5. Operating Voltage: 120 VAC

2.8 PILOT AND CONTROL DEVICES

A. Pilot Devices: Pushbuttons, selector switches, and indicating lights shall be rated heavy-duty, oil-tight or watertight and corrosion resistant as required. All units shall be furnished with standard size legend plates with legends as described on the project Drawings.

B. Selector switches shall have the number of positions, switching arrangement, number and type of contact blocks indicated on the project Drawings.

C. Contact blocks shall have a minimum continuous current rating of 10 amperes at 240 VAC. Contact blocks shall have screw type connection terminals.

D. Indicating lights shall be light emitting diode type 120VAC, color cap, and push-to-test feature. Provide flashing type lights where indicated.

E. Pilot device manufacturers shall be:

1. Allen-Bradley Bulletin 800H or 800T or equal by same manufacturer as motor starters.

F. Control relays shall be plug-in type with sockets and hold-in clips. Sockets shall have screw terminals. Contacts shall be silver-cadmium, rated 10 amperes at 240 VAC. Relays shall have two-pole, double throw contacts (DPDT). Relays shall have a manual operator and pilot light. Coil voltages shall be 120 VAC, or as noted on the project Drawings. Relays shall be as manufactured by Allen-Bradley Bulletin 700, Type HA or HB, or equal by same manufacturer as motor starters.

2.9 EQUIPMENT IDENTIFICATION AND WIRE TAGGING

A. All control wiring shall be identified by means of computer-generated, heat shrink type wire marker. Wire numbers shall be as shown on the drawings.

B. Each component mounted within the enclosure shall be provided with equipment identification. Equipment and device nameplates or identification shall be of engraved laminated plastic, with white lettering on black background. Nameplates shall be as listed herein or as shown on the project Drawings.

2.10 REGULATED POWER SUPPLY

A. When DC power supply is required for controllers, and 2-wire analog loops, provide two redundant 24 V DC regulated power supplies.

B. The contractor shall be responsible for providing and sizing all instrument loop power supplies. The instrument loop power supplies shall be sized to include at least 100% spare capacity. Submit power supply load calculations with the panel shop drawings.

C. The power supply shall be sized to include 100% spare capacity.

D. Acceptable power supply manufacturers:

1. Phoenix Contact
2. SOLA
3. Or equal

2.11 ACESSORY CIRCUIT BREAKERS

A. Accessory circuit breakers shall have terminal lug wire size #14 - #2 AWG Cu or Al. Reversible line and load lugs for flush mount wiring. DIN mounted (symmetrical rail 35 x 7.5 DIN/EN 50 022). UL Listed as HACR type from 15 A to 70 A. Field installable quick connectors. Single handle with internal common trip. UL Listed 120/240VAC (10,000 AIC).

B. Accessory circuit breakers shall be thermal magnetic type.

C. Accessory circuit breakers shall be supplied with reversible lugs. Mounting brackets shall be provided for flush installation.

2.12 MOTOR BRANCH CIRCUIT BREAKERS

A. Motor branch-circuit breakers shall be motor protection type with adjustable instantaneous trip, or thermal magnetic type circuit breakers with inverse time-current characteristics..

B. Motor branch-circuit breakers shall be provided by manufacturer/supplier of solid-state motor controllers.

2.13 ACCESSORY AND CONTROL POWER TRANSFORMER

A. Accessory and control power transformer primary shall be as specified on the drawings, dry type, rated 240/480 volt primary, 120 volt secondary, 60HZ, single phase, with two 5% FCBN taps, 115 degrees C temperature rise.

B. Accessory and control power transformer shall be Acme #TA-2-81220 and TA-2-81323 or equal.

2.14 MOTOR STARTERS, CONTACTORS AND RELAYS

A. These units shall be type and size with the number of poles and accessories as indicated on the Drawings.

B. Unless indicated otherwise, all of these units shall be by the same manufacturer as the motor starters.

C. Control relays shall be plug-in “ice-cube style” with screw terminal base and hold-in clips.

D. Motor starters shall be Allen Bradley NEMA rated FVNR, or approved equal. IEC motor starters and contactors are not acceptable. Provide thermal overload elements and two sets of NO/NC auxiliary dry contacts. Provide NEMA Size as required or as indicated, but NEMA size 1 shall be the smallest acceptable size. Provide Hand-Off-Auto selector switch and On pilot light. Provide a fused control power transformer.

E. Provide enclosure for motor starters and contactors that are not otherwise furnished integral to custom control panels.

2.15 ACCESSORY DEVICES

A. These devices shall be heavy duty type and shall mount in the starter/pump control panel enclosure on the swing out panel or panel door, as indicated.

B. Unless otherwise indicated, these devices shall be by the same manufacturer as the motor starters.

2.16 PUMP PANEL ENCLOSURE

A. Provide stainless steel NEMA 4X enclosure, as indicated on the drawings, with interior painted steel back panel for mounting components, interior painted steel swingout panel for mounting control devices such as control switches and pilot lights, and exterior door with padlock hasp. Non-metallic panels, non-metallic swingout and non-metallic back panels are not acceptable.

2.17 SURGE PROTECTION DEVICE

A. The SPD shall be constructed using multiple surge current diversion arrays of metal oxide varistors (MOV), matched to 1% variance. The array shall consist of multiple gap-less metal oxide varistors, with each MOV individually fused. The arrays shall be designed and constructed in a manner which ensures MOV surge current sharing. No gas tubes, silicon avalanche diodes or selenium plates/rectifiers shall be used. The status of each array shall be continuously monitored and a green LED shall be illuminated if the array is in full working order. All protection modes, including N-G, shall be monitored and internally fused. Summary alarm dry contacts shall be provided: phase loss, undervoltage, power loss, protection failure.

2.18 PUMPs, MOTORs, and I&C CONTROLS

A. Refer to Division 25 Specifications and I & C Drawings for Scope of Work.

B. The Division 26 Contractor shall be responsible for I & C wiring and conduit and connections to instruments.

PART 3 – EXECUTION

3.1 SYSTEM OPERATION

A. Refer to Division 25, Equipment Specifications, and I & C Drawings and Details.

3.2 INSTALLATION

A. Provide and install all necessary bracket mounting devices, structural pieces and anchors necessary for this purpose.

1. Provide a heavy-duty mounting frames, set in concrete. Provide corrosion protection coating for any portion of framez in direct contact with concrete.

B. General mounting heights for the various type devices shall be as follows, unless otherwise indicated.

1. Control Panel - 5'-6" to top.

C. All control devices, motor starters, and relays inside the pump control panel shall be identified with engraved laminate nameplate.

D. Control panels shall have engraved laminate nameplate on exterior.

E. Install and connect pump cables furnished with each pump.

F. Install and connect pump seal and temperature sensor cables for each pump motor.

G. Furnish, install and connect control cables for each level float.

H. Furnish and install stainless steel strain relief mesh grips and anchors for each cable installed in the wet well as required.

3.3 WIRING

A. Provide wiring for all motors, starters, VFDs, contactors, control equipment, and instruments.

B. Connections shown to equipment are approximate and do not represent the actual point of connection. Verify actual location before roughing-in.

3.4 START-UP AND COMMISSIONING

A. The Manufacturers and Div. 25 and Div. 26 Contractors shall supply authorized personnel for start-up service as needed to ensure satisfactory operation. Subsequent trips to the job site to correct defects shall be made at no charge to the Owner during the warranty period.

B. Simulate failures/operations and detail how the operation/failure was simulated with the result. Submit the procedures for simulating the operation/failures to the engineer during the submittal phase. The engineer must approve the means and methods prior to performing the actual test. Include the final test results in the operation and maintenance manual.

C. The above testing and commissioning may overlap with owner training.

3.5 TRAINING

A. The Manufacturers and Div. 25 and Div. 26 Contractors shall supply authorized personnel to conduct an Operating and Maintenance training session. The Owner shall have the right to video tape the training for future reuse.

B. The training session(s) shall be conducted and repeated as needed until the Owner and Engineer are satisfied that the operators are comfortable with the operation and maintenance of the system. Training shall be done on site with the owner's personnel. Start-up and training personnel shall provide their full attention to this customer while on site.

C. Contact the Owner at 6 months and 1 year after substantial completion and provide additional training as may be needed to insure all Owner questions related to Operation and Maintenance are addressed.

3.6 WARRANTY

A. A 1 year warranty shall begin from the time of "substantial completion" as issued by the engineer. This shall cover all materials, parts and labor needed to correct a component failure or workmanship deficiency that becomes known during the warranty period.

END OF SECTION 26 27 16

SECTION 26 27 26 - WIRING DEVICES

PART 1 GENERAL

1.01 SUBMITTALS

A. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.

1.02 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Products: Listed, classified, and labeled as suitable for the purpose intended.

C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

PART 2 PRODUCTS

2.01 WIRING DEVICES - GENERAL REQUIREMENTS

A. Provide wiring devices suitable for intended use with ratings adequate for load served.

B. Wiring Device Applications:
   1. Receptacles Installed Outdoors or in Damp or Wet Locations: Use weather-resistant GFCI receptacles with weatherproof covers.

C. Wiring Device Finishes:
   1. Provide wiring device finishes as described below, unless otherwise indicated.
   2. Wiring Devices Installed in Unfinished Spaces: Gray with galvanized steel wall plate.
   3. Wiring Devices Installed in Wet or Damp Locations: Gray with weatherproof cover.

2.02 WALL SWITCHES

A. Wall Switches - General Requirements: AC only, quiet operating, general-use snap switches with silver alloy contacts, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 20 and where applicable, FS W-S-896; types as indicated on the drawings.

B. Standard Wall Switches: Industrial specification grade, 20 A, 120/277 V with standard toggle type switch actuator and maintained contacts; single pole single throw, double pole single throw, three way, or four way as indicated on the drawings.

2.03 RECEPTACLES

A. Receptacles - General Requirements: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498, and where applicable, FS W-C-596; types as indicated on the drawings.
   1. NEMA configurations specified are according to NEMA WD 6.

B. Convenience Receptacles:
   1. Standard Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R; single or duplex as indicated on the drawings.

C. GFCI Receptacles:
   1. GFCI Receptacles - General Requirements: Self-testing, with feed-through protection and light to indicate ground fault tripped condition and loss of protection; listed as complying with UL 943, class A.

2. Standard GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style.
3. Weather Resistant GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style, listed and labeled as weather resistant type complying with UL 498 Supplement SD suitable for installation in damp or wet locations.

2.04 WALL PLATES AND COVERS

A. Wall Plates: Comply with UL 514D.
   1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.
   2. Size: Standard.
   3. Screws: Metal with slotted heads finished to match wall plate finish.

B. Galvanized Steel Wall Plates: Rounded corners and edges, with corrosion resistant screws.

C. Weatherproof Receptacle Covers for Wet Locations: Gasketed, cast aluminum, with hinged lockable cover and corrosion-resistant screws; listed as suitable for use in wet locations while in use with attachment plugs connected and identified as extra-duty type.

D. Weatherproof Switch Covers for Wet or Damp Locations: Gasketed, metallic, with externally operable actuating means and corrosion-resistant screws; listed as suitable for use in wet locations.

PART 3 EXECUTION

3.01 INSTALLATION

A. Perform work in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.

B. Coordinate locations of outlet boxes provided under Section 26 05 33.16 as required for installation of wiring devices provided under this section.

C. Install wiring devices in accordance with manufacturer's instructions.

D. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

E. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.

F. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

END OF SECTION

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SECTION 26 28 16 - DISCONNECT SWITCHES

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

A. Extent of disconnect switch work and applications are indicated on the drawings.

B. Applications of disconnect switches include non-fusible equipment disconnects, fusible equipment disconnects, fusible circuit protection, fusible service entrance equipment.

C. Types of disconnect switches for this project:

D. Heavy duty 600 VAC, 3-pole, fusible or non-fusible as indicated on the drawings, NEMA 4X construction, UL listed for service entrance applications.

E. Meter Enclosure (Meter Base and All Internal Components)

1. Provided and installed by local utility.

1.2 QUALITY ASSURANCE

A. Disconnect switches shall be constructed to NEMA standard KS1-1983; shall be NEMA Type HD; shall be UL listed.

PART 2 PRODUCTS

2.1 DISCONNECT SWITCHES

A. All switches shall have switch blades which are fully visible in the "OFF" position when the switch door is open. All current- carrying parts shall be plated to resist corrosion and promote cool operation. Switches shall have removable arc suppressors where necessary to permit easy access to line-side lugs. Lugs shall be copper and shall be front-removable and UL listed for 75 degrees C copper conductors.

B. Switching mechanism shall be quick-make, quick-break, with handle that is pad-lockable in the "OFF" position. The handle position shall indicate whether the switch is "ON" or "OFF".

C. Enclosure shall be suitable for the environment in which it is installed; or NEMA 4X outdoor weatherproof. Enclosure door shall have door interlock, with defeat mechanism, which prevents the door from opening when the switch is "ON".

D. Enclosure door shall have door interlock, with defeat mechanism, which prevents the door from opening when the switch is “ON”.

E. All fusible switches shall accept Class R current limiting fuses and shall have rejection clips.

UL listed short-circuit rating shall be 200,000 rms symmetrical amperes with Class R fuses.

F. Ampere rating shall be as indicated on the drawings, or if not indicated as required for the circuit.

G. Disconnect switches used for service entrances shall be UL listed for service entrance applications, and shall have grounding provisions for service grounding and bonding.

2.2 MANUFACTURERS

A. Manufacturers:

1. Cutler Hammer.
2. Square D Company.
3. General Electric.
4. Siemens.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install safety switches where indicated on drawings, with ratings indicated.

B. Install securely to walls, columns, or machine frames, and provide all necessary brackets, anchors, unistrut channels, and hardware.

C. Do not mount equipment directly to masonry or concrete walls. Provide support channels.

D. Equip with class RK5 time-delay current limiting fuses if switch is fusible type.

E. Terminate all conductors including equipment grounding conductor.

F. Test switch mechanism to ensure smooth mechanical operation.

END OF SECTION

SECTION 26 29 23 - VARIABLE-FREQUENCY MOTOR CONTROLLERS

PART 1 - GENERAL

1.01 DESCRIPTION

A. This specification is to cover a complete Variable Frequency Drive (VFD aka: VFD, AFD, ASD, Inverter, AC Drive, et al) consisting of an active supply inverter designed for use with a standard AC induction motor, synchronous reluctance (SynRM) and permanent magnet (PM) motors in water and wastewater applications. The VFD must provide a V/Hz or sensor-less vector mode of operation.

B. The drive manufacturer shall supply the drive and all necessary options as specified. VFDs that are manufactured by a third party and "brand labeled" shall not be acceptable. All VFDs installed on this project shall be from the same manufacturer.

C. *Drives provided for the South Plant high service pumps and the North Plant high service pumps shall be Ultra-Low Harmonic (ULH) drives as indicated on drawings. Drives provided for all wells shall be 6-Pulse type drives.

1.02 QUALITY ASSURANCE

A. Referenced Standards and Guidelines:
   1. Institute of Electrical and Electronic Engineers (IEEE)
      a. IEEE 519, Guide for Harmonic Content and Control.
   2. Underwriters Laboratories (as appropriate)
      a. UL508C
      b. UL61800-5-1
   3. National Electrical Manufacturer's Association (NEMA)
      a. ICS 7.0, AC Adjustable Speed Drives
   4. International Electro-technical Commission (IEC)
      a. EN/IEC 61800-3
      b. 2014/35/EU Low Voltage Directive
      c. 2014/30/EU Electromagnetic compatibility (EMC)
      d. 2006/42/EC Machinery Directive
   5. National Electric Code (NEC)
      a. NEC 430.120, Adjustable-Speed Drive Systems
   6. International Building Code (IBC)
      a. IBC 2012 Seismic – referencing ASC 7-05 and ICC AC-156
   7. CSA
      a. C22.2 No. 274-17, Industrial control equipment

B. Qualifications:
   1. VFDs and options shall be UL508C listed. The ACQ580 standard VFD shall be UL labeled 100 kA SCCR, RMS Symmetrical, 600V max.
   2. UL-APPROVAL the VFDs shall be available as UL compliant version which complies the technical regulations of UL according to UL61800-5-1. A UL listing document shall be available to confirm VFDs compliance with the requirements. Manufacturer's statements of UL compliance or pending approval are not accepted. The VFD shall comply the technical regulations of UL according to UL508C. UL listing document shall be available to confirm VFDs compliance with the requirements.
   3. Environmental Manufacturing: The VFD shall comply with Restriction of Hazardous Substances in Electrical and Electronic Equipment directive 2011/65/EU requirements, so called RoHS II

requirements. The VFD shall be easy to recycle. The manufacturer shall make recycling instructions publicly available. The recycling instructions shall provide recycling information in accordance to Waste Electrical and Electronic Equipment directive 2012/19/EU (WEEE)

4. FUNCTIONAL SAFETY
   a. The VFDs shall support 'Safe Torque Off' (STO) function capable for safety related applications up to SIL 3, SIL_{CL} 3 and PL e.
   b. The VFD shall comply with the following standards
      1) IEC 61508:2010; SIL
      2) ISO 13849-1:2006; PL e
      3) IEC 62061:2005; SIL_{CL} 3
      4) IEC 61800-5-2:2007; SIL 3

1.03 SUBMITTALS

A. The Submittals shall include the following information:
   1. Product Overview
   2. Dimensional Drawings
   3. Control Circuit Drawings
   4. Engineering Data including rating tables and weight
   5. General Notes

PART 2 - VARIABLE FREQUENCY DRIVES (VFD)

2.01 VARIABLE FREQUENCY DRIVES (VFD)

A. The VFD shall be solid state, with a Pulse Width Modulated (PWM) output. The VFD shall be a Sensor-less Vector AC to AC converter utilizing the latest Insulated Gate Bipolar Transistor (IGBT) technology. The VFD shall employ a Sensor-less Vector inner loop torque control strategy that mathematically determines motor torque and flux. The VFD must also provide an optional operational mode for V/Hz Operation.

B. Acceptable manufacture: ABB ACQ580 product family or approved equal

C. Ratings
   1. The VFD shall be rated to operate from 3-phase power at one of the following voltage ranges. (380-480), VAC +10%/-15%, 48Hz to 63Hz. 5-400 hp the VFD shall employ a full wave rectifier to prevent input line notching and operate at a fundamental (displacement) input power factor of 1.0. at all speeds and nominal load. The input power factor shall have programing capability to adjust power factor lagging to leading. The ULH standard VFD efficiency shall be 96.5% or better at full speed and load.
   2. The overvoltage trip level shall be a minimum of 30% over nominal, and the under-voltage trip level shall be a minimum 35% under the nominal voltage.
   3. Normal Duty / Variable Torque output voltage and current ratings shall match the adjustable frequency operating requirements of a standard AC induction, synchronous reluctance (SynRM) or permanent magnet (PM) motors in water and wastewater applications. The short-term normal duty overload current capacity shall be 110% of rated current for one (1) minute out of ten (10) minutes.
   4. Heavy Duty / Constant Torque output voltage and current ratings shall match the adjustable frequency operating requirements a standard AC induction, synchronous reluctance (SynRM) or permanent magnet (PM) motors in water and wastewater applications. The short-term heavy-duty overload current capacity shall be 150% of rated current for one (1) minute out

of ten (10) minutes and peak overload capacity shall be 180% for two (2) seconds out of each minute with an instantaneous overcurrent trip at 350% or higher.

5. Output frequency shall be adjustable between 0Hz and 500Hz forward or reversing. Operation above motor nameplate shall require programming changes to prevent inadvertent high-speed operation.
6. The VFD shall be furnished in an Open Chassis (IP00), UL Type 1 (NEMA 1) or UL Type 12* (NEMA 12*) listed enclosure rated as specified for operation at ambient temperatures between -15°C and 40°C at an altitude not exceeding 3300 feet, with relative humidity less than 95% and no condensation allowed.
7. The printed circuit boards (PCB) shall be conformal coated to protect from atmospheric contamination by Chemical gasses and Solid particles per IEC 60721-3-3; Chemical gasses Class 3C2 and Solid particles Class 3S2.

D. HARMONICS

1. Wall mount designs from horsepower reference range of 5HP to 150HP in UL Type 1 (NEMA 1) or UL Type 12* (NEMA 12*) and a single point power connection per each electrical phase. Horsepower range of 200HP to 400HP shall be in UL Type Open (NEMA Open) and a single point power connection per each electrical phase.
2. The VFD construction shall maintain current distortion levels at the VFD's input terminals to levels at or below those listed in "IEEE Recommended Practice and Requirements for Harmonic Control in Electric Power Systems, IEEE Std. 519."
   a. Compliance to IEEE Std 519 shall not require the use of additional 12 or 18 Pulse Rectifier bridges, external active filters or passive harmonic filters
3. The VFD shall have a total harmonic content of 5% or less of full rated current at the input terminals of the VFD.
4. All harmonic mitigating components must be internal to the VFD and supplied as a complete integrated solution.
5. The VFD shall be constructed with an input T-Series LCL line filter rated for the full current of the drive to remove high order components cleaning the AC waveform above switching frequency of the active supply unit.
6. The VFD shall control the waveform of the input current and reduces the low order harmonic current drawn from the power line.
7. Each input phase of the VFD shall incorporate a symmetrical LCL filter arranged in a T-configuration. Drives without an LCL circuit are not allowed, as the LCL circuit adds extra impedance to the line reducing overall current, including harmonics and lowering fault current potential.
8. Regenerative front end VFDs used as harmonic solutions are not acceptable, due to possible regeneration on to power distribution network. The VFD shall not interfere with the Emergency Back-up Generator's voltage regulator.
9. Stand alone Active or Passive harmonic filters are not acceptable.
10. Harmonic solutions that have a potential to produce leading power factor shall not be acceptable.
11. VFD's without DC Bus capacitors are not acceptable
12. The VFD shall have a DC bus voltage controller to automatically maintain the DC bus levels in high or low line conditions for the purpose of maintaining full motor voltage at all times.
13. The VFD shall employ an active supply unit design, implemented in multiple variants and generations of drives of similar technology, with over 20 years of use in industry.
14. All models shall provide a complete, ready-to-install solution.

E. Built in Power Quality values: There shall be built in Power quality values to provide connected grid information.
   1. Line Current
   2. Active Current
   3. Reactive Current
   4. Grid Voltage
   5. Grid Power
   6. Power Factor of the Drive

2.02 MOTOR CONTROL

A. The VFD shall be capable of controlling an induction motor, permanent magnet motor and synchronous reluctance motors as standard. Have a maximum allowed motor cable length 1000 feet (300 meters). The VFD shall commission an induction motor, permanent magnet motor and synchronous reluctance motor with the motor nameplate values only, without the need to get the motor values from other sources.

B. Scalar and vector control modes shall be supported and there shall be independent control chains and parameters for both of the motor control modes.

C. The overload rating of the VFD shall be 110% of its rated normal duty current for 1 minute every 10 minutes and with a minimum of 130% for 2 seconds every 1 minute. Overload ability shall be available at all times - not only at start.

D. The VFD shall be capable of sensing the loss of load (broken belt / broken coupling / dry pump) and signal the loss of load condition. The drive shall be possible to be programmed to signal this condition via a control panel warning, relay output and/or over the serial communications.

E. Relay outputs shall include programmable for on/off time delays that will allow for drive acceleration or deceleration to and from zero speed, without signaling a false underload condition.

F. It shall be possible to disconnect a motor running full speed by opening an optional contactor between motor and VFD without causing any damage to the VFD.

G. The VFD shall include a standard embedded functional safety feature Safe Torque Off, (STO), to make the motor mechanically safe.

H. The VFD shall include an energy optimization circuit (flux optimization) that will automatically reduce applied motor voltage to the motor to reduce energy consumption by up to 10% and lower audible motor noise.

I. The VFD shall be capable of starting into a spinning load (forward or reverse) up to full speed and accelerate or decelerate to a set-point (flying start) without tripping or component damage.

J. The VFD shall restart after a power loss without the need to resend the start command. This feature shall be there regardless of the control source, control panel, I/O or fieldbus.

K. Flux braking shall be available, where the VFD controls the motor to dissipate the extra rotary energy as heat whenever braking is required. It shall be possible to use this flux braking feature to decelerate the motor from one speed to another – not only for stopping the motor.

L. Power-Loss-Ride-Through shall be programmable. If the incoming supply voltage is cut off, the VFD continues to operate using the kinetic energy of the rotating motor. The drive continues to be operational as long as the motor rotates and generates energy.

M. The VFD shall include a switching frequency control function. This adjusts the switching or carrier frequency, based on actual VFD temperature and allows the highest carrier frequency without de-rating the VFD or operating at high carrier frequency only at low speeds (temperature fold-back). It shall be possible to set a minimum and a reference switching frequency.

N. The VFD shall include a noise smoothing function, which distributes the acoustic motor noise over a range of frequencies instead of a single tonal frequency resulting in lower peak noise intensity.

O. The VFD shall have three (3) programmable critical frequency or critical speed lockout ranges to prevent the VFD from operating the load continuously on an undesirable speed range (skip frequencies)

2.03 STANDARD CONTROL HARDWARE FEATURES - ADJUSTABLE BY THE USER

A. General I/O

1. All I/O terminals shall be color coded to simplify wiring and troubleshooting, and shall have a special mode for testing I/O and the drive configuration without being connected to equipment.
2. All I/O shall be accessible (monitor and control) for fieldbus protocols (pass-through I/O).
3. It shall be possible to monitor status of the I/O from VFDs control panel.

B. ANALOG I/O

1. The VFD shall have at least two (2) programmable analog inputs. Both inputs shall accept current (0 to 20 mA or 4 to 20mA) or voltage (0 to 10 VDC) signals. The signal type selection, voltage or current, shall be made via VFD user interface. DIP-switches or jumpers are not allowed for input type programming. Analog Input shall have an inaccuracy of ≤1% of full scale in both current and voltage modes
2. The analog inputs shall be programmable to be used as: speed reference, frequency reference, pressure monitor, PID loop controller's set-point reference or signal feedback, or other defined inputs.
3. If the analog input reference (4 to 20 mA or 2 to10 VDC) is lost, the VFD shall give the user the option of: (1) stopping and displaying a fault; (2) running at a programmable preset speed and displaying an alarm; (3) hold the VFD speed based on the last good reference received and displaying an alarm. The drive shall be programmable to signal this condition via a control panel warning, relay output and/or over the serial communication bus.
4. The VFD shall have at least two (2) programmable analog outputs (0 to 20 mA or 4 to 20 mA) out of which one shall be software configurable to be either voltage (0 to 10 VDC) or current output. Analog Output shall have an inaccuracy of ≤1% of full scale in both current and voltage modes
5. The analog outputs shall be programmable to give an output signal proportional to frequency, motor speed, output voltage, output current, motor torque, motor power, DC bus voltage, active reference or other defined data.

C. DIGITAL I/O

1. The VFD shall have at least six (6) programmable digital inputs (24 VAC and 12 to 24 VDC, PNP or 5 pcs NPN) to connect to external devices, as follows:
    a. All inputs can be configurable for PTC sensors.
    b. There shall be a programmable run permissive circuit.
    c. Up to four (4) programmable free text interlock inputs shall be available.
    d. The VFD shall have at least one digital input which can be configured to receive a pulse signal up to 16 kHz.

D. Relay I/O

1. The VFD shall have at least three (3) programmable digital Form-C relay (changeover) outputs. The relays shall include programmable on and off delay times and adjustable hysteresis.

E. I/O Optional Extension Modules

1. The following I/O option modules shall be available:
    a. Relay Extension module with two relay outputs and one digital output, with an external input 24 volt to maintain power and control of module.
    b. PTC input module for up to 6 PTC sensors with an external input 24 volt to maintain power and control of module, and is capable of triggering the STO circuitry of the VFD.
    c. Digital input option module to provide additional 6 digital inputs which can be operated with 115 VAC or 230 VAC voltage.

2.04 SOFTWARE FEATURES

A. Pump SPECIFIC features:
1. The VFD shall have 2 quick ramps that allow for quick acceleration and/or deceleration of the pump motor.
2. The VFD shall offer a pump cleaning feature to reduce build-up of debris on the pump impeller. This feature can be activated by: Every start or Stop, when drive is in a underload / overload condition, timed interval or digital input. The cleaning cycle status shall be visible in the panel screen when cleaning is active. The VFD shall operate normally after the cleaning cycle is completed.
3. The VFD shall offer torque boost for applications where increased torque is needed for initial starting of the pump motor.
4. The VFD shall have intelligent pump control (IPC) with multi-pump functionality and an intelligent master/follower configuration for controlling up to 8 parallel pumps equipped with VFDs without additional modules. VFD shall have a parameter synchronization feature to program the PID, IPC and AI parameters in all parallel VFDs. The Functionality to start and stop the pumps based on capacity, operating time or efficiency of the pump to ensure each pump is operated regularly.
    a. The IPC shall control:
        1) Level Control
        2) Flow Control
        3) Pressure Control
        4) Pump Alternation
5. The VFD shall have the ability to calculate the flow either based on the measured pressure difference or sensor-less flow calculations based on the power curve of the pump
6. The VFD shall have soft pipe filling functionality, can be used to fill an empty pipe, by having programmable pipe fill time.
7. The VFD shall have a programmable Sleep functionality for PID control in pumping systems to stop the pump during low demand. “Sleep Boost” shall be available to reduce short cycling of the pump. The boost function will boost the pressure or water level before the pump shuts down to sleep.

B. PID CONTROL
1. PID controller shall be standard in the drive, allowing an analog input signals to be connected to the VFD for the closed loop control. The VFD shall have 250 mA of 24 VDC power to power an external transmitter supplied by others. The loop controller set-point shall be adjustable from the VFD control panel, analog inputs, or over field bus. The set-point shall be set and displayed in engineering units.
2. There shall be two parameter sets for the first PID loop controller. Switching between the sets shall be possible via digital inputs, timed function, and serial communications or from the control panel.

3. The VFD shall have the ability to calculate water or air flow from pressure difference, from a differential pressure transducer or two separate pressure transducers.

C. FUNCTION BLOCK PROGRAMMING
1. The VFD shall provide a PLC kind programming capability as standard.
2. It shall be possible to use different kinds of arithmetic, logical, selection, comparison and operation function blocks to monitor and control the VFD, functions, inputs, outputs and variables.
3. There shall be a possibility to run different kinds of function block programs in different states and to set the criteria, when to change the state.

D. TIMED FUNCTIONS
1. Real-time clock and calendar shall be available as standard for giving true time and date information to fault event history. The real-time clock should have a minimum of 10 years power-off back-up without optional components. Back-up battery shall be replaceable without opening the VFD enclosure
2. Real time clock shall be possible to use with timed functions, which shall allow controlling the VFD and its functions based on time of the day, day of the week, seasons of the year, holiday periods and holiday dates and special working periods and working days
3. Timed functions should be possible to use for starting and stopping the drive, for selecting the speed reference, for selecting the PID loop controller's set-point, for controlling the relay outputs, for selection the control location, for giving the run permissive or interlock signal to the VFD, etc.
4. There shall be also a boost function, which allows starting the VFD and/or its functions regardless, time of the day, day of the week, seasons or holidays.

E. Fault Logger: A fault logger shall accommodate seven diagnostic values together with a date and time stamp.

F. Built in Energy Calculators: There shall be built-in counters for calculating energy savings achieved with the VFD.
1. Used and saved energy
2. CO_2 reduction
3. Saved money
4. Programmable kW Rate

G. Pre-Set Speeds: There shall be seven (7) programmable pre-set speeds.

H. Operating Values: All applicable operating values shall be capable of being displayed in engineering (user) units. A minimum of three operating values from the list below shall be capable of being displayed at all times. Engineering units shall be freely configurable for the user to display.
1. Output frequency
2. Motor speed (RPM, %, or engineering units)
3. Motor current
4. Calculated motor torque
5. Calculated motor power (kW)
6. DC bus voltage
7. Output voltage
8. Energy Consumption

I. Underload and overload curves shall be user-definable.

J. Independently adjustable acceleration and deceleration ramps with 1 to 1800 seconds adjustable time ramps. There shall be a possibility to use start delay before acceleration to ensure that all start conditions have been fulfilled.

K. Changed parameters list shall be available in order to assist commissioning and troubleshooting.
L. The VFD shall include pass code protection against unauthorized parameter changes. The pass code and the protection level shall possible to be defined by the user.
M. The VFD shall have ability to use any internal parameter value as input for any other parameter
N. The VFD shall have the capability to fault or to show warning when triggered from external sources.

2.05 PROTECTIONS

A. The following protection functions shall be available:
1. Dry pump Protection: (Prevent the pump from running dry. Protects the pumps bearings and shaft seal from damage when there is no water in the pump)
2. Overvoltage and under-voltage controller
3. Ground Fault (Earth-leakage) supervision
4. Motor short-circuit protection
5. Output and input switch supervision
6. Overcurrent protection
7. Phase-loss detection (both motor & line)
8. Underload and overload supervision
9. Freely configurable supervisions for any parameter or signal to trigger an action.
10. Communication loss functionality to ensure uninterrupted operation. The drive shall change control location from PLC to other external location identified by user, e.g. drive's embedded PID/loop controller and change back when communication is recovered.
11. The VFD shall have pump protection functions for flow and pressure to avoid damages of the pump and for leakage detection.
    a. Inlet protection for avoid dry run, cavitation and blocked pipe
    b. Outlet protection for avoid high pressure and leakages
    c. Stall protection for avoid running locked pump

2.06 USER INTERFACES

A. DETACHABLE CONTROL PANEL
1. The control panel shall include Hand-Off-Auto selections and manual speed control. The drive shall incorporate "bump-less transfer" of speed reference when switching between "Auto" and "Hand" modes. There shall be a possibility to reset the VFD from the control panel.
2. The control panel shall include a backlit LCD. The display shall be in complete words, in a language selectable by the user, for programming and fault diagnostics (alphanumeric fault codes are not acceptable)
3. The control panel shall have a real-time clock with battery backup for adding time stamps to events, faults, warnings and also timer functions utilizing real-time clock.
4. There shall be an editable home-view in the control panel to allow different customer specific configurations
5. A dedicated "Help" button shall be available on the control panel. The Help button shall provide context sensitive assistance for programming and troubleshooting.
6. The control panel shall provide interactive assistants (wizards) to help to commission and use the drive.
7. The control panel shall provide a clear, interactive, context sensitive menu based user interface to make it easy to adjust the settings of the drive.
8. The control panel shall provide an easy to use I/O menu, where the user can see the status and function of all the analog and digital inputs and outputs.

9. The control panel shall have a menu, which contains diagnostic data about the drive operation collected in one single location. The data shall include data about active faults, warnings and events. In addition the data shall contain a summary of VFD active control sources.
10. The user shall be able to take a screen capture snapshot of the display with the control panel and be able to download the screen capture for user's computer for further purposes.
11. The user shall be able to connect a PC tool with a USB cable to the control panel to be able to set up and control the VFD. It shall be possible to connect the USB cable without using any tools.
12. The VFD shall provide a possibility for an optional Bluetooth keypad
13. The VFD supplied with optional Bluetooth keypad shall have a local control panel with control buttons regardless of the wireless connection possibility.
14. The control panel shall contain a back-up information of the VFD settings. Back-up information shall be possible to be saved on the control panel both manually and automatically.
15. The control panel shall be detachable in all types of enclosures, without tools to allow easy commissioning and programming of multiple VFDs.
16. The control panel shall have the capability to copy VFD settings from a VFD to next VFD, regardless of the VFD power, voltage or enclosure rating.
17. The control panel shall have an editable contact info that shows up in case of a fault.

B. SERIAL COMMUNICATIONS

1. The VFD shall have an EIA-485 (RS-485) port for serial communications as standard.
2. The VFD shall be equipped with built-in fieldbus communication of type Modbus RTU
3. There shall be following optional protocols available as plug-in and inbuilt options:
    a. Each drive shall include EtherNet/IP protocol module to communicate directly with new Allen Bradley CompactLogix PLC controllers.
    b. The use of third party gateways or multiplexers is not acceptable and all communication modules shall fit inside the enclosure of the VFD.
    c. Serial communication capabilities shall include, but not be limited to: run-stop control, speed set adjustment, proportional/integral/derivative (PID) control adjustments, loop controllers' set-point adjustment, current limit, acceleration/deceleration time adjustments and lock and unlock the keypad.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Installation shall be the responsibility of the installation contractor. The contractor shall install the drive in accordance with the recommendations of the VFD manufacturer as outlined in the VFD installation manual.

B. Power wiring shall be completed by the electrical contractor, to NEC code and adhering to local electrical codes, wiring requirements based on the VFD input current. The contractor shall complete all wiring in accordance with the recommendations of the VFD manufacturer as outlined in the installation manual.

3.02 START-UP

A. A factory-authorized service technician shall perform start-up on each drive. "Start-up" shall not include installation or termination of either power or control wiring. Start-up costs shall include time and travel for the estimated number of visits required. Additional labor or return trips to the site shall be billed at ABB published or negotiated rates. Upon completion, a startup service report shall be up loaded to ABB Service and can be provided upon request.

3.03 PRODUCT SUPPORT

A. Factory trained application engineering and service personnel that are trained on the VFD products offered shall be locally available at both the specifying and installation locations.
B. A toll free 24/365 technical support line connected to factory support personnel located in the US shall be available. Technical support offered only through the local sales office is not acceptable.
C. Training shall include installation, programming and operation of the VFD, and serial communication. Factory authorized start up and owner training to be provided locally upon request.

3.04 WARRANTY

A. An extended 6-year warranty shall be provided to cover all warranty costs including travel, labor, and parts, for a full 6 years from the date of manufacture of the Drive. The warranty shall cover all drive failures including line anomalies, power transients and surges, load anomalies, limited accidental exposure to moisture or corrosives and accidental collision of other physical damage. Product misapplications, vandalism and chronic problems due to the misapplication or installation issues documented in previous repair or start-up reports are not covered. For specific details regarding warranty, please see ABB Terms and Conditions.

END OF SECTION

SECTION 26 51 00 - INTERIOR LIGHTING

PART 1 GENERAL

1.01 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, installed accessories, and ceiling compatibility; include model number nomenclature clearly marked with all proposed features.
   1. LED Luminaires:
      a. Include estimated useful life, calculated based on IES LM-80 test data.
      b. Withing WWTP, provide C1D2 rated lighting. See drawings for schedule and details.

1.02 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70 and 820.

PART 2 PRODUCTS

2.01 LUMINAIRE TYPES

A. Furnish products as indicated in luminaire schedule included on the drawings.

2.02 LUMINAIRES

A. Provide products that comply with requirements of NFPA 70.

B. Provide products that are listed and labeled as complying with UL 1598, where applicable.

C. Provide products listed, classified, and labeled as suitable for the purpose intended.

D. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.

E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.

F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

G. LED Luminaires:
   1. Components: UL 8750 recognized or listed as applicable.
   2. Tested in accordance with IES LM-79 and IES LM-80.
   3. LED Estimated Useful Life: Minimum of 50,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.

2.03 EMERGENCY LIGHTING UNITS

A. Description: Emergency lighting units complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.

B. Battery:
   1. Size battery to supply all connected lamps, including emergency remote heads where indicated.

PART 3 EXECUTION

3.01 INSTALLATION

A. Coordinate locations of outlet boxes provided under Section 26 05 33.16 as required for installation of luminaires provided under this section.

B. Install products in accordance with manufacturer's instructions.

C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 500 (commercial lighting) and NECA 502 (industrial lighting).

D. Provide required support and attachment in accordance with Section 26 05 29.

E. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.

F. Bond products and metal accessories to branch circuit equipment grounding conductor.

G. Emergency Lighting Units:
   1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal lighting in same room or area. Bypass local switches, contactors, or other lighting controls.

H. Install lamps in each luminaire.

END OF SECTION

SECTION 26 56 00 - EXTERIOR LIGHTING

PART 1 GENERAL

1.01 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, weight, effective projected area (EPA), and installed accessories; include model number nomenclature clearly marked with all proposed features.
   1. LED Luminaires:
      a. Include estimated useful life, calculated based on IES LM-80 test data.

1.02 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

PART 2 PRODUCTS

2.01 LUMINAIRE TYPES

A. Furnish products as indicated in luminaire schedule included on the drawings.

2.02 LUMINAIRES

A. Provide products that comply with requirements of NFPA 70.

B. Provide products that are listed and labeled as complying with UL 1598, where applicable.

C. Provide products listed, classified, and labeled as suitable for the purpose intended.

D. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.

E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, poles, foundations, supports, trims, accessories, etc. as necessary for a complete operating system.

F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

G. Provide luminaires listed and labeled as suitable for wet locations unless otherwise indicated.

H. LED Luminaires:
   1. Components: UL 8750 recognized or listed as applicable.
   2. Tested in accordance with IES LM-79 and IES LM-80.
   3. LED Estimated Useful Life: Minimum of 50,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.

PART 3 EXECUTION

3.01 INSTALLATION

A. Coordinate locations of outlet boxes provided under Section 26 05 33.16 as required for installation of luminaires provided under this section.

B. Install products in accordance with manufacturer's instructions.

C. Install luminaires in accordance with NECA/IESNA 501.

D. Provide required support and attachment in accordance with Section 26 05 29.

E. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.

F. Wall-Mounted Luminaires: Unless otherwise indicated, specified mounting heights are to center of luminaire.

G. Bond products and metal accessories to branch circuit equipment grounding conductor.

H. Install lamps in each luminaire.

END OF SECTION

SECTION 26 90 00 - HEAT TRACE

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

A. This specification defines the general requirements for materials, installation and field testing of an electrical heat tracing system for freeze protection applications.

B. The contractor shall be responsible for supplying the materials, labor, supervision, tools and equipment required to complete the installation of a complete heat trace system

1.2 QUALITY ASSURANCE

A. The contractor shall warrant that all materials furnished for this project will be new, unused and free of defects at the time of testing and commissioning of the system and that the system will perform in accordance with the project specification requirements, if maintained properly and not subjected to electrical and/or mechanical damage.

B. The contractor shall repair and/or replace any heat tracing system components which do not perform as specified for a period of twelve (12) months from the time the system is turned over to the owner or eighteen (18) months after completion, whichever occurs first.

C. The heat tracing system shall be designed, manufactured, installed, and tested in accordance with the applicable requirements of the latest edition of the all codes and standards.

D. Equipment and materials shall be approved/listed in accordance with either of the following companies:
   1. Factory Mutual (FM)
   2. Underwriter's Laboratory (UL)

E. The heat tracing manufacturer shall be ISO 9001 certified.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's data on all heat trace components.

B. Include detailed description and calculations for each heat trace circuit as described in the contract documents. Include heat trace run, panel circuit number, pipe description, pipe size, insulation type, insulation thickness, insulation size, maintenance temperature, minimum ambient temperature, heat trace cable type, total cable length, pipe length, voltage, trace ratio, power points, nominal operating current, total maximum current, nominal operating power, cable W/ft., pipe W/ft., design heat loss, cable temperature.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering electrical heat trace products which may be incorporated in the work shall include the following:
   1. Thermon (Rick Sanders P#800-824-1754, C#317-670-5631, rsanders@temcoinc.com or approved equal.

2.2 HEAT TRACE

A. The purpose of the heat trace system is to apply sufficient electric heat to the outside of liquid filled pipes and equipment to prevent freezing during exposure to low ambient conditions.

B. Multiple heating cables may be operated in parallel from the same power circuit ; multiple loops may be connected to a single branch breaker.

C. Each grouping of heat trace shall be originate from an “Heat Trace Terminal Box”. This terminal Box shall include labeling and designations of circuit numbers and pipe numbers and shall include a local disconnect with indicating light. Refer to the Heat Trace Terminal Box section of this specification.

D. The following heater cables are approved for use on this project.:
   1. Low Temperature Self-Regulating Heating Cable: Heating cables shall be self- regulating, capable of maintaining process temperature up to 150°F and continuous exposure to pipeline temperatures of 185°F while de-energized. Cable must be capable of being cut to desired length to suit conditions at installation and must form a continuous heating circuit. Heat output shall respond to temperature change. The heater cable assembly consists of two parallel 14 AWG nickel plated copper bus wires. A semiconductive PTC polymer is extruded over and between these parallel conductors, forming a continuous matrix heating element. An insulating jacket of polyethylene is then extruded over the heating element core. Long term stability shall be established by the service life performance test per IEEE 515 Std-1997. Therrmon BSX 8-2 or approved equal.

   2. High Temperature Self-Regulating Heating Cables: Power Limiting heating cables shall be used to maintain temperatures to 250°F and continuous exposure to pipeline temperatures of 400°F when the cable is de-energized. Power limiting heating cables shall be constructed of two 16 AWG nickel-plated copper bus wires, individually insulated with a high temperature fluoropolymer. At regular intervals one of the bus conductors will be alternately exposed for connection to the heating element described below. A PTC (Positive Temperature Coefficient) conductor shall be spirally wrapped around a fiberglass carrier strand to form a coiled resistor heating element. This coiled resistor element shall be helically wrapped around the insulated voltage supply bus wires making electrical contact with alternate bus wires at regular intervals to complete the heating circuit. The basic cable will be covered by means of a metallic braid of nickel plated copper. The braid will provide a nominal coverage of seventy percent (70%) and will exhibit a resistance not exceeding 0.003 ohm/ft. Long term stability shall be established by the service life performance test per IEEE 515 Std-1997. Thermon HTSX-2 or approved equal.

E. Heat Trace Design Parameters, 25MPH Wind, Ambient Air Temp of -40 DEG F.

F. A minimum safety factor of twenty percent (20%) shall be used to determine heat loss.

G. Heater cable lengths for piping shall include cable on all in-line components including but not limited to: Flanges, Pumps, Valves, Pipe Supports / Hangers, Vents and Drains, Instruments.

H. The heat trace shall be capable of continuous and reliable operation when hanging loose in free air during equipment removal and replacement.

I. Heat trace shall be rated for area classification that is designated.

2.3 HEAT TRACE TERMINAL BOX

A. Each control panel for outdoor location shall be housed in a rack mounted or free standing NEMA 4X stainless steel, weatherproof corrosion resistant enclosure. The panel housing shall be completely enclosed with full height hinged door(s) on front and shall have a steel back panel for mounting of equipment. Control panels for indoor location shall be NEMA 12 rated.

B. All wire and heat trace terminations within the terminal box shall include terminal block style terminations. Terminal blocks shall be rail mounted, modular type with tubular screw pressure plate wire connections. Terminal shall have a minimum rating of 600 Volts with an ampacity of 55 amps per pole.

C. Push buttons, selector switches and indicating lights shall be heavy duty oil tight type. All pilot lights shall be LED style with a push to test function.

D. Control relays and timers shall be plug-in type with screw terminal sockets. Each relay shall have a minimum of two Form "C" contacts with a minimum rating of 3 amps at 120 VAC.

E. Include a 30A , 480V rotary style disconnect, NEMA 4X rated, with lock-out capabilities.

F. All conduits entering or leaving this enclosure shall include a rain tight conduit hub

G. Include low point condensate drains for all conduits entering the terminal box.

H. Terminal Box shall be labeled with the following information:
   1. Pipes that are heat traced from the terminal box..
   2. Panel and circuit the terminal box is fed from.

2.4 HEAT TRACE COMPONENTS

A. Heat Trace Power Connection Kit shall be NEMA 4x and rated for the heat trace and pipeline temperature. Thermon #DP or approved equal.

B. BHeat Trace Splice Kit: Thermon #TBSK or approved equal.

C. Heat Trace Pipeline Thermostat shall be NEMA 4X and rated for the heat trace and pipeline temperature. Thermon #E4X-1 or approved equal.

D. Heat Trace Ambient Air Thermostat shall be NEMA 4X. Thermon #B4X-15140 or approved equal.

E. Heat Trace End Kit shall be rated for the heat trace and pipeline temperature. Thermon ET-8C or approved equal.

2.5 NAMEPLATE AND CIRCUIT TAGS

A. All major electrical components, instrument, control devices and junctions boxes shall be labeled with engraved nameplates in accordance with the descriptions shown on the drawings.

B. Nameplates shall be made of three ply laminated plastic consisting of two block polished surfaces with a white core. The nameplates shall be 11/16" thick, beveled on the face with white letters engraved on black background.

C. Nameplate engraving shall be with minimum 3/16" high letters for all nameplates on front or exterior of equipment. 1/8" high letters may be used for engraving of nameplates which are used for identifying interior components mounted inside an enclosure or box.

D. Except where otherwise noted, all engraved nameplates shall be permanently attached with stainless steel screws. Attachment of nameplates shall not compromise the required enclosure classification.

E. All power circuits and all RTD circuits shall be identified with stainless steel tags attached with stainless steel wire. The tags shall be fastened to the conduit at each junction box, each heater power connection box and each RTD enclosure. A separate tag shall be provided for each circuit entering the box or enclosure.

PART 3 - EXECUTION

3.1 INSTALLATION OF HEAT TRACE

A. Generally, heating cables shall be installed on pipes in a single pass without spiraling the cable. Where the heat loss of the pipe exceeds the output of the cable an additional pass or passes shall be used. Heater cable may be applied up to a 2 to 1 ratio in such a manner that all in-line components can be easily removed and re-installed.

B. Self-regulating, Power Limiting, Constant Wattage Modular and Flexible Series Resistance heater cables shall be attached to pipes on maximum one foot (1') centers with polyester fiber or glass cloth adhesive tape.

C. Heater cables shall be installed such that all in-line devices and equipment may be easily removed and re-installed without cutting the heater cable.

D. RTD sensors shall be installed in a location on the pipe such that the pipe temperature, not the

heater cable temperature, is sensed.

E. Heater cables shall be installed on the lower quadrant of horizontal pipe whenever possible to avoid mechanical damage.

F. Heater cables shall be installed on the outside radius of a 45° or 90° pipe elbow.

G. Heater cables shall be installed in accordance with manufacturer's recommendations and shall be terminated with approved fittings

H. Coordination with the piping insulation is required to coordinate over sizing of insulation to accommodate for the heat trace diameters.

3.2 GROUNDING

A. Each power circuit conduit shall contain a green insulation ground wire for grounding of all power junction boxes, heater power connection boxes, and heater splice boxes, The ground wire shall be sized per NEC requirements, and shall be grounded to the control panel ground bus.

B. A separate grounding connection shall be provided inside each box, ground connections shall be made with either a service post type connector or by means of a screw tapped into the metal frame but shall not weaken sealed enclosures approved for hazardous location and shall not compromise the specified NEMA enclosure standards.

C. Where screw type connections are used, ground wires shall be provided with ring tongue lugs.

D. The metallic braid on the self-regulating heater cables shall be grounded by connecting to the ground terminal inside the heater power connection and splice boxes.

E. All conduit entries into control panel enclosures shall be bonded and grounded to control panel ground bus utilizing grounding bushings.

3.3 FIELD QUALITY CONTROL

A. The specified inspections and tests shall be conducted on each control panel assembly and on each heating cable.

B. The Owner shall have the right to perform a preshipment inspection and to witness factory tests on each control panel assembly. The vendor shall provide the Purchaser with a minimum of seven (7) days advance notice for all inspection and testing dates.

C. The Owner shall also have the right, at his discretion, to perform inspections and witness factory tests on electrical heating cables.

D. The Owner's authorized representative shall be permitted to inspect the control panel assemblies and electric heating cables for compliance with the purchase order, this specification, industry standards, the manufacturer's standards and the vendor's drawings.

E. Each control panel shall be complete with all components installed prior to shipment. Any discrepancies found as a result of inspection or tests shall be corrected by the Vendor at no cost to the Owner (including the cost of time for making the corrections and repeating the tests and/or inspections).

F. High frequency spark test at 6000 Volts (3.0 KHz nominal) shall be performed across the primary dielectric insulation on every foot of material shipped.

G. Heat Trace inspections shall be completed prior to the installation of the insulation; any removal of insulation to inspect heat trace shall be the responsibility of the contractor.

H. Insulation resistance shall be measured from heating device connections to metal covering with a 500 Vdc test voltage. However, it is strongly recommended that higher test voltages be used – mineral insulated heating cables should be tested at, but not exceeding, 1000 Vdc, and polymeric insulated heater cables should be tested at 2500 Vdc.

I. Heating cable shall be meggered when received at job site before installation.

J. Heating cable shall be meggered after installation but before thermal insulation is applied.

K. Heating cable shall be meggered after thermal insulation has been installed.

L. All three of the above field megger readings shall be 20 megohms or greater. Otherwise, the heating cable is not acceptable and must be repaired or replaced. Field megger tests shall be recorded for each cable, and certified reports shall be submitted to the Engineer.

END OF SECTION

SECTION 31 10 00 - SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 DEFINITIONS

A. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.

B. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil," but in disturbed areas such as urban environments, the surface soil can be subsoil.

C. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction.

D. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction.

E. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.3 MATERIAL OWNERSHIP

A. Except for materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.4 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic-ways if required by Owner or authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 31 23 23 - Fill.

1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Verify that trees, shrubs, and other vegetation to remain or to be relocated have been flagged and that protection zones have been identified and enclosed according to requirements in Section 01 50 00 – Temporary Facilities and Controls.

C. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 EXISTING UTILITIES

A. Locate, identify, and disconnect utilities indicated to be abandoned in place.

END OF SECTION 31 10 00

SECTION 31 20 00 - EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Excavation, filling, backfilling and compacting.
2. Trenching and trench backfilling.
3. Mass earthwork and rough grading.
4. Finish grading, including spreading of topsoil.
5. Dewatering.
6. Soil stabilization.
7. Testing and inspection.

B. Related Sections:
1. Division 02 Section “Selective Demolition”.
2. Division 31 Section “Site Clearing”.
3. Division 31 Section “Erosion Control And Sedimentation Controls”.

1.2 CLASSIFICATION

A. Uniformity Coefficient: Used in this Specification as defined by ASTM D2487.

B. Plasticity Index: Used in this Specification as defined by ASTM D4318.

C. Zone of Influence: Used in this Specification to delineate the boundaries of a soil mass beneath a soil supported element that contributes to the support of the element. The Zone of influence is defined by imaginary lines extending outward and downward on a one (vertical) to one (horizontal) slope from line five feet outside the base perimeter of the supported element.

D. Topsoil Excavation: Excavation of sandy loam, sandy clay loam or clay loam from within the topsoil stripping limits that is suitable for use as topsoil.

E. Unsuitable Material Excavation: Mass excavation of unsuitable materials from within the zone of influence that is not suitable for the support of foundations, floor slabs and other elements.

F. Common Excavation: Common excavation shall consist of all excavation not included as rock excavation or excavation which is otherwise classified and paid for, including flexible type pavement and all rippable materials.

G. Rock Excavation: Rock excavation shall consist of igneous, metamorphic, and sedimentary rock which cannot be excavated without blasting; the use of a modern power shovel of no less than one cubic yard (.84 cubic meter) capacity, properly used, having adequate power and in good

running condition; or the use of other equivalent powered equipment. It shall also include all boulders or other detached stones each having a volume of 1/2 or a cubic yard (0.38 of a cubic meter) or more.

H. Unclassified Excavation: Unclassified excavation shall consist of the excavation and disposal of all materials to whatever character encountered in the work.

I. Structural Fill: Approved borrow material required for backfilling and embankment construction within the zone of influence and meeting the specified material requirement.

J. General Fill: Approved material obtained from common excavation, unsuitable material excavation, and off-site borrows locations if necessary for backfilling and embankment construction in all areas not within the zone of influence and meeting the specified material requirements.

1.3 QUALITY ASSURANCE

A. Testing and Inspection:

1. All testing and inspection shall be performed by an independent testing agency, which will be responsible for all testing, sampling and inspection.
2. The Contractor is responsible for providing these services.
3. The Contractor is responsible for all coordination and scheduling with the independent testing agency.

B. Any work in public right-of-way or other areas subject to the jurisdiction of anybody shall be performed either to the requirements of that jurisdiction or to the requirements of this Specification, whichever is more stringent.

1.4 REFERENCES

A. American Society of Testing and Materials (ASTM) Publications:

B. ASTM C977 Quicklime and Hydrated Line for Soil Stabilization

C. ASTM D422 Particle Size Analysis of Soils

D. ASTM D1556 Density and Unit Weight of Soil In Place by the Sand Cone Method

E. ASTM D1557 Laboratory Compaction Characteristics of Soil Using Modified Effort

F. ASTM D854 Specific Gravity of Soil Solid by Water Pycnometer

G. ASTM D2167 Density and Unit Weight of Soil in Place by the Rubber Balloon Method

H. ASTM D2216 Water (Moisture) Content of Soil and Rock by Mass

I. ASTM D2922 Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

J. ASTM D3017 Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)

K. Indiana Department of Transportation (INDOT) Publication: Standard Specifications latest edition.

1.5 DUST CONTROL

A. The Contractor shall comply with the requirements of 326 IAC 6-4 for fugitive dust.

B. The Contractor shall take adequate measures to control dust on the site. The Contractor shall have on the site an adequate number of watering vehicles to control dust by his operations.

1.4 SUBMITTALS

A. All submittals shall be reviewed and approved by Engineer.

B. Product Data and Test Reports:

1. Field and laboratory tests and inspections.
2. Drainage file: Include material specifications and sieve analysis. Include signed material certificate from manufacturer/supplier.
3. Chemical modification: Include material specifications and signed material certificate from manufacturer/supplier.
4. Geo-synthetic materials: Include material specifications and signed material certificate from manufacturer/supplier.
5. Analysis shall state the following: (Refer to Part 2 for minimum requirements)

    a. Percentage of organic matter.
    b. Gradation of sand, silt and clay, Include USDA textural classification.
    c. Cation exchange capacity.
    d. Deleterious material.
    e. ph.
    f. Mineral and plant nutrient content (phosphorus, potassium, magnesium, calcium).
    g. Any requirements or recommendations necessary to make it suitable.
    h. Annual nutrient requirements and recommendations for evergreens shrubs, trees, and flowers.
    i. Soil test results without recommendations will be rejected.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Except as otherwise noted herein, the following materials shall be provided as specified in this section.

B. General:

1. All soil materials shall be approved by the Engineer.
2. All soil materials shall be suitable for each application.
3. Suitable soils are defined as soils which provide proper strength, compaction and drainage requirements and which are approved by the Engineer.
4. Fill material which is unsuitable due to excess moisture will not be classified as unsuitable if it can be dried to optimum moisture specified herein by manipulation, aeration or blending with other materials satisfactorily as approved by the Engineer.

C. Fill Materials:

1. Note: The following describes fill materials and their application for use. The materials shall be used for the listed applications, unless designated otherwise on the Drawings. If the Contractor has any questions or concerns regarding the materials or intended application, contact the Engineer for directions. Compaction requirements are the percentage of maximum dry density per ASTM D698 Standard Proctor Test, unless noted otherwise in the Geotechnical Report.

2. General fill:

a. Suitable on-site or off-site fill material free of debris, roots, organic and frozen materials, and stones having a maximum dimension of 2”.
b. Minimum compaction: 95%.
c. Application: General filling and backfilling of excavations and trenches outside of the building.

3. Structural fill:

a. Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2 inch sieve and not more than 10 percent passing a No. 200 sieve.
b. Minimum compaction: 95%
c. Application: Compacted subgrade under buildings, foundations and areas subject to structural loads.

4. Granular fill:

a. Clean, natural or manufactured sand per requirements of INDOTSS Type “B” borrow, 4.75mm (No. 4) gradation. Pea gravel is not acceptable.
b. Minimum compaction: 95%.

c. Application: Backfilling of excavations and trenches which are under or within 5’ of pavement, and underneath exterior concrete pavement, walks, curbs and slabs on grade.

5. Drainage Fill:

a. General: Clean, washed fill sand with 100% passing the 4.75mm (No.4) sieve and no more than 5% passing the 0.075 mm (No. 200) sieve. Pea gravel or #53 stone are not acceptable.
b. Minimum compaction: 95%.
c. Application: Free draining material required for applications such as the outside of basement walls, the back side (earth side) of retaining walls and building slabs on grade.

6. Aggregate fill: Unless otherwise indicated, shall meet the following:

a. Naturally or artificially graded mixture of natural or crushed gravel, crushed stone and natural or crushed sand.
b. ASTM D2940, with 100 percent passing a 1 ½ inch sieve and not more than 8 percent passing a No. 200 sieve.
c. Application: base course under concrete and other items per plans.

7. Permeable soil mix:

a. Permeable soil mix to promote infiltrate and allows runoff to filter through media and sustain vegetation.
b. Soil shall consist of the following:

a) 50-60% sand.
b) 20-30% compost.
c) 20-30% topsoil.

c. Clay is not permitted.
d. Shall have a minimum permeability rate of 1.0 feet per day (0.5 inches per hour)
e. Application: Rain Gardens and Bioswales.

D. Topsoil:

1. Topsoil shall be fertile, friable, natural surface soil obtained from well-drained areas and possessing characteristics of representative soils in the project vicinity that produce heavy growths of crops, grass or other vegetation.
2. Topsoil shall consist of friable loam, reasonably free of subsoil, clay lumps, brush, roots, weeds or other objectionable vegetation, stones or similar objects larger than 1-1/2" in any dimension, litter or other materials unsuitable or harmful to plant growth.
3. Supplement on-site topsoil with off-site topsoil as necessary.
4. Unless otherwise indicated, minimum compacted thickness in lawn areas is 4".
5. The mechanical analysis of topsoil shall be as follows:

a. 1" mesh sieve size; 99%-100% passing.

b. 1/4" mesh sieve size: 97%-100% passing.
c. No. 100 mesh sieve size: 40%-60% passing.
d. No. 200 mesh sieve size: 20%-40% passing.

6. The following minimum requirements shall also be met:

a. Organic matter: 3-5%.
b. pH: 6.5 to 7.3.
c. Sand, silt, clay content: per USDA loam textural classification.
d. Minerals and nutrients: Per Geotechnical Engineer or Soil Scientist recommendations and amendments suitable for use in local area.

E. Soil Separator Fabric:

1. Nonwoven, needle-punched geotextile fabric manufactured from polyolefins or polyesters per ASTM M288, suitable for subsurface drainage and other specified applications.
2. Application: subsurface drains and as specified in Contract Documents.
3. Specifications (values based on Mirafi 140N):

a. Apparent opening size: 70 (U.S. Standard Sieve Size); ASTM D-4751-99A.
b. Flow rate: 135 gpm/sf; ASTM D-4491-99A.
c. Puncture strength: 65 lbs; ASTM D-4833-00.
d. Mullen Burst: 225 lb/sq. in.
e. Grab tensile/elongation: 155 lbs/50%.
f. UV Resistance: 70% at 500 hours.

F. Geo-synthetic Reinforcement:

1. General: H-Series HX165 Geogrid as manufactured by Tensar International Corp., Atlanta Georgia.
2. Application: Soil stabilization as required and as recommended by the Geotechnical Engineer.

G. Chemical Modification:

1. General: INDOTSS 215.
2. Materials: Hydrated lime per INDOTSS 913.04(b) and Type I Portland cement per INDOTSS 901-01(b).
3. Quantity: 4.0 +/- 0.5% by dry unit mass of the soils.
4. Application: If Geotechnical report indicates that chemical modification may be needed for soil stabilization, then the Contractor shall include provisions for chemical modification in their bid.

H. Other Materials:

1. All other materials not specifically described but not required for proper completion of the Work of this Section, shall be selected by the Contractor subject to the approval of the Architect/Engineer and Geotechnical Engineer.

PART 3 - EXECUTION

3.1 REQUIREMENTS

A. General:

1. Excavations and embankments shall be finished to reasonably smooth and uniform surfaces. No materials shall be wasted without permission. Excavation operations shall be conducted so that material outside the limits of slopes will not be disturbed. Prior to beginning excavation, grading, embankment operations in any area, all necessary clearing, and grubbing and topsoil removal in that area shall have been performed.

    a. All spongy and yielding material which will not readily compact when approximately dry and all vegetation shall be removed from within clearing limits and to such depths as ordered. None of this removed material shall be used in embankments.

2. When the Contractor performs grading operations after daylight hours, he shall provide and maintain at his expense sufficient artificial lighting to permit proper construction and inspection.

3. Grading operations shall be kept well in advance of paving operations in order to take advantage of maximum time for settlement.

4. The roadway and embankments shall be kept well drained at all times by keeping the center higher than the sides and uniformly graded. If necessary, temporary drainage ditches shall be provided as directed.

5. The Contractor shall employ one or a combination of the following for subgrade preparation for pavement:

    a. Compaction of subgrade and embankments to 95% Modified Proctor (ASTM D1557).
    b. Compaction of lime stabilized subgrade and embankments to 95% Modified Proctor (ASTM D1557).

6. The Contractor shall employ one or a combination of the following options for subgrade preparation under buildings in embankment areas only:
    a. Compaction of subgrade and embankments to 95% Modified Proctor five feet beyond the proposed outside of the building. Compaction shall extend to subgrade at 0.5 horizontal to 1.0 vertical.
    b. Compaction of lime stabilized subgrade and embankments to 95% modified proctor five feet beyond the proposed outside of the building. Compaction shall extend to subgrade at 0.5 horizontal to 1.0 vertical.

7. Weather: Do not perform earthwork activities during inclement weather.

8. Dust: Use all necessary and appropriate means, such as water sprinkling, as required to prevent dust from being a nuisance to the Owner, public and concurrent performance of other work on the site.

9. Conflicts: Should the preceding job conditions or other items specified herein because of actual or possible conflicts, notify the Architect/Engineer immediately and do not proceed until such conflict has been resolved.

B. Preparation: Verify that the following has been completed prior to beginning earthwork:

1. Protective fencing has been installed for trees and vegetation to remain.
2 Site clearing (clearing and grubbing).
3. Selective site demolition.
4. Erosion and sediment control measures are in place.

C. Protection:

1. For items indicated to remain, provide protection to prevent damage from construction activities. Any damage or destruction to items intended to remain intact shall be repaired or replaced to the satisfaction of the Owner at the Contractor's expense.
2. Topsoil: Protect placed topsoil from heavy machinery traffic. Remove and replace topsoil that is compacted by heavy machinery traffic.
3. Subgrade: Ditches and drains along the subgrade shall be maintained to always drain effectively. Repair subgrade of any ruts that may occur by reshaping and recompacting as required.
4. Utilities: Determine locations of existing utilities and the extent to which they may affect earthwork operations. Where service and utility lines are to remain, provide protection to prevent damage or disruption of services.
5. Damaged utilities shall be repaired immediately at the Contractor's expense.
6. Open excavation:

a. The Contractor is responsible for ensuring all open excavations are properly barricaded and always protected. This includes work such as mass excavation and trenching and includes other potentially dangerous conditions such as retention ponds.
b. Provide and install all necessary and appropriate means such as, but not limited to, signage, fencing, traffic barricades, and lighting to warn, discourage, and prevent danger to adjacent workers and the public.
c. Unless otherwise indicated, install a minimum 6' 10-guage chain link fence around all open excavations, retention ponds, and other areas of potential danger, and maintain them while such conditions exist. Increase measures as required by site conditions.

3.2 LAYOUT

A. Layout locations of building, parking areas, drive, walks, curbs, finish elevations and other work, including mechanical and electrical items that are to be installed on the project site as indicated in the Contract Documents.

B. References: Establish and maintain lines, corners, elevations and general reference points. Verify dimensions indicated on Drawings. If conflicts exist, immediately notify the Engineer before continuing work.

3.3 EXCESS WATER CONTROL

A. Where the excavation extends below the groundwater level, the Contractor shall provide, operate and maintain dewatering equipment necessary to maintain a dry excavation unless otherwise allowed by the Engineer. The dewatering method shall be activated to lower the water level below the established excavation level before the excavation reaches that level. The dewatering method shall not disturb the density of the subgrade soils. Dewatering shall be continued until all work below the groundwater table is completed and it is assured that the cession of dewatering will have no detrimental effect on any aspect of the project or until upon the written request of the Contractor, the Engineer gives written consent to cease dewatering operations. Dewatering shall then be discontinued gradually at a rate not to exceed 25 percent of the pumping capacity every three days or equivalent until all dewatering has ceased unless otherwise allowed in writing by the Engineer.

B. The Contractor shall keep the site free of standing water. The Contractor shall construct all necessary temporary ditches, swales and other means to keep stormwater away from work. When the permanent storm drainage system or portions thereof are constructed, stormwater shall be directed to the permanent stormwater collection systems. Upon completion of the work and anytime necessary during construction operations, the permanent stormwater collection system shall be cleaned of all sediment or debris which may enter the system.

C. The Contractor shall provide sufficient pumps to dewater all areas of the site where excavations are made or fills are placed in such a manner that creates a sump or depression that may hold water.

D. Dewatering:

1. Provide and maintain ample means and devices with which to promptly remove and dispose of all water from every source always entering the excavations or other parts of the work during construction.
2. Dewater by means which will ensure dry excavations and the preservation of the final lines and grades at bottom of excavations, such as sump pumps, trenching, etc.
3. Do not use extreme measures or durations to cause adverse effects to Project Site or adjoining properties.

3.4 CHEMICAL MODIFICATION

A. General:

1. Scarify and/or disc area to a depth of 12” prior to distributing modifiers.
2. Utilize screw type, cyclone, or pressure manifold type distributors to apply modifier.
3. Do not apply when wind conditions create potential hazards or transference of material to adjacent areas.

4. Mix modifiers with rotary speed mixers or disc harrow and continue until a homogenous layer of the required thickness is obtained.
5. Compaction:

    a. Lime modified soils shall be compacted within 3 days.
    b. Cement modified soils shall be compacted within 30 minutes.

6. Observation and testing: Quantities of materials, placing, mixing, and compacting shall be, as recommended, observed and tested by the Engineer.

3.5 STOCKPILING

A. General:

1. See drawings for designated stockpiling areas. If Drawings do not designate specific areas, or areas shown are insufficient, contact Engineer for direction.
2. Stockpile earth materials in manners that will prevent intermixing of different materials and intrusion of trash, debris and organic materials.
3. Slope stockpiled materials to provide adequate surface drainage.
4. Install and maintain erosion control measures. Refer to drawings and Division 31 Section "Erosion Control And Sedimentation Control". At a minimum, silt fences shall be installed around all stockpiled areas. Seed areas which are to remain stockpiled for extended periods of time.
5. Storage or stockpiling of materials on the subgrade is prohibited.

3.6 EXCAVATION

A. General:

1. Excavation slopes shall be maintained in a stable condition at all times and shall not be steeper than 1.5 horizontal to 1 vertical unless proper precautions, as stipulated by OSHA, are taken.
2. The base of the excavation shall be protected against any damage, which affects the strength and compressibility characteristics of the exposed soil. Factors, which may damage the exposed excavation, are freezing, groundwater seepage inflow, equipment traffic, etc.
3. Surplus common excavation material shall be disposed of at locations as directed by the Owner.
4. Excavation shall conform to the dimensions and elevations indicated on the Drawings, except as specified herein.
5. Excavation shall extend sufficient distance from walls and footings to allow for placing and removal of forms, installation of services and inspection.
6. Remove unsuitable material below indicated depths and replace it with suitable, compacted material or lean concrete, at the Engineer discretion.
7. Topsoil stripping: Strip topsoil to its depth from areas to be covered by building, by walks and by other work and where existing surface areas required grading to establish new elevations.
8. Subgrade: Unless otherwise indicated, excavate to following subgrades:

a. Slab-on-grade: Sub-grade at bottom of drainage fill or at bottom of existing topsoil, whichever is lower.
b. Drives and paving: Sub-grade at bottom of aggregate base.
c. Footing: Sub-grade at indicated bottom of footing.
d. Lawn area: Sub-grade 4” below indicated surface elevation.

3.7 EMBANKMENT AND COMPACTION

1. Embankment construction shall consist of constructing all embankments, including preparation of the areas upon which they are to be placed; the placing and compacting of approved material within embankment areas; and the placing and compacting of embankment material in holes, pits, and other depressions within the embankment area. Only approved materials shall be used in the construction of embankment backfill.

2. After the embankment area has been cleared and before embankment is placed, the building areas and areas to be paved shall be proofrolled prior to compaction of the subgrade and placement of any structural fills. All pronounced depressions left in the original ground surface by removal of objectionable material from within embankment limits shall be refilled with suitable material well compacted to the same density as required for the above embankment. Isolated soft pockets that are located during the proofrolling phase of this project shall be excavated and replaced with structural backfill. The material removed from the soft pockets shall be disposed of off site or re-used as fill material in yard areas only. The Contractor shall identify such replacement of soft pockets. Replacement shall proceed only when authorized prior to proceeding with the work. The upper 6 inches of the original ground shall be compacted with a 3-wheel roller weighing no less than 10 tons, or with other approved compacting equipment to the same density as required for the above embankment, unless otherwise directed by the Engineer. Subgrade compaction requirements shall be as follows:

3. Underneath and five feet out from the limits of:
   a. All buildings.
   b. All areas to receive paving
   95% Modified Proctor (ASTM D1557)
   c. All other areas: 95% Modified Proctor (ASTM D1557)

4. Frozen materials, stumps, roots, all or parts of trees, brush, weeds, or other perishable materials shall not be placed in any embankment. Stones greater than 4 inches in any dimension shall not be left within 6 inches of the finished subgrade. The original ground surface or the surface of any lift in place shall not be frozen and shall be free from objectionable quantities of snow, ice or mud.

5. The embankment material shall be placed in uniform level layers, left properly shaped as set out above, and compacted with approved compacting equipment.

6. Each lift shall be disked or treated by some other mechanical means that will insure the breaking up on any existing lumps and clods.

7. The loose depth of each lift shall be such that the required compaction can be obtained, but in no case shall it exceed 8 inches. Where a tamping roller is used, the loose depth of lift shall not exceed the length of the tamper feet. The surface area of the end of each foot of the tamping roller shall be no less than 5-1/2 square inches.

8. In places inaccessible to motorized compacting equipment the required compaction shall be obtained with approved mechanical tamps or vibrators, in which case the depth of lifts, loose measurement, shall not exceed 6 inches.

9. If the embankment material is too wet and the compaction is not satisfactory, the material shall be aerated to remove excess moisture. Excess moisture shall be that which is above optimum moisture. When the material is too wet, the Owner shall make sufficient moisture tests to determine the amount of excess moisture to be removed by aeration and to further determine that the excess moisture has been removed. In addition to the density requirements set out herein, all embankments shall be constructed satisfactorily.

10. Only structural backfill material shall be used beneath footings, floor slabs and other foundations and shall extend outward away from the base of the foundation element at a 1:1 slope. Structural backfill material shall be placed adjacent to all structural walls for a minimum horizontal distance of two feet from the exterior of the walls and shall be placed to an elevation eighteen inches below finished grade. A clay cap shall then be placed above the structural backfill placed adjacent to the walls. Structural backfill material shall also be placed to a minimum depth of twelve inches beneath footings, floor slabs and other foundation elements.

11. General fill material can be used in areas not defined in Item I above unless otherwise noted on the Drawings.

12. No fill shall be placed against any structure until placed concrete has been allowed to cure for at least 3 days. Backfill shall be placed in such a manner that the structure will not be damaged by shock from falling earth. Special precautions shall be taken to prevent wedging action of filling material against structures. Heavy equipment for spreading and compacting shall not operate closer to foundation walls than set forth as follows:
13. Fill placed adjacent to vertical or near vertical walls (within a zone defined by imaginary lines extending horizontally away from the base of the wall for a distance of 3 feet and thence upward and outward on a 1 to 1 slope to the elevation of the top of the wall) shall be compacted to the specified density with light equipment not exceeding 1500 pounds in static weight or dynamic rated impact.

14. All fill shall be of an approved material starting on an approved subgrade. Each lift shall be compacted to a dry density not less than the following percentage of maximum dry density determined by the Modified Proctor Test (ASTM D1557):

USAGE	COMPACTION %
Beneath footings, foundation slabs (limit based upon 5 feet from footing or foundation slab and extruding outward at a 45 degree angle to natural ground surface)	95
Beneath future building slabs on grade	95
Beneath piping	95
Unreinforced subgrade and embankment beneath pavements and sidewalks	95
Adjacent to and over piping except in paved areas	95
Adjacent to (or behind) vertical walls	95
Landscaping fill	90

3.8 SUBGRADE PREPARATION

1. General: Subgrade shall be shaped to line, grade, and cross section, and compacted as specified. This operation shall include plowing, disking, and any moistening, aeration, or other operation required to obtain specified compaction. Soft or otherwise unsatisfactory material shall be removed and replaced with satisfactory excavated material or other approved material as directed. Low areas resulting from removal of unsatisfactory material shall be brought up to required grade with satisfactory materials, and the entire subgrade shall be shaped to line, grade, and cross section and compacted as specified.

2. After rolling, the surface of the subgrade for the roadways shall not show deviation greater than 3/8-inch when tested with a 10 foot straightedge applied both parallel and at right angles to the centerline of the area. The elevation of the finished subgrade shall not vary more than 0.05 foot from the established grade and cross section.
3. Compaction: Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment well suited to the type of material being compacted.

4. Granular Fill Material Installation:
   a. The aggregate subbase and base shall be properly installed before the Contractor may apply dual wheel loads of 9,000 pounds or above.

3.9 TRENCHING

A. General:

1. All trenching shall conform to OSHA and all other applicable safety standards.
2. Verification:

    a. Contractor shall verify all existing grades, inverts, utilities, obstacles and topographical conditions prior to any trenching, excavation or underground installations.
    b. In the event existing conditions are such as to prevent installations in accordance with the Contract Documents, immediately notify the Engineer and await decision before continuing work.
    c. Architect/Engineer decision will be final and binding upon the Contractor, and installations shall be in accordance with same.

3. Saw cut existing pavements to proper width for trenching.
4. Legally dispose materials unsuitable for trench backfilling off-site.

B. Width:

1. Trenches for piping shall be not less than 12” wide or more than 1.5 times the outer diameter (of the pipe layed therein) plus 12” wide, and shall be excavated true-to-line, so that a clear space not less than 6” or more than 8” in width is provided on each side of the pipe.
2. For sewers, the maximum width of the trench specified shall apply to the width at and below the level at the top of the pipe. The width of the trench above that level may be made as wide as necessary for sheeting and bracing, and proper installation of the Work.
3. Trenches shall be open vertical construction.

C. Depth:

1. Trench as required to provide the elevations shown on the drawings.
2. Where elevations are not shown on the drawings, trench to sufficient depth to give a minimum of 36” of fill above the top of the pipes measured from the adjacent finish grade.
3. Where trench excavation is inadvertently carried below proper elevation, backfill with approved material and then compact to provide a firm and unyielding subgrade and/or foundation at no additional cost to the Owner.

D. Trench Bracing:

1. Properly support all trenches in strict accordance with all pertinent rules and regulations.
2. Brace, sheet, and support trench walls in such a manner that they will be safe and that the ground alongside the excavation will not slide or settle, and that all existing improvements of every kind, whether on public or private property, will be fully protected from damage.
3. In the event of damage to such improvements, immediately make all repairs and replacements necessary at no additional cost to the Owner.

4. Arrange all bracing, sheeting, and shoring so as to not place stress on any portion of the completed Work until the general construction thereof has proceeded far enough to provide sufficient strength.
5. All shoring and sheeting required to perform and protect the excavation and as required for the safety of employees and abutting structures shall be performed. All workmen performing work in 48" or deeper trench or excavation shall be protected by use of a welded sheet steel "safety box."
6. Removal: Exercise care in the drawing and removal of sheeting, shoring, bracing, and timbering to prevent collapse or caving of the excavation faces being supported.

E. Bedding:

1. Where pipes or conduits are to be installed, excavate below the proposed alignment of the pipe and backfill with clean sand to provide uniform support unless otherwise noted on the drawings.
2. Unless shown otherwise on Drawings, minimum bedding to be 4" below pipe.
3. Storm sewer pipes are to be bedded with stone.
4. Refer to drawings and details for further information and requirements.

F. Grading and Handling of Trenched Material:

1. During excavation, material shall be stacked in an orderly manner a sufficient distance back from edges of trenches to avoid overloading and prevent slides or cave-ins.
2. Control the temporary stockpiling of trenched material in a manner to prevent water from running into the excavations.
3. Do not obstruct the surface drainage but provide means whereby stormwater is diverted into existing gutters, surface drains or other temporary drains.
4. Any water accumulated in the trenches shall be removed by pumping or by other approved methods.

3.10 FILLING, BACKFILLING AND COMPACTING

A. Prior to filling, backfilling and compacting, proof-roll and remediate subgrade per Part 3 Quality Assurance.

B. Unless otherwise indicated, maximum lift thickness is 8" of un-compacted material.

C. Moisture:

1. Thoroughly mix each layer to assure uniformity of material.
2. Supplement mixing with wetting or drying as required to obtain the moisture content required for the indicated percentages of compaction.
3. All fill shall be placed so that the moisture content is within +/- 2% of the optimum moisture content according to ASTM D698.
4. Do not use frozen materials in the fill or allow the fill to be placed upon frozen materials.

D. Compaction:

1. Compaction shall be accomplished by approved means and shall meet the following densities for various parts of the Work. See Section 3.7 for density requirements of individual soil materials.
2. Compaction by flooding is not acceptable.
3. In cut areas where pavement is planned, scarify the upper 12” of subgrade prior to compaction.

E. Equipment:

1. Tracked equipment shall not be used as compaction equipment.
2. The static weight of compaction equipment utilized for the compaction of backfill materials near walls as defined in No.3 below shall not exceed 2,000 lbs. for non-vibratory equipment and 1,000 lbs. for vibratory equipment.
3. All heavy equipment, including compaction equipment heavier than noted herein, shall not be allowed closer to walls than 3 feet plus the vertical distance from backfill surface to the bottom of the wall.

3.11 GRADING

A. General:

1. After filling and backfilling operations are complete, neatly and evenly grade areas to be seeded or sodded.
2. Scarify subgrade to a depth of 6” and place minimum 4” topsoil (6” maximum).
3. Grade to obtain the elevations indicated within a tolerance of plus or minus 0.1 foot.
4. Slope finished subgrade surface to provide drainage away from building walls.

B. Treatment After Completion of Grading:

1. After grading is completed and inspected, permit no further excavation, filling, or grading except with the review of and the inspection by the Owner.
2. Use all necessary means to prevent the erosion of freshly graded areas during construction and until such time as permanent drainage and erosion control measures have been installed.

3.12 QUALITY ASSURANCE

A. Coordination:

1. A representative from the Owner shall be present to always observe and perform tests earthwork is in progress.
2. Contractor shall provide minimum 72 hour notice to Owner and Engineer before each operation requiring testing or inspection.

B. Testing:

1. To verify the adequacy of compaction, in-situ field density tests will be performed by the testing agency.
2. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.
3. Footing subgrade: Verify by testing that the soil bearing capacity is acceptable at each column footing and at 8 feet intervals along wall footings at the indicated bearing elevations.
4. Testing agency will test compaction of soils in place according to ASTM D1556, ASTM D 2167, ASTM D 2922, and ASTM D2937, as applicable.
    a. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sq. ft. or less of paved area or building slab, but in no case fewer than three tests.
    b. Foundation Wall Backfill: At each compacted backfill layer, at least one test for every 100 feet or less of wall length, but no fewer than two tests.
    c. Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 150 feet or less of trench length, but no fewer than two tests.

C. Proof rolling:

1. Proof rolling shall be supervised by the Owner and/or Engineer.
2. Since standard test procedures are not available for proof rolling, the necessary scope and method of testing shall be determined by the testing agency, subject to review by the Owner and/or Engineer.
3. In areas covered by buildings and other site improvements, and other areas deemed necessary by the Owner and/or Engineer, prepare and test subgrade as follows:

    a. Using a loaded tri-axle dump truck or other approved method, the Contractor shall proof-roll the exposed subgrade under the observation of the Geotechnical Engineer.
    b. Based on this observation, plus supplemental testing as required, the Geotechnical Engineer shall determine when and where soft, loose or other undesirable materials are to be removed and replaced.

D. Approval and Remediation:

1. When testing and proof rolling indicate proper compaction has been obtained, and after approval from Engineer has been given, continue fill and backfill work until the indicated elevation is achieved.
2. If required density has not obtained, the Contractor shall remove the defective material and repeat operations until the required density is obtained, and approval is given by the Engineer.
3. Cost of material removal, replacement, compaction and re-testing shall be the responsibility of the Contractor.

3.13 SURPLUS SOIL MATERIALS

A. Unless otherwise indicated or directed by Owner, remove excess soil materials and legally dispose of off-site.

3.14 JOB COMPLETION

A. Upon completion of the Work of this Section:

1. Remove all trash and debris from earthwork operations.
2. Remove surplus equipment and tools.
3. Leave the site in a neat and orderly condition.
4. Restore all adjacent areas disrupted by earthwork activities to their original condition.

END OF SECTION 31 20 00

SECTION 31 23 16 – EXCAVATION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes requirements for performing open cut excavations to the widths and depths necessary for constructing structures, pipelines and conduits including excavation of any material necessary for any purpose pertinent to the construction of the Work.

1.2 RELATED DOCUMENTS

A. The following drawings and general provisions apply to this Section.

1. Section 31 10 00 “Site Clearing”
2. Section 31 23 16.13 “Trenching”
3. Section 31 23 23 “Fill”

1.3 DEFINITIONS

A. Earth: "Earth" includes all materials which, in the opinion of the Engineer, do not require blasting, barring, or wedging for their removal from their original beds. Specifically excluded are all ledge and bedrock and boulders or pieces of masonry larger than one cubic yard in volume.

B. Rock: "Rock" includes all materials which, in the opinion of the Engineer, require blasting, barring, or wedging for removal from their original beds and which have compressive strengths in their natural undisturbed state exceeding 300 psi. Boulders or masonry larger than one cubic yard in volume are classed as rock excavation.

1.4 SUBMITTALS

A. General: Provide all submittals, including the following, as specified in Division 01.

B. Dewatering Excavation Plan: Develop an excavation dewatering plan that considers site ground and groundwater conditions, the type and arrangement of the equipment to be used and the proper method of groundwater disposal. Prepare the dewatering plan before beginning excavations below groundwater. Maintain one copy of the dewatering plan at the project site to be available for inspection while all dewatering operations are underway.

1.5 SITE CONDITIONS

A. Existing Conditions: Make any geotechnical investigations deemed necessary to determine existing site conditions..

B. Underground Utilities: Locate and identify all existing underground utilities prior to the commencement of Work.

C. Quality and Quantity: Investigate and determine the quality, quantities, and methods to be used to excavate earth and rock.

PART 2 - EXECUTION

2.1 GENERAL

A. Clearing: Clear open cut excavation sites of obstructions preparatory to excavation. Clearing in accordance with Section 31 10 00, includes removal and disposal of vegetation, trees, stumps, roots, and bushes, except those specified to be protected during trench excavation.

B. Banks: Shore or slope banks to the angle of repose to prevent slides or cave-ins in accordance with Section 31 23 16.13 “Trenching”.

C. Hazardous Materials: If hazardous materials not specifically shown or noted are encountered, proceed in accordance with General Conditions Article 5.06, Hazardous Environmental Condition at Site.

2.2 TRENCH EXCAVATION

A. Refer to Section 31 23 16.13 “Trenching” for trenching requirements.

2.3 FINISHED EXCAVATION

A. Finish: Provide a reasonably smooth finished surface for all excavations, which is smooth and uniformly compacted.

B. Finish Methods: Provide a degree of finish which is ordinarily obtainable from blade-grade operations, except as otherwise specified in Section 31 23 23 “Fill”.

2.4 PROTECTION

A. Traffic and Erosion: Protect newly graded areas from traffic and from erosion.

B. Repair: Repair any settlement or washing away that may occur from any cause, prior to acceptance. Re-establish grades to the required elevations and slopes.

C. Other Requirements: Conduct all Work in accordance with the environmental protection requirements specified in Division 01.

2.5 AUTHORIZED ADDITIONAL EXCAVATION

A. Carry the excavation to such additional depth and width as authorized in writing, for the following reasons:

1. In case the materials encountered at the elevations shown are not suitable.

2. In case it is found desirable or necessary to go to an additional depth, or to an additional depth and width.

B. Refill Materials: Refill such excavated space with either 3,000 psi lean concrete or compacted select fill material.

C. Compaction: Where necessary, compact fill materials to avoid future settlement.

D. Payment: Additional earth excavations so authorized, concrete or select fill materials authorized for filling such additional excavation, and compaction of select fill materials will be paid for as a change in the Work.

2.6 UNAUTHORIZED EXCAVATION

A. Stability: Refill any excavation carried beyond or below the lines and grades shown, except as specified in the subsection headed "Authorized Additional Excavation", with such material and in such manner as may be approved to provide for the stability of the various structures.

B. Refill Materials: Refill spaces beneath all manholes, structures, pipelines, or conduits excavated without authority with 3,000 psi lean concrete or compacted select fill material, as approved.

C. Payment: Refill for unauthorized excavation will not be measured and no payment will be made therefor.

2.7 SEGREGATION STORAGE AND DISPOSAL OF MATERIAL

A. Stockpiling Suitable Materials: Stockpile topsoil suitable for final grading and landscaping and excavated material suitable for backfilling or embankments separately on the site in approved locations.

B. Stockpile Locations: Store excavated and other material a sufficient distance away from the edge of any excavation to prevent its falling or sliding back into the excavation and to prevent collapse of the wall of the excavation. Provide not less than 2 feet clear space between the top of any stockpile and other material and the edge of any excavation.

C. Excess Materials: Transport and dispose of surplus excavated material and excavated material unsuitable for backfilling or embankments at an off-site disposal location. Obtain the off-site disposal location.

2.8 REMOVAL OF WATER

A. Water Removal: During the excavation period and until completion and acceptance of the Work at final inspection, immediately remove and properly dispose of all water entering any excavation or other parts of the Work.

B. Dry Excavations: Keep the excavation dry.

C. Discharge of Water: Dispose of water pumped or drained from the Work in a safe and suitable manner without damage to adjacent property or streets or to other work under construction.

D. Protection: Provide adequate protection for water discharged onto streets. Protect the street surface at the point of discharge.

E. Sanitary Sewers: Do not discharge water into sanitary sewers. Do not discharge water containing settable solids into storm sewers.

F. Repair: Promptly repair all damage caused by dewatering the Work site.

END OF SECTION 31 23 16

SECTION 31 23 16.13 - TRENCHING

PART 1 - GENERAL

A. Excavate subsoil required for utilities.
B. Remove lumped subsoil, boulders, and rock.
C. Perform excavation in accordance with utility's requirements.
D. Do not advance open trench more than 100 feet ahead of installed pipe.
E. Cut trenches sufficiently wide, within established construction limits and/or temporary construction easements, to enable installation and allow inspection. Remove water or materials that interfere with work.
F. Excavate bottom of trenches maximum 1.5 times the outside diameter of pipe plus 12”.
G. Excavate trenches to depth indicated on drawings. Provide uniform and continuous bearing and support for bedding material and pipe.
H. Do not interfere with 45 degree bearing slay of foundations.
I. When project conditions permit, slope side walls of excavation starting 2 feet above top of pipe. When side walls cannot be sloped, provide sheeting and shoring to protect excavation as specified in this section. When subsurface materials at bottom of trench are loose or soft, excavate to greater depth as directed by engineer until suitable material is encountered.
J. Cut out soft areas of subgrade not capable of compaction in place. Backfill with subsoil fill and compact to density equal to or greater than requirements for subsequent backfill material.
K. Trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.
L. Correct areas over excavated areas with compacted backfill as specified for authorized excavation or replace with fill concrete as directed by engineer.
M. Remove excess subsoil not intended for reuse, from site.
N. Provide means of ingress and egress from the trenches as required by applicable safety and health regulations.

(NO TEXT THIS PAGE)

SECTION 31 23 19 – DEWATERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes construction dewatering.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by dewatering operations.

1. Prevent surface water and subsurface or groundwater from entering excavations, from ponding on prepared subgrades, and from flooding site or surrounding area.
2. Protest subgrades and foundation soils from softening and damage by rain or water accumulation.

B. Install dewatering system to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

C. Provide temporary grading to facilitate dewatering and control of surface water.

D. Protect and maintain temporary erosion and sedimentation controls, which are specified in Section 31 25 00 “Erosion and Sedimentation Controls”, during dewatering operations.

3.2 INSTALLATION

A. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power, and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.

1. Space well points or wells at intervals required to provide sufficient dewatering.
2. Use filters or other means to prevent pumping of fine sands or silts from the subsurface.

B. Place dewatering system into operation to lower water levels before excavation below groundwater level.

C. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction.

D. Provide standby equipment on-site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails.

3.3 OPERATION

A. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed or until dewatering is no longer required.

B. Operate system to lower and control groundwater to permit excavation, construction of structures, and placement of fill materials on dry subgrades, Drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.

1. Do not permit open-sump pumping that lead to loss of fines, soil piping, subgrade softening, and slope instability.
2. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.

C. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water and sediment in a manner that avoids inconvenience to others.

D. Remove dewatering system from Project site on completion of dewatering. Plug or fill any well holes with bentonite grout or cut off and cap wells a minimum of 36 inches below overlying construction.

3.4 PROTECTION

A. Protect and maintain dewatering system during dewatering operations.

1. Promptly repair damages to adjacent facilities caused by dewatering.

END OF SECTION

(NO TEXT FOR THIS PAGE)

SECTION 31 23 23 - FILL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Subsoil fill materials.
2. Coarse aggregate materials.
3. Fine aggregate materials.
4. Backfilling site structures to subgrade elevations.
5. Fill for over-excavation.

B. Related Sections:
1. Section 31 23 16.13 - Trenching.

1.2 REFERENCES

A. Indiana Department of Transportation (INDOT) Standard Specifications (latest edition).

B. ASTM International:

1. ASTM D698 - Standard Test Method for Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
2. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).
4. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
5. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (shallow depth).

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures.

B. Materials Source: Submit name of imported fill materials suppliers.

C. Material Data: Submit gradation charts, sieve analysis for imported aggregate testing results.

D. Test Reports: Submit certified laboratory reports of all proposed backfill material. Test reports are to be dated within 6 months of backfill operation.

1.4 QUALITY ASSURANCE

A. Furnish each imported material from single source throughout the Work.

PART 2 - PRODUCTS

2.1 FILL MATERIALS

A. See Specification 31 20 00 for details.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify subdrainage, damp proofing, or waterproofing installation has been inspected.

B. Verify structural ability of unsupported walls to support loads imposed by fill.

3.2 STOCKPILING

A. Stockpile materials on site at locations approved by Owner.

B. Stockpile in sufficient quantities to meet Project schedule and requirements.

C. Separate different aggregate materials with dividers or stockpile individually to prevent mixing.

D. Direct surface water away from stockpile site to prevent erosion and deterioration of materials.

E. Stockpile Cleanup: Remove stockpile, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

3.3 PREPARATION

A. Compact subgrade to density requirements for subsequent backfill materials.

B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with subsoil fill and compact to density equal to or greater than requirements for subsequent fill material.

3.4 BACKFILLING

A. Backfill areas to contours and elevations with unfrozen materials.

B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.

C. Place fill material in continuous layers and compact in accordance with INDOT standards.

D. Employ placement method that does not disturb or damage other work.

E. Maintain optimum moisture content of backfill materials to attain required compaction density.

F. Make gradual grade changes. Blend slope into level areas.

G. Remove surplus backfill materials from site.

H. Leave fill material stockpile areas free of excess fill materials.

3.5 TOLERANCES

A. Section 01 40 00 - Quality Requirements.

B. Top Surface of Backfilling Under Paved Areas: Plus or minus 0.5 inch from required elevations.

C. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

3.6 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements.

B. Perform laboratory material tests in accordance with ASTM D698.

C. Perform in place compaction tests in accordance with the following:

1. Density Tests: ASTM D1556, ASTM D2167, or ASTM D6938.
2. Moisture Tests: ASTM D1557.

D. When tests indicate Work does not meet specified requirements, remove Work, replace, and retest.

E. Proof roll compacted fill surfaces under slabs-on-grade and paving.

3.7 PROTECTION OF FINISHED WORK

A. Section 01 73 00 - Execution.

B. Section 01 77 00 – Closeout Procedures.

C. Reshape and re-compact fills subjected to vehicular traffic.

3.8 SCHEDULE

A. Fill to Correct Over-excavation:

1. Select fill, flush to required elevation, compact uniformly to 95 percent of maximum density.

3.9 COMPACTION EQUIPMENT

A. Equipment and Methods: Carry out all compaction with suitable approved equipment and methods.

1. Compact clay and other cohesive material with sheep's-foot rollers or similar equipment where practicable. Use handheld pneumatic tampers elsewhere for compaction of cohesive fill material.
2. Compact low cohesive soils with pneumatic-tire rollers or large vibratory equipment where practicable. Use small vibratory equipment elsewhere for compaction of cohesionless fill material.
3. Do not use heavy compaction equipment over pipelines or other structures unless the depth of fill is sufficient to adequately distribute the load.

3.10 FINISH GRADING

A. Final Contours: Perform finish grading and blend into conformation with remaining natural ground surfaces.

1. Leave all finished grading surfaces smooth and firm to drain.

2. Bring finish grades to elevations within plus or minus 1.00 inch of existing or contours shown.

B. Surface Drainage: Perform grading outside of building or structure lines in a manner to prevent accumulation of water within the area. Where necessary or where shown, extend finish grading to ensure that water will be carried to drainage ditches, and the site area left smooth and free from depressions holding water

3.11 RESPONSIBILITY FOR AFTERSETTLEMENT

A. Aftersettlement Responsibility: Take responsibility for correcting any depression which may develop in backfilled areas from settlement within one year after the work is fully completed. Provide as needed, backfill material, pavement base replacement, permanent pavement, sidewalk, curb and driveway repair or replacement, and lawn replacement, and perform the necessary reconditioning and restoration work to bring such depressed areas to proper grade as approved.

3.12 INSPECTION AND TESTING OF FILLING

A. Sampling and Testing: Engage an independent testing laboratory to perform all sampling, testing, and laboratory analysis in accordance with the appropriate ASTM Standard Specification. Provide compaction testing of all in-place backfill after every 400 feet of pipe installation. Record in-place fill compaction values at 50-foot intervals. Additionally, record compaction values at a minimum of 10 feet and 5 feet below final surface elevation and at the surface at each location. Record in-place fill compaction values at a minimum of 10 feet and 5 feet below final surface elevation and at the surface at all road/driveway crossings. Record in-place fill compaction values a minimum of 10 feet and 5 feet below final surface elevation and at the surface at 25-foot intervals through roadway/parking areas. Submit copies of all fill tests to the Engineer. If testing reveals non-compliance with Contract requirements, all additional testing and placement of adequately compacted fill will be made at the Contractor's expense.

B. Correction of Work: Correct any areas of unsatisfactory compaction by removal and replacement, or by scarifying, aerating, or sprinkling as needed and recompaction in place prior to placement of a new lift.

END OF SECTION 31 23 23

(NO TEXT THIS PAGE)

SECTION 31 25 00 – EROSION AND SEDIMENTATION CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. The following Sections and general provisions apply to this Section.

1. 31 10 00 “Site Clearing”.
2. 31 23 16.13 “Trenching”.
3. 31 23 23 “Fill”.

1.2 SUMMARY

A. Section includes Temporary control measures as shown on the plans or as ordered by the Owner during the life of the Contract to control water pollution, soil, erosion, and siltation using berms, dikes, dams, sediment basins, fiber mats, gravel, mulches, grasses, slope drains, and other erosion control devices or methods.

1.3 DESCRIPTION

A. This item shall consist of temporary control measures as shown on the Drawings or as ordered by the Owner during the life of the Contract to control water pollution, soil erosion, and siltation using berms, dikes, dams, sediment basins, fiber mats, gravel, mulches, grasses, slope drains, and other erosion control devices or methods.

B. Temporary erosion control measures contained herein shall be coordinated with the permanent erosion control measures specified as part of this Contract to the extent practical to assure economical, effective, and continuous erosion control throughout the construction period.

C. Temporary control may include work outside the construction limits such as borrow put operations, equipment, and material storage sites, waste areas, and temporary plant sites.

1.4 SUBMITTALS

A. Submit Erosion Control Plan Product Cut Sheets to Engineer for review and approval.

B. Prior to start of construction, Contractor shall submit schedules for accomplishment of temporary and permanent erosion control work, as are applicable for clearing and grubbing, grading, and construction. The Contractor shall also submit a proposed method of erosion and dust control on haul roads and borrow pits and a plan for disposal of waste materials. Work shall not be started until the erosion control schedules and methods of operations for the applicable construction have been accepted by the Engineer.

PART 2 - PRODUCTS

2.1 MULCHES

A. Mulches may be hay, straw, fiber mats, netting, bark, wood chips, or other suitable material reasonably clean and free of noxious weeds and deleterious materials.

2.2 STRAW BALE DIKE

A. Straw bale dikes shall be used as needed to prevent soil erosion at all stream or ditch crossings.

2.3 OTHER

A. All other materials shall meet commercial grade standards and shall be approved by the engineer before being incorporated into the project.

PART 3 - EXECUTION

3.1 GENERAL

A. In the event of conflict between these requirements and pollution control laws, rules, or regulations of other federal, state, or local agencies, the more restrictive laws, rules, or regulations shall apply.

B. The Contractor shall be responsible for compliance to the extent that construction practices, construction operations, and construction work are involved.

3.2 AUTHORITY OF OWNER

A. The Owner and the Owner’s authorized Representatives have the authority to limit the surface area of erodible earth material exposed by clearing and grubbing, to limit the surface area of erodible earth material exposed by excavation, borrow, and fill operations, and to direct the Contractor to provide immediate permanent or temporary pollution control measures to minimize contamination of adjacent streams.

3.3 CONSTRUCTION DETAILS

A. The Contractor will be required to incorporate all permanent erosion control features into the project at the earliest practicable time as outlined in the accepted schedule. Except where future construction operations will damage slopes, the Contractor shall perform the permanent seeding, mulching, and other specified slope protection work in stages as soon as substantial areas of exposed slopes can be made available. Temporary erosion and pollution control measures will be used to correct conditions that develop during construction that were not foreseen during the design state; that are needed prior to installation of permanent control features; or that are needed temporarily to control erosion that develops during normal construction practices but are not associated with permanent control features on the project.

B. Where erosion is likely to be a problem, clearing and grubbing operations should be scheduled and performed so that grading operations and permanent erosion control features can follow immediately thereafter if the project conditions permit; otherwise, temporary erosion control measures may be required between successive construction stages.

C. The Owner will limit the area of clearing and grubbing, excavation, borrow, and embankment operations in progress, commensurate with the Contractor's capability and progress in keeping the finish grading, mulching, seeding, and other such permanent control measures current in accordance with the accepted schedule. Should seasonal limitations make such coordination unrealistic, temporary erosion control measures shall be taken immediately to the extent feasible and justified.

D. If temporary erosion and pollution control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of the work as scheduled or as ordered by the Owner, such work shall be performed by the Contractor at his/her own expense.

E. The Owner may increase or decrease the area of erodible earth material to be exposed at one time as determined by analysis of project conditions.

F. The erosion control features installed by the Contractor shall be acceptably maintained by the Contractor during the construction period.

G. Whenever construction equipment must cross watercourses at frequent intervals, and such crossings will adversely affect the sediment levels, temporary structures must be provided and not alter watercourse flow or sedimentation

H. Pollutants including fuels, lubricants, bitumen, raw sewage, wash water from concrete mixing operations, and other harmful materials shall not be discharged into or near rivers, streams, and impoundments or into natural or manmade channels leading thereto.

END OF SECTION

SECTION 32 31 13 - CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Chain-link fences.
2. Swing, manually-operated gates.

1.3 REFERENCES

A. American Society of Civil Engineers

1. ASCE/SEI 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures

B. ASTM International

1. ASTM F 567 - Standard Practice for Installation of Chain-Link Fence
2. ASTM F 1043 - Standard Specification for Strength and Protective Coatings on Steel Industrial Fence Framework

1.4 FIELD CONDITIONS

A. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

1.5 DESIGN

A. General: Provide fencing of the chain-link type and six (6) feet high with six (6) feet of diamond mesh woven wire fabric topped by extension arms with a vertical height of approximately one foot above the top of the fabric, unless shorter to match existing as denoted on drawings. Design the extension arms to carry three double strands of barbed wire. Locate the fence as shown in the contract drawings.

B. Fabric, Supports, and Fittings: Provide black color coated steel fabric, supports and fittings. Coat the framework, posts and hardware except hinges and latches to match the fabric with thermoplastic or thermoset resins and provide oven baked materials to a minimum dry coating of seven (7) mils. Color coat all accessories except hinges and latches to match the fence. Provide aluminum hinges and latches.

C. Pipe Sizes and Weights: Provide pipe sizes and weights meeting the requirements of ASME B 36.10, Table 2 and ASTM A 53, Table 1. All pipe sizes listed are nominal, unless otherwise indicated.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle all pipe, fittings and appurtenances as specified in Division 01 and as follows.

B. Upon receipt at the job site, check and inspect all materials to ensure that no damage occurred during shipping or handling. Store materials in such a manner to ensure proper ventilation and drainage, and to protect against damage, weather, vandalism, and theft.

1.7 Submittals

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, and operational descriptions and finishes. This should also include manufacturer's cut sheets.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted.

B. Fences and Gates

1. K&M Fencing
2. Or Approved Equal

C. Manufacturers must be Build American Buy America (BABA) compliant.

2.2 FABRIC

A. Provide fabric that is one piece woven 2-inch mesh chain link of 9-gauge galvanized steel wire with a minimum breakload of 1800 lbs/ft for vinyl coated steel 2170 lbs/ft for galvanized steel and which is interwoven to form a continuous fabric with no splices is coated after weaving. Provide the top selvage twisted and barbed and the bottom selvage knuckled. Clean the fabric of all grease and foreign matter before coating and shipping. Stretch the fabric tightly approximately two (2) inches above grade level and attach the fabric to the terminal or gate posts using beveled tension bands and tension bars.

1. Provide galvanized fabric that is fusion coated with a minimum seven mil coating of polyvinyl chloride (PVC) applied over a thermoset plastic bonding agent. Conform the PVC to Federal Specification RR-F-191.
2. Vinyl coat all cut ends.
3. Conform aluminum fabric to Fed. Spec. RR-F-191.

2.3 BARBED WIRE

A. Provide barbed (where noted on the plans) wire consisting of three strands of 0.110-inch diameter wire with 12-1/2 gauge galvanized steel wire with 4-point round barbs spaced not more than five (5) inches apart.

1. Provide barbed wire for vinyl coated fence, finished with color coating as specified for the fabric. Provide uncoated barbs.

2.4 TENSION WIRE

A. For the tension wire for the fence bottom use a minimum 7-gauge galvanized coil spring steel.

2.5 TOP AND BRACE RAILS

A. General: Furnish the top rail in approximately 20-foot lengths with couplings approximately 6 inches long for each joint. Provide one coupling in each 5 with an expansion spring. Provide the rail continuous from end-to-end for each run of fence. Provide brace rails at all terminal posts, located the rails midway between the top and bottom of the fabric and extend from the terminal post to the first adjacent line post. Securely fasten rails at both ends. Provide top and brace rails of the same material as the fabric.

B. Pipe Type: Top rail to be 1-5/8-inch OD.

2.6 POSTS

A. General: Provide all posts that are galvanized steel pipe, or coated as specified for vinyl coated framework, posts and hardware in Paragraph 1.5.

B. Pipe Posts: Provide pipe posts as follows:

1. For end, corner and pull posts use 2-7/8-inch, Schedule 40 pipe. Length of terminal posts and pull post to be approximately 3 feet 6 inches longer than height of fabric.
2. For line posts use 2-inch, Schedule 40 pipe.
3. For gate posts use the following pipes for different leaves:

Width of Gate Leaf	Nominal Minimum Post Size	Minimum Depth into Concrete
up to 6’-0”	2-1/2-inch Schedule 40	36”
over 6’-0” to 12’-0”	3-1/2-inch Schedule 40	36”
over 12’-0” to 18’-0”	6-inch Schedule 40	48”
over 18’-0” to 23’-0”	8-inch Schedule 40	48”
over 23’-0” to 30’-0”	10-inch Schedule 40	48”

4. Bending Strength: Provide materials with the minimum bending strength based on a 6-foot cantilever for rolled formed or tube posts as follows:

	Minimum Bending Strength, lbs Galvanized Steel
1. End, Corner and Pull Posts: 2.875-inch OD roll formed or	444
2. Line Posts: For fences 8 feet maximum height 1.875- by 1.625-inch C-Section	245
3. Gate Posts: For leaves up to 6 feet wide 2.875-inch OD roll formed	444

2.7 GATES

A. General: For the perimeter construction of gates with leaves up to 6 feet wide, use 1-1/2-inch Schedule 40 pipe and for gates with leaves greater than 6 feet wide, use 2-inch Schedule 40 pipe.

B. Braces: Provide the gates with sufficient horizontal and vertical members and bracing to ensure structural stability to prevent sagging and to provide for the attachment of fabric, hardware and accessories. Provide gates with diagonal cross bracing consisting of 3/8-inch diameter adjustable length truss rods where necessary to provide frame rigidity without sag or twist.

C. Gate Accessories: Equip gates with hinges, latches, center stops, hasps, holdbacks, and padlocks. Provide hinges, latches, center stops, hasps, and holdbacks that are galvanized steel after fabrication. Provide double gates with a center drop bar and gate holdbacks.

D. Latches: Provide gate latches that are positive locking, pivoting type with the padlocking arrangement accessible from either side of the gate.

E. Padlocks: Provide manipulation-resistant combination padlocks of solid brass pin tumbler type with hardened steel or brass shackles as scheduled and with size and shackle opening to equal the specified product.

F. Hinges: Hang all gates on offset hinges to permit swinging the gate through a 180-degree arc to lie, when not obstructed, along and parallel to the line of the fence.

G. Barbed Wire: Top gates with barbed wire on extension arms to same as specified for the fence.

2.8 ATTACHMENTS

A. General: Provide all attachments fabricated to match the fabric as specified for framework, posts and hardware in Paragraph 1.5, except provide aluminum hinges and latches.

B. Tension Bars: Provide 3/16-inch by ¾-inch galvanized steel tension bars attached to the terminal posts be means of beveled edge bands.

C. Truss Rods: Provide 3/8-inch diameter galvanized steel truss rods. Securely mount truss rods between the line post end of the brace rail and the base of the terminal post.

D. Post Tops: Provide post tops of galvanized steel to form weathertight caps. Make provisions for installation or passage of the top rail.

E. Brace and Tension Bands: Provide galvanized steel brace bands and tension bands of the “unclimbable” beveled edge type with 3/8-inch diameter square shouldered aluminum carriage bolts, nonremovable from outside of the fence.

F. Rail Couplings: Provide rail couplings of the outside sleeve type, not less than six inches long, self-centering, which allows for expansion and contraction. Provide galvanized steel rail couplings.

G. Fabric Ties: Provide 11-gauge galvanized steel fabric ties.

H. Hog Rings: Provide 11-gauge wire, aluminum alloy, Type 6061-T6 hog rings.

I. Extension Arms: Provide galvanized steel extension arms for supporting the barbed wire. Design the arms with an adequate cross section to withstand without failure or permanent deflection a perpendicular force of 250 pounds applied at the end of the arm when the arm is securely attached to the post. Construct extension arms to be slanted out.

1. Provide Vee-type arm at 45 degrees to vertical with a vertical height approximately one foot above the top of the fabric, one for each post.

2.9 PERFORMANCE REQUIREMENTS

A. Structural Performance: Chain-link fence and gate frameworks shall withstand the design wind loads and stresses for fence height(s) and under exposure conditions indicated according to ASCE/SEI 7.

1. Design Wind Load.

a. Minimum Post Size: Determine according to ASTM F 1043 for post spacing not to exceed 10 feet for Material Group IA, ASTM F 1043, Schedule 40 steel pipe.
b. Minimum Post Size and Maximum Spacing: Determine according to CLFMI WLG 2445, based on mesh size and pattern specified.

B. Lightning Protection System: Maximum resistance-to-ground value of 25 ohms at each grounding location along fence under normal dry conditions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for a certified survey of property lines and legal boundaries, site clearing, earthwork, pavement work, and other conditions affecting performance of the Work.

1. Do not begin installation before final grading is completed unless otherwise permitted by Engineer.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.3 CHAIN-LINK FENCE INSTALLATION

A. General: Install chain-link fencing according to ASTM F 567 and manufacturer's requirements specified. Do not begin installation and erection before final grading is completed, unless otherwise approved.

B. Install fencing on established boundary lines inside property line as shown on Drawings.

C. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated in Drawings, in firm, undisturbed or compacted soil.

1. If not indicated, excavate holes for each post to the minimum diameter recommended by the fence manufacturer, but not less than four times the largest cross-section of the post.
2. Unless otherwise indicated, excavate the hole depths approximately 3 inches lower than the post bottom, with the bottom of posts set not less than 36 inches below finished grade.

D. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.

1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
2. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.

    a. Exposed Concrete: Extend 2 inches above grade; shape and smooth to shed water.
    b. Concealed Concrete: Place top of concrete 2 inches below grade as indicated on Drawings to allow covering with surface material.
    c. Posts Set into Sleeves in Concrete: Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts are inserted into sleeves, fill annular space between post and sleeve with anchoring cement, mixed and placed according to anchoring material manufacturer's written instructions. Finish anchorage joint to slope away from post to drain water.

d. Posts Set into Holes in Concrete: Form or core drill holes not less than 5 inches deep and 3/4 inch larger than OD of post. Clean holes of loose material, insert posts, and fill annular space between post and concrete with anchoring cement, mixed and placed according to anchoring material manufacturer's written instructions. Finish anchorage joint to slope away from post to drain water.

E. Terminal Posts: Install terminal end, corner, and gate posts according to ASTM F 567 and terminal pull posts at changes in horizontal or vertical alignment as indicated on Drawings. For runs exceeding 500 feet, space pull posts an equal distance between corner or end posts.

F. Line Posts: Space line posts uniformly at 10 feet o.c.

G. Post Bracing and Intermediate Rails: Install according to ASTM F 567, maintaining plumb position and alignment of fence posts. Diagonally brace terminal posts to adjacent line posts with truss rods and turnbuckles. Install braces at end and gate posts and at both sides of corner and pull posts.

1. Locate horizontal braces at mid height of fabric 72 inches or higher, on fences with top rail, and at two-third fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.

H. Top Rail: Install according to ASTM F 567, maintaining plumb position and alignment of fence posts. Run rail continuously through line post caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended in writing by fencing manufacturer.

I. Intermediate and Bottom Rails: Secure to posts with fittings.

J. Fasteners: Install nuts for tension bands and carriage bolts on the side of fence opposite the fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

K. Barbed Wire: Firmly install the barbed wire in slots in the extension arms, anchored to the terminal extension arms after removal of all sag from the wire.

L. Tension Wire: Attach the tension wire to the bottom of the fabric by hog rings spaced at 24-inch intervals and to terminal posts by brace bands.

M. Fabric: Leave approximately 2 inches between finished grade and the bottom selvage, unless otherwise indicated. Pull the fabric taut and tie to posts, rails, and tension wires. Install the fabric on the security side of the fence, and anchor the fabric to the framework so that the fabric remains in tension after the pulling force is released.

3.4 GROUNDING AND BONDING

A. Comply with requirements in Section 26 05 26 "Grounding and Bonding for Electrical Systems."

B. Fence and Gate Grounding:

1. Ground for fence and fence posts shall be a separate system from ground for gate and gate posts.
2. Install ground rods and connections at maximum intervals of 1500 feet.
3. Fences within 100 feet of Buildings, Structures, Walkways, and Roadways: Ground at maximum intervals of 750 feet.
4. Ground fence on each side of gates and other fence openings.

    a. Bond metal gates to gate posts.
    b. Bond across openings, with and without gates, except openings indicated as intentional fence discontinuities. Use No. 2 AWG wire and bury it at least 18 inches below finished grade.

C. Protection at Crossings of Overhead Electrical Power Lines: Ground fence at location of crossing and at a ground rod located a maximum distance of 150 feet on each side of crossing.

D. Fences Enclosing Electrical Power Distribution Equipment: Ground according to IEEE C2 unless otherwise indicated.

E. Grounding Method: At each grounding location, drive a grounding rod vertically until the top is 6 inches below finished grade. Connect rod to fence with No. 6 AWG conductor. Connect conductor to each fence component at grounding location.

1. Make grounding connections to each barbed wire strand with wire-to-wire connectors designed for this purpose.
2. Make grounding connections to each barbed tape coil with connectors designed for this purpose.

F. Connections:

1. Make connections with clean, bare metal at points of contact.
2. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
3. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
4. Make above-grade ground connections with mechanical fasteners.
5. Make below-grade ground connections with exothermic welds.
6. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

G. Bonding to Lightning Protection System: Ground fence and bond fence grounding conductor to lightning protection down conductor or lightning protection grounding conductor according to NFPA 780.

3.5 ADJUSTING

A. Lubricate hardware and other moving parts.

END OF SECTION 32 31 13

SECTION 32 90 00 – LANDSCAPING WORK

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Soil, soil preparation, soil tests, excavation, planting, seeding, sodding, pruning, edging, fertilizing and maintenance.

B. Related Work Specified in Other Sections Includes, But is Not Limited to, the Following:

1. Section 31 23 16 - Excavation
2. Section 31 23 23 - Fill

1.2 REFERENCES

A. Codes and standards referred to in this Section are:

1. ASTM C 33 - Specification for Concrete Aggregates

1.3 SUBMITTALS

A. General: Provide all submittals, including the following, as specified in Division 1.

B. Soil Tests: Submit soil test results.

C. Maintenance Instruction Manual: Upon completion of the landscaping work and prior to final payment, furnish a landscaping maintenance manual. Include complete and detailed instructions on the recommended maintenance procedure to be followed for maintaining lawns and each species of plant material. Include a schedule of all planted and seeded materials and all pertinent growing and maintenance information and requirements for watering, fertilizing, lime applications, spraying, cultivating, pruning and weed control.

1.4 DELIVERY, STORAGE AND HANDLING

A. General: Deliver, store and handle all products and materials as specified in Division 1 (and as follows:)

B. Topsoil: Deliver top soil in a dry state without enough moisture to allow it to be packed or squeezed into a ball.

C. Balled and Bare Root Plants: Immediately after delivery, set all balled plants on the ground with the balls well protected with soil. Water and properly maintain all plants until planting. Plant or heel in bare rooted plants which cannot be planted immediately upon

delivery. No materials heeled in for more than a week may be used. Before the roots are covered, open bundler and separate the plants.

D. Grass Seed: Deliver grass seed in standard size bags of the vendor, showing weight, analysis and name of vendor. Store the seed so as not to impair its effectiveness.

E. Sod: Deliver sod to the site in fresh condition and within two days of the time it has been dug.

F. Fertilizer: Deliver fertilizer mixed as specified, in standard size bags, showing weight, analysis and the name of the manufacturer. Store the fertilizer in a weatherproof storage place in a manner that will keep it dry without affecting its effectiveness.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Seeding and Sodding: Sow grass seed between August 15th and October 15th unless sowing between March 15th and June 1st is permitted. Sow seed when the wind velocity is below 5 mph. Place sod between August 15th and October 15th or between March 15th and June 1st, or during the season or seasons which are normal for such work as determined by weather conditions and accepted practice in the locality and as approved.

B. Planting: Unless otherwise directed, plant deciduous material from March 1st to June 1st and from September 1st to December 1st. Plant evergreen material from April 1st to June 1st and from September 1st to November 1st.

1.6 WARRANTY

A. General: Apply the warranty to all seeded, sodded and planted areas. Have the warranty period commence after the final acceptance of all landscaping work exclusive of all replacement plant materials.

B. Plant Material: Warranty plant materials for a period of one year.

C. Seeded Areas: Warranty seeded lawn areas to the time of establishment of an acceptable uniform stand of grass.

D. Sod: Warranty sod to 30 days following the first cutting.

1.7 MAINTENANCE

A. General: Maintain all seeded, sodded and planted areas during the warranty period.

B. Grass Areas: Maintain all seeded and sodded areas to well establish a uniform stand of weed-free grass. Reseed or resod areas failing to develop a uniform stand.

C. Trees, Shrubs and Ground Covers: Cultivate trees, shrubs and ground covers and weed and water when necessary, but not less than twice a month, to prevent plant material from dying. Replace any plant material which is found to be dead or dying during the warranty period to original specifications upon request. Include the full cost of replacing dead or dying plant material in the Contract Amount. No separate payment will be made for replacements. Maintain plant material to be alive, in good growing condition and free of weeds.

D. Replacement: Replace plant material and resod or reseed only during the specified planting seasons and warranty the replacement material for the same period of time as the original material.

PART 2 PRODUCTS

2.1 SOIL

A. Topsoil: Provide a natural friable top soil of the region, rich in organic matter, without any material toxic to plant growth and of uniform quality, free of large roots, sticks, hard clay, weeds, brush, stones over 1-inch in maximum dimension or other litter or waste products. Provide topsoil containing no decomposed stone, salts or alkali, and not less than 15 parts per million of available nitrates, 3 parts per million of available phosphorus, 15 parts per million of potash, and having a pH of not less than 6.0 nor more than 7.2 at a depth of 8 inches below the surface of the field from which it is removed. Provide topsoil with a mechanical analysis as follows:

Sieve	Percentage Passing
1 inch	100
1/4 inch	97-100
No. 100	40- 60

B. Planting Soil: Prepare planting soil by mixing 10 parts of topsoil with fertilizer and 1 part of peat moss.

2.2 GRASS SEED AND SOD

Grass Seed: Provide a fresh, clean, new crop of grass seed f
approximately 49 percent turf-type Tall Fescue, 24 percent Perennial Ryegrass,
24 percent Creeping Red Fescue, and 3 percent White Dutch Clover, conforming
to INDOT 621 Seed Mixture R. Provide seed components free of noxious weed seeds
and having not less than the following purity and germination:

Component	Percent Purity	Percent Germination
Tall Fescue	98	85

Perennial Ryegrass	95	90
Creeping Red Fescue	95	85
White Dutch Clover	97	90

Tag each sack in accordance with the agricultural seed laws of the United States and the State of Indiana. Show on each tag the producer's guarantee as to the year grown, the percentage of purity, the percentage of germination and the tests by which the percentages were determined. Provide seed for this project having a test date within 6 months of the date of sowing.

A. Sod: Provide nursery-grown Improved Kentucky Blue Grass sod, free of weeds, a minimum of 1-inch thick of dense growth and cut with sharp edges in 18-inch widths and not less than 3 feet long. Sod which has been grown on peat or which has been dug more than two days previous to delivery or which has been allowed to have the roots dry out or on which the grass has turned brown will not be accepted.

2.3 PLANT MATERIALS

A. General: Provide plant materials that are true to species or variety, sound, healthy, vigorous acclimated plants free from defects, disfiguring knots, sun-scaled injuries, abrasions of the bark, plant diseases and insect eggs, borers and all other forms of infestations. Provide material that has normal, well-developed branch systems and vigorous root systems and that is freshly dug, nursery-grown stock grown under the same climatic conditions as the Project location. Provide material grown under climatic conditions similar to those in the locality of the project for at least 2 years and transplanted or root pruned at least in the last 3 years.

B. Plant Size: Dimension a plant as it stands in its natural position. Measure trees under 4 inches in caliper at a point 6 inches above the ground and trees more than 4 inches in caliper at a point 12 inches above ground. Provide the stock of a fair average of the minimum and maximum sizes specified. Do not cut back large shrubs to sizes specified.

C. Balled, Burlapped and Platformed Plants: Dig balled and burlapped, as well as balled and platformed, plants with sufficient roots and a solid ball of earth securely held in place by burlap and stout natural fiber rope. Manufactured balls are not acceptable. Provide balled and platformed plants with sturdy platforms of a size equal to the diameter of the horizontal midsection of the ball of earth.

D. Bare-Rooted Plants: Dig bare-rooted plants with sufficient root spread and depth to ensure full recovery and development of the plants. Cover roots for these plants with a uniformly thick coating of mud by being puddled immediately after they are dug.

E. Inspection: Submit plants to inspection for approval at the place of growth, for conformity to specification requirements as to quality, size and variety. In addition to the place of growth inspection, submit plants to inspection for approval upon delivery at the project site or during the progress of the work, for size and condition of balls or roots, diseases, insects, and

latent defects or injuries. Remove rejected plants immediately from the site. Do not substitute plants for those specified unless approved.

2.4 COMMERCIAL FERTILIZER

A. Provide all commercial mixture fertilizer uniform in composition, free flowing, conforming to state and federal laws and suitable for application with equipment designed for that purpose. Provide fertilizer with organic, inorganic or combined elements with the following composition by weight:

1.	Nitrogen	12-parts by weight
2.	Phosphorus pentoxide	12-parts by weight
3.	Potash	12-parts by weight

B. Incorporate into the topsoil as specified at the rate of 600 pounds per acre by mechanical spreader. The fertilizer shall be uniformly worked in to the top 4-inches of topsoil.

2.5 ACCESSORIES

A. Tree Wrap: Provide new, clean, plain, 8-ounce weight burlap material 6 inches wide for wrapping tree trunks.

B. Weed Barrier Fabric: Provide Pro-5 fabric as manufactured by the DeWitt Co., or equal.

C. Gravel: Provide smooth river bed gravel of solid or mixed color range to be as selected and meeting the requirements of ASTM C 33 and graded according to Size No. 467, Table II.

D. Mulch: Provide ground corn cobs, wood chips, tree barks, buckwheat hulls or other approved materials for mulch.

E. Edging: Provide commercial hot-rolled steel edging plate, 4 inches wide and 1/8-inch thick. Fabricate edging in sections with loops pressed from or welded to the face of sections at 30-inch centers to receive 16-inch long tapered steel stakes. Provide edging finished with the manufacturer's standard paint.

2.6 TESTS

A. Sample: Submit a 10-ounce sample of the proposed topsoil to a testing laboratory in sealed containers to prevent contamination.

B. Analysis: Analyze the topsoil sample to determine the amount of lime necessary and the appropriate fertilizer mix and quantity required for planting, seeding and sodding.

PART 3 EXECUTION

3.1 GRADES

A. General: Existing and final contours shown depict finished grades after completion of landscaping work.

B. Lawn Grades: Grade lawns to meet walks, curbs and adjoining surfaces after uniform settlement of surfaces. Correct water pockets or ridges which appear after surface settlement takes place on or before the end of the guarantee period.

3.2 EXCAVATION FOR PLANTING

A. General: Obtain approval for all plant locations before excavation. Remove from the site all material that is surplus and unsuitable for backfill.

B. Ground Cover and Grass Areas: Excavate for ground cover and grass areas to the required depths for grass to receive 6 inches of topsoil and for groundcover to receive 6 inches of planting soil.

C. Plant Pits: Excavate plant pits with vertical sides and a circular outline.

1. Dig tree and evergreen pits at least twice the diameter of the ball, and deep enough to permit an 8-inch layer of compacted planting soil beneath the ball.

2. Dig shrub pits a minimum of twice the diameter of the ball and deep enough to allow 6 inches of compacted planting soil beneath the ball.

D. Drain: Install french drains for all trees, ornamental trees, and evergreens planted on berms and other locations where the grade permits, from bottom of planting pit to the finished grade with a trench 9 inches wide, filled with a 6-inch thick layer of 3/4-inch washed gravel. Cover the gravel layer with a filter mat before backfilling the trench with soil.

3.3 SOIL CONDITIONING

A. Disking: Before the application of topsoil, sodding or seeding, disk the area to be seeded, sodded or planted with groundcover to a depth of 6 inches. Continue the disking until the subsoil surface is sufficiently broken to provide a good bond between subsoil and topsoil. Spread 6 inches of planting soil over the disked area to a uniform depth and density.

B. Ground Limestone: Incorporate ground limestone, if required by the results of the soil test report, into the upper 3 inches of planting soil. Uniformly spread fertilizer and mix into the soil to a depth of 1-1/2 inches or as recommended by the manufacturer.

3.4 SEEDING AND SODDING

A. Seeding: Sow seed at the rate recommended by the seed producer. Evenly rake the surface after seeding with a fine-tooth rake. Mulch all newly seeded areas and cover with a minimum of 1/4-inch of straw or hay, approximately at the rate of 1 bale per 1,000 square feet, then thoroughly wet.

B. Sodding: Lay sod in such a manner that the surface is smooth and even and all edges abut one another tightly. Water and roll sod so that a bond is produced between the prepared topsoil and the sod. On slopes greater than 3 to 1, stake installed sod with approved wooden sod stakes at a minimum rate of three stakes per square yard of sod.

3.5 PLANTING

A. Layout: Outline locations for trees, shrubs, evergreens and bed and stake for approval. Obtain location approval prior to commencing planting operations.

B. Setting Plants: Set plants plumb and straight with the crown at finished grade. Compact soil around the base of the ball, and fill the void 3/4 of the way up from the bottom. Water each plant immediately. After the water has completely drained, fill the plant pits to finished grade. Properly spread out roots of bare root plants and carefully work topsoil among them. Cut off any broken or frayed roots with a clean cut. Form a shallow basin, the size of the ball with a ridge of soil to facilitate watering. After that operation is completed, apply a second watering immediately. Finish all planting pits and beds within a period of 3 days following installation. Construct tree saucers, cultivate and outline planting pits with a neat edge, when necessary.

C. Mulching: Immediately after planting operations are completed, cover all tree and shrub pits with mulch to a minimum depth of 2 inches. Limit mulch for trees to saucer diameter and, for shrubs, the entire shrub bed.

D. Pruning: Prune each tree and evergreen with clean, sharp tools in accordance with standard horticultural practice to preserve the natural character of the plant. Remove suckers and all dead, broken or badly bruised branches.

E. Wrapping: Wrap the tree trunks of all trees with burlap tree wrapping securely tied with suitable cord at top and bottom and at 2-foot intervals along the trunk. Overlap the wrapping 2 inches top and bottom and entirely cover the trunk from the ground to the height of the second branch, neat and snug.

F. Guying: Guy trees as necessary to be plumb and straight through final inspection. Remove guy wires at completion of project.

G. Watering: During planting, thoroughly saturate the soil around each plant with water and as many times later as seasonal conditions require until the end of the guarantee period.

3.6 EDGING

A. General: Establish a neat edge where planting areas meet grass areas, with spade or edging tools, immediately after all planting and seeding is completed. Establish good flowing curves as shown. Maintain edging until the end of the guarantee period.

3.7 GRAVELED AREAS

A. General: Lay a weed barrier in accordance with the manufacturer's recommendations and top with a 4-inch layer of gravel. Edge graveled areas with metal edging.

END OF SECTION

SECTION 33 01 30.13 - SANITARY SEWER, FORCE MAIN AND MANHOLE TESTING

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:
   1. List of testing equipment for sanitary gravity sewers, force mains, and manholes
   2. Operating procedures for testing equipment.

1.2 REFERENCE STANDARDS

A. ASTM International
   1. ASTM – D2122 Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings
   2. ASTM – D3034 Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
   3. ASTM – F1417 Standard Practice for Installation Acceptance of Plastic Non-pressure Sewer Lines Using Low-Pressure Air
   4. ASTM – C1244 Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill

PART 2 – TESTING EQUIPMENT

2.1 GRAVITY SEWER TESTING

A. Vacuum Testing Equipment:
   1. Vacuum pump
   2. Vacuum line.
   3. Vacuum tester base:
      i. Compression band seal.
      ii. Outlet port.
   4. Shutoff valve.
   5. Stopwatch.
   6. Plugs.
   7. Vacuum gage: calibrated to 0.1 in. Hg.

B. Deflection Testing Equipment:
   1. "Go, no go" mandrels.
   2. Pull/retrieval ropes.

C. Low Pressure Air Testing Equipment:
   1. Plugs
   2. Compressor
   3. Piping for air lines
   4. Pressure gauge

D. Hydrostatic Testing Equipment:
   1. Hydrostatic water pump
   2. Pneumatic or mechanical plugs
   3. Hoses

4. Pressure gauge

E. Valve Testing Equipment
   1. Hydrostatic water pump
   2. Pneumatic or mechanical plugs
   3. Hoses
   4. Tools for opening/closing valves

F. Lamping:
   1. Lamp open cut gravity piping after flushing and cleaning.
   2. Perform lamping operation by shining light at one end of each pipe section between manholes.
   3. Observe light at opposite end.
   4. Pipe not installed with uniform line and grade will be rejected.
   5. Remove and reinstall rejected pipe sections.
   6. Reclean and lamp until pipe section is installed to uniform line and grade.

G. Plugs:
   1. Plug outlets, wye branches, and laterals.
   2. Brace plugs to resist test pressures.

H. Infiltration Testing – Gravity Sewers:
   1. Maximum allowable infiltration: 100 gal/in of pipe diameter for each mile per day for reach of piping undergoing testing.
   2. Include allowances for leakage from manholes.
   3. Perform testing with minimum positive head of 2 feet.

I. Deflection Testing of Plastic Sewer Piping: Shall be completed in accordance with ASTM D3034.

J. Perform Low Pressure Air Test - Gravity Sewers
   1. Testing procedure: test gravity sewers using low-pressure air in accordance with ASTM F1417
      i. Isolate the section of sewer under test using pneumatic plugs that have a sealing length greater than the diameter of the pipe and are capable of resisting test pressure without external bracing or blocking. It is advisable to plug the upstream end of the line first to prevent any upstream water from collecting in the test line.
      ii. Introduce low pressure air slowly into the sealed line until the internal air pressure reaches the “starting air pressure” of 4.0 psi greater than the average back pressure of any groundwater above the pipe, but not greater than 6.0 psi.
      iii. After the starting air pressure is reached, throttle the air supply to maintain that internal pressure for at least two minutes. This time permits the temperature of the entering air to equalize with the temperature of the pipe wall.
      iv. When temperatures have been equalized and the starting pressure stabilized, disconnect the air supply and allow pressure to drop. Observe the continuous monitoring pressure gauge while the pressure is decreased to no more than 0.5 psi from the starting air pressure. The time in minutes required for the pressure to drop 0.5 psi must not be less than as calculated using the following formula.

         T=0.085 x (d) x (d)60 x q x 2 where:

T = shortest time, in minutes, allowed for the air pressure to drop 0.5 psi

K = 0.000419 x (d) x (l), but not less than 1.0

Q = leak rate, 0.0015 cubic feet per minute per square feet of internal surface

D = inside pipe diameter, in inches

L = length of pipe being tested, in feet

2.2 PRESSURE TESTING OF BURIED OR EXPOSED FORCE MAINS AND SPECIFIED GRAVITY SEWERS

A. Pressure test sections of SDR 21 sewer (areas of sewer with less than 10 feet of horizontal separation from water mains) according to Indiana State Code 327.

B. Completely backfill all harnessed sections of buried piping before such sections are tested.

C. Pressure test buried or concealed pipelines for leakage by maintaining the fluid in the pipe at the specified pressure for a minimum period of 2 hours and no more than 8 hours.

D. Pressure test the piping for leakage as a whole or in sections, valved or bulkheaded at the ends. Apply the specified pressure to the piping through a tap in the pipe by means of a hand pump or other approved method. Do not use air for testing.

E. Test the piping at a minimum of 100 psi, or 1.5 times the upstream pump shut-off head as determined from the pump manufacturer's performance curves, whichever is greater.

F. Allowable leakage: stop all visible leakage. Do not allow leakage for any piping, as determined by the above test, to exceed the allowable leakage of whichever guideline is more stringent of the following:

As given by the following formula in section 5.2 of AWWA C600:

$$L = (S \times D \times (P)^{1/2})/148{,}000$$

in which L is the allowable leakage in gallons per hour, S is the length of water main tested in feet, D is nominal diameter of the pipe in inches and P is the average test pressure in psi gauge.

G. Hydrostatic tests for ductile iron pipe shall be completed in accordance with AWWA C151/A21.51-17.

2.3 MANHOLE TESTING

A. If air testing, test whenever possible prior to backfilling in order to more easily locate leaks.
B. Repair both outside and inside of joint to ensure permanent seal.
C. Test manholes with manhole frame set in place.
D. Vacuum testing:
   1. Comply with ASTM C1244.
   2. Plug pipe openings; securely brace plugs and pipe.

3. Inflate compression band to 40 psi. Create seal between vacuum base and structure.
4. Connect vacuum pump to outlet port with valve open, then draw vacuum to 10 in. Hg.
5. Close valve.
6. Manhole test duration in seconds:

Depth (ft.)	Diameter (in)				
	48	54	60	66	72
	Time (s)				
8	20	23	26	29	33
10	25	29	33	36	41
12	30	35	39	43	49
14	35	41	46	51	57
16	40	46	52	58	67
18	45	52	59	65	73
20	50	53	65	72	81
22	55	64	72	79	89
24	59	69	78	87	97
26	64	75	85	94	105
28	69	81	91	101	113
30	74	87	96	106	121

7. Record vacuum drop during test period.
8. If vacuum drop is greater than 1 in. Hg during testing period, repair and retest manhole.
9. If vacuum drop of 1 in. Hg does not occur during test period, manhole is acceptable; discontinue testing.

E. If vacuum test exceeds 1 in. Hg drop in specified time after repair, repair and retest manhole.

F. Repair visible leaks regardless of quantity of leakage.

G. If test indicates work does not meet specified requirements, remove work, replace and retest.

2.4 VALVE TESTING

Operate valves in the section under test through several complete cycles of closing and opening. Have the test pressure for each valve, when in the closed position, applied to one side of the valve only. Test each end of the valve in this manner.

H. Test each valve in the same test pressure as that specified for the pipe in which the valve is installed.
1. Stop all external and internal leakage through the valves.
2. Stop all valve movement or structural distress.

END OF SECTION

SECTION 33 05 05.31 - HYDROSTATIC TESTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawing and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following: Hydrostatic testing of all finished water mains installed. Furnish all items necessary to perform the Work, except as otherwise specified.

1.3 REFERENCES

A. AWWA C600 - Installation of Ductile Iron Mains and Their Appurtenances
B. AWWA C906 – Polyethylene Pressure Pipe and Fittings
C. AWWA C500 - Metal-Seated Gate Valves for Water Supply Service
D. AWWA C502 - Dry-Barrel Fire Hydrants
E. AWWA C503 - Wet-Barrel Fire Hydrants
F. AWWA C509 - Resilient-Seated Gate Valves for Water Supply Service

1.4 QUALITY ASSURANCE

A. Test procedures should be performed to meet the requirements of AWWA Standard C600 and C900.

1.5 SUBMITTALS

A. Submit Certified Test Reports indicating passing all required tests.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TESTING

A. Hydrostatic tests shall be performed on all water mains installed. Make arrangements with the Owner and/or Owner's representative for scheduling each test. Each test shall be performed on the day mutually agreed upon and in the presence of the Owner and/or Owner's Representative.

B. Furnish equipment, temporary piping, pumps, fittings, gauges, and operating personnel necessary to conduct the tests. Coordinate with the Owner and the Engineer to locate hydrant to obtain test water from and maximum flow to be removed from the system.

C. The water mains may be tested in sections between valves when there is one or more intermediary valves in a water main.

D. Each section of water main shall be complete and thrust blocks and/or joint restraints shall have been in place prior to being tested.

E. Expel all air from the water main test section during the filling of the main and prior to the application of test pressure. Tap the water main at high points, if necessary, to release all air from the water main. Plug taps after the test is successfully completed. Plugs shall be watertight.

F. Test water mains at a static pressure of 150 pounds per square inch over a period of two consecutive hours.

1. Do not allow leakage for water mains to exceed the pound per square inch specified by the following formula in Section 5.2 of AWWA C600.

$$L = \frac{SxDx(P)^{1/2}}{148{,}000}$$

in which L is the allowable leakage in gallons per hour or the quantity of water supplied to maintain test pressure, S is the length of water main tested in feet, D is the nominal diameter of the pipe in inches, and P is the average test pressure in psi gauge.

2. The test will be considered successful when the pressure drop over the test period is the value calculated in Section 3.1.F.1 or less.
3. Ensure make-up water is from a measurable source.
4. Correction: Repair defects and repeat test until acceptable.
5. The maximum length of pipe to be tested shall be 2000 feet.

G. Hydrostatic Testing Protocol for Directionally Drilled HDPE (or other relevant) Pipe

1. The pipe shall be hydrostatically tested before being connected to other piping systems. The pipe shall be tested independently of other hydrostatic tests. Hydrostatic testing will consist of filling the constructed pipeline with water taking care to bleed off trapped air. The Contractor shall pressurize the pipe to 150 psi for a minimum of 4 hours to give the pipe time to expand. During this initial 4 hours, make-up water shall be added as needed to maintain the pressure within 5 psi of the specified pressure. At the end of the first 4 hours, the pipe shall be pressurized to the specified pressure and the test commences. The pipeline shall be maintained under the test pressure for a continuous period of between 1 and 3 hours by pumping water into the line at frequent intervals. The volume of water so added to maintain pressure within 5 psi of the specified pressure shall be measured and considered to represent the "leakage" from the line during the interval. The allowable "leakage" for the pipeline shall not exceed the allowances given in the following table.

Pipe Nominal Size (in)	**1-Hour Test, Allowable Leakage (gal/100 ft of pipe)**	**2-Hour Test, Allowable Leakage (gal/100 ft of pipe)**	**3-Hour Test, Allowable Leakage (gal/100 ft of pipe)**
3	0.1	0.15	0.25
4	0.13	0.25	0.4
6	0.3	0.6	0.9
8	0.5	1	1.5
10	0.75	1.3	2.1
11	1	2	3
12	1.1	2.3	3.4
14	1.4	2.8	4.2
16	1.7	3.3	5
18	2.2	4.3	6.5
20	2.8	5.5	8
22	3.5	7	10.5
24	4.5	8.9	13.3
28	5.5	11.1	16.8
32	7	14.3	21.5
36	9	18	27
40	11	22	33
48	15	27	43

2. It is understood that the pipe will continue to expand after the initial 4 hours under pressure and throughout the 1 to 3-hour test period. The allowable "leakage" presented in the table above accounts for this expansion and no additional allowable "leakage" will be considered.

3. Under no circumstances shall the total time under the specified test pressure exceed 8 hours. If the test is not completed due to leakage, equipment failure, etc., the test shall be terminated, and the pipeline shall be de-pressurized and permitted to “relax” for a minimum of 8 hours prior to the next testing sequences.
4. If there are no visual leaks or significant pressure drops during the final test period, and the measured "leakage” is less than allowable, the pipeline passes the hydrostatic test.
5. In the event that the “leakage” exceeds the specified allowable, the Contractor shall be responsible to repair or replace the pipeline until the pipeline passes the hydrostatic test.

END OF SECTION

SECTION 33 05 13 - PRECAST CONCRETE WASTEWATER STRUCTURES

PART 1 GENERAL

A. Inspection on delivery: Accept materials on site in manufacturer's original packaging and inspect for damage. If any manhole section is damaged in the process of transportation and handling, reject and immediately remove such sections from the site, and replace the damaged manhole sections at no increase in contract price.
B. Comply with precast concrete manufacturer's instructions and ASTM C913 for unloading, storing, and moving precast structures.
C. Storage:
    1. Store precast concrete structures to prevent damage to owner's property or other public or private property.
    2. Repair property damaged from materials storage.
D. Submittals
    1. Product Data: Manufacturer’s product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes. This shall also include any manufacturer’s cut sheets/shop drawings and operations and maintenance manuals.

PART 2 PRODUCT

A. Manufacturers:
    1. County Materials
    2. Oldcastle Precast, Inc.
    3. Rinker Materials.
    4. Approved Equal.
B. Sections:
    1. Description: Reinforced precast concrete conforming to ASTM C478 and ASTM A1064, with 28-day compressive strength of 5000 psi, and with watertight gaskets conforming to ASTM C923.
    2. Joints:
        i. Conforming to ASTM C443.
        ii. Maximum leakage: 0.025 gal. Per hour per foot of joint at 3 feet of head.
    3. Manholes: 48-inch riser and eccentric cone with grade rings and cast-iron frame and cover with 24-inch access opening.
    4. Pump Station Wet Wells: Flat top, appropriately sized access hatch cutout to accommodate pump maintenance activities, precast base section supplied with extended buoyancy collar to withstand upward buoyant forces with groundwater at grade.
    5. Valve Vaults: Flat top, appropriately sized access hatch cutout to accommodate valve operation and maintenance activities
C. Resilient Connector Manufacturers:
    1. Kor-N-seal, as manufactured by NPC Systems, Inc., Milford, NH.
    2. PSX: Positive seal, as manufactured by Press-Seal Gasket, Corp., Fort Wayne, IN.

3. Approved Equal.

D. Riser Rings Manufacturers:
   1. County Materials
   2. Oldcastle Precast, Inc.
   3. Rinker Materials.
   4. Approved Equal.

E. Riser Rings:
   1. More than or equal to 4 inches thick:
      i. Material: Precast concrete.
      ii. Comply with ASTM C478.
   2. Less than 4 inches thick:
      i. Material: Cast iron.
      ii. Comply with AASHTO M306.
   3. Rubber seal wraps:
      i. Wraps and band widths: Conform to ASTM C877, Type III.
      ii. Cone/riser ring joint: Minimum 3 inches overlap.
      iii. Frame/riser ring joint: 2 inches overlap.
      iv. Additional bands: Overlap upper band by 2 inches.

F. Accessories:
   1. Joint sealant: Comply with ASTM C990.

G. Manufacturers:
   1. Ram-Nek, as manufactured by K.T. Snyder Company, Inc., Houston, TX or approved equal.
   2. Kent-Seal, as manufactured by Hamilton-Kent, Kent, OH or approved equal.

H. Bolts:
   1. Stainless Steel: Comply with ASTM F593.
   2. Galvanized: comply with ASTM F1554.

PART 3 EXECUTION

A. Preparation
   1. Mark each precast structure by indentation or waterproof paint showing date of manufacture, manufacturer, and identifying symbols and numbers as indicated on drawings to indicate its intended use.
   2. Coordinate placement of inlet and outlet pipe or duct sleeves required by other sections.
   3. Do not install structures where site conditions induce loads exceeding structural capacity of manholes or structures.
   4. Inspect precast structures immediately prior to placement in excavation to verify that they are internally clean and free from damage; remove and replace damaged units.

B. Installation
   1. Grout manhole benches to achieve slope to exit piping, trowel smooth, and contour to form continuous drainage channel.

2. Where below the groundwater table, coat exterior with two coats of bituminous interior coating at direction of the owner.
3. Set manhole cover frames and covers level to correct elevations without tipping.
4. Setting manholes and structures:
    i. When lowering manholes and structures into excavations and joining pipe to units, take precautions to ensure that interior of pipeline and structure remains clean.

C. Assembly:
1. Assemble multi-section manholes and structures by lowering each section into excavation.
2. Install rubber gasket joints between precast sections according to manufacturer's recommendations.
3. Lower, set level, and firmly position base section before placing additional sections.

D. Remove foreign materials from joint surfaces and verify sealing materials are placed properly.
E. Maintain alignment between sections by using guide devices affixed to lower section.
F. Joint sealing materials may be installed on site or at manufacturer's plant.
G. Verify that installed manholes and structures meet required alignment and grade.
H. Remove knockouts or cut structure to receive piping without creating openings larger than required to receive pipe; fill annular spaces with mortar.
I. Cut pipe flush with interior of structure.
J. Shape inverts through manhole and structures as indicated on details.
K. Sanitary Manhole Drop Connections:
1. Construct drop connections into sanitary manholes as indicated on details.

L. Castings:
1. Set frame and cover 1.5 feet above finished grade for manholes and other structures with covers located within unpaved areas to allow area to be graded away from cover beginning 1 inch below top surface of frame. Embed frames in mortar. Provide wedges or shims for accurate and level placing of the frames.
2. Connections to riser section: manufacture riser sections with openings properly located for making connections to sewers. Unless otherwise shown or permitted, provide 6 inches minimum distance between a joint in a manhole section and the nearest edge of an opening for a connecting sewer. Make the diameter of such openings to be not more than 4 inches larger than the outside diameter of the pipe to be connected.
3. Lift holes: Provide lift holes that are formed, tapered, or drilled. Repair lift holes in a clean, workmanlike manner using a conical shaped pre-cast plug, properly sealed in place using non-shrink cement grout or an expanding portland cement mixture such as Octocrete as manufactured by IPA Systems, Inc. In accordance with manufacturer's application instruction.
4. Adjusting rings and external chimney seal: Provide a soiltight seal between the precast manhole and adjusting ring, and each adjoining adjusting ring, and between the adjusting ring and casting by the use of mortar. Seal joints both internally and externally.

M. Source Quality Control

1. Accept that the quality of all materials, the process of manufacture, and the finished precast manhole or structure is subject to inspection and approval by the engineer. The owner or engineer may make such inspection at the place of manufacture, on the work after delivery or at both places. The owner or engineer may reject any precast manhole or structure at any time on account of failure to meet any of the specifications' requirements even though sample manhole sections may have been accepted as satisfactory at the place of manufacture.
2. The owner reserves the right to core manholes either at the job site or point of delivery to validate strength of concrete and placement of steel. If cores fail to demonstrate the required strength or indicate incorrect placement of reinforcing steel, reject all sections not previously tested until sufficient additional cores are tested, at no increase in contract amount, to substantiate conformance to these requirements.

3. Prior to being installed, each precast manhole or structure shall be carefully inspected. Reject those not meeting the specifications and replace at the contractor's expense. Acceptance: base acceptance of manholes passing a proof-of-design test in accordance with ASTM

END OF SECTION

SECTION 33 05 15 – SEWER STRUCTURE REHABILITATION

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. It is the intent of this Specification to provide for the rehabilitation and protection of sewer structures suffering from corrosion damage, infiltration/exfiltration, and structural deterioration via the application of a complete liner system. Work includes all materials and equipment required for structure rehabilitation and protection to eliminate infiltration, repair voids, restore structural integrity and provide corrosion protection by application of sprayed liner to the chimney, walls, and bench of the structure.

1.2 RELATED DOCUMENTS

A. Division 01 00 00
B. Division 33 00 00
C. Division 40 00 00

1.3 SUBMITTALS

A. Shop drawings and manufacturer's literature shall be submitted to the ENGINEER for approval.

B. All materials and procedures required to establish compliance with the specifications shall be submitted including the following:

1. Descriptive literature, bulletins, and/or catalogs of materials including Material Safety Data Sheets (MSDS) and test data for each product used.

2. Work procedures including flow diversion plan, method of repair, etc.

3. Material and method for repairing leaks or cracks in structures.

4. Qualifications of applicator including the manufacturer’s certification.

5. Warranty Documentation.

6. Final installation report on completed structures.

1.4 DELIVERY, STORAGE, AND HANDLING

A. The CONTRACTOR shall keep materials dry, protected from weather, and stored under cover until used for application. Lining compounds shall be stored and handled in accordance with the MSDS instructions.

1.5 QUALITY ASSURANCE

A. Application of lining materials shall be performed by operators familiar with the handling of the products and materials involved and equipment employed. CONTRACTOR's foreman and applicator(s) shall have a minimum of three (3) year's experience in the spray application of these products.

1. The CONTRACTOR shall provide a copy of a Manufacturer's Certification that the CONTRACTOR and/or Applicator have been trained and approved in the handling, mixing, and application of the products to be used.

PART 2 PRODUCTS

2.1 The materials to be utilized in the lining of structures shall be designed and manufactured to withstand the severe effects of hydrogen sulfide in a wastewater environment. Manufacturer of corrosion protection products shall have a minimum of 10 years' experience in the production of the lining products utilized and shall have satisfactory installation record.

2.2 SpectraShield Liner System, or approved equal: The lining system to be utilized for sewer structures shall be a multi-component stress skin panel liner system as described below:

A. Liner.

Installation	Liner
Moisture Barrier	ModifiedPolymer
Surfacer	Polyurethane/Polymeric blend
foam	
Final Corrosion Barrier	Modified Polymer

B. Modified polymer shall be sprayable, solvent-free, two-component polymeric, moisture/chemical barrier specifically developed for the corrosive wastewater environment.

TYPICAL CHEMICAL ANALYSIS

"A" Component

Viscosity, 77° F, cps., ASTM D-1638	300-400
Physical State	Liquid
Color	Clear to amber
Hygroscopicity	Reacts with water

"B" Component

Viscosity, 160° F, cps., ASTM D-1638	400-600
Physical State	Liquid
Color	Flamingo Pink
Non-Volatile	100%

Reaction Profile (100 grams, 175° F sample)

Gel Time, seconds	1-2
Tack Free Time, seconds	15
Cure Time, seconds	30

Processing

A System / B System, volume ratio	1.00 / 1.00

Typical Physical Properties

Tensile Strength, PSI	>1500
Elongation, %	>125
Tear Strength, PSI	350
Shore D Hardness	55-65
100% Modulus, PSI	>1500

2.3 Polyurethane Rigid Structure Foam, low viscosity two-component, containing flame retardants:

TYPICAL CHEMICAL ANALYSIS

"A" Component

Viscosity, 77° F, cps., ASTM D-1638	200
Physical State	Liquid
Color	Dark Brown
Hygroscopicity	Reacts with water and Evolves CO_2 gas

"B" Component

Viscosity, 77° F, cps., ASTM D-1638	600-1000
Physical State	Liquid
Color	Tan
Hygroscopicity	Absorbs water rapidly thus changing ratio

Reaction Profile (100 grams, 77° F sample)

Cream Time, seconds	1-4
Tack Free time, seconds	5-8
Rise Time, seconds	6-10

Processing

A System / B System, volume ratio	1.00 / 1.00

Typical Physical Properties

Density, nominal, core, lbs/ft3 ASTM	4-10

D-1622 @ 74° F	
Compression Strength, ASTM D-1621	
@74° F parallel rise; PSI	90-150
Closed Cell Content, % - ASTM 1940 @ 74° F	Over 90
Shear Strength, PSI - ASTM C-273 @ 74° F	225-250

Total thickness of multi-component stress skin panel liner shall be a minimum of 500 mils. The product shall be SpectraShield, by CCI Spectrum, Inc., or approved equal.

2.4 Madewell Liner System or approved equal.

A. Restoration Mortar: Mainstay ML-72 Sprayable Microsilica Cement Mortar. Low shrinkage, high strength, sprayable microsilica mortar.

1. Composition: Blend of cements, microsilica, thermoplastic fibers, densifiers, and modifiers. Mortar shall not contain calcium aluminate cements or aggregates.

a. Thickness: 1 inch minimum.

b. Compressive Strength, ASTM C109:
(1) 1 Day: 3,000 psi.
(2) 28 Days: 10,000 psi.

c. Flexural Strength, ASTM C293:
c. 1 Day: 535 psi.
(1) 28 Days: 1,400 psi.

d. Tensile Strength, ASTM C496:
(1) 1 Day: 330 psi.
(2) 28 Days: 790 psi.

e. Shrinkage, ASTM C596:
(1) 28 Days @ 90%: 0.01 percent.

f. Uniaxial Tensile Bond Strength, ACI 503R, Appendix A:
(1) 28 Days: Greater than 500 psi over high strength concrete (5,000 psi compression strength concrete - bond strength governed by substrate tensile strength). Minimum acceptable bond = 145 psi.

g. Color: Dark gray.

PART 3 EXECUTION

3.1 STRUCUTRE PREPARATION

A. Contractor shall furnish and install repair patching and surface coating materials in all structures designated to receive lining. Contractor shall not perform patching and sealing activities in any structure when the structural integrity has been severely compromised. If, in the opinion of the contractor, any structure designated to be lined has lost its structural integrity, in whole or in part, the contractor shall immediately notify the ENGINEER and provide photographic documentation for review. The ENGINEER and OWNER will assess the condition of the structure and provide written instructions to CONTRACTOR on how to proceed.

B. Prior to conducting any work, perform inspection of structure to determine need for protection against hazardous gases or oxygen depleted atmosphere and the need for flow control or flow diversion.

C. CONTRACTOR shall take appropriate action to comply with all local, state, and federal regulations including those set forth by OSHA, EPA, the OWNER, and any other applicable authorities.

D. New concrete structures receiving a lining shall have cured a minimum of 28 days since manufacturer prior to commencing installation of the liner system.

3.2 SURFRACE PREPARATION

A. Conduct surface preparation program to include monitoring of atmosphere for hydrogen sulfide, methane, low oxygen or other gases, approved flow control equipment, and hydro blasting equipment.

B. The surface to be repaired must be clean and free of any loose materials. Hydro blasting equipment shall be used to remove all foreign materials from the structure including dirt, grit, roots, grease, sludge and all debris or materials that may be attached to the wall or bottom of the structure. Loose or protruding brick, mortar and concrete shall be removed using a mason’s hammer and chisel. CONTRACTOR shall place covers over the pipe openings, or use other means, to prevent extraneous material from entering the sewer system. All debris shall be removed from the structure disposed of by the CONTRACTOR.

C. After completion of surface cleaning, perform the seven-point check list, which is the inspection for:

1. Leaks

2. Ring and Cover condition

3. Cracks

4. Invert Condition

5. Holes

6. Inlet and Outlet Pipe Condition

7. Exposed Rebar

D. Repair all active leaks with the infiltration control mix and void areas with the cementitious patching mix. Repairs to defective pipe penetrations may be repaired with non-shrink grout or an approved alternative method. When severe infiltration is present, drilling may be required to pressure grout outside the structure using either a cementitious or chemical grout.

3.3 LINER INSTALLATION

A. The limits of the corrosion protection system shall be all exposed concrete/brick extending from the structure frame to and including the bench encompassing all surfaces including walls, tap sections, risers, etc., unless otherwise directed by the ENGINEER.

B. Application of multi-component system shall be in strict accordance with manufacturer's recommendation.

3.4 INSPECTION AND CERTIFICATION

A. Final concrete/brick structure corrosion protection system shall be completely free of pinholes or voids. Entire exposed concrete/brick surface shall be protected with corrosion protection system. Liner thickness shall be the minimum value as described herein.

B. All defects identified during inspection such as pinholes, low film millage, etc. shall be repaired with the same material.

C. Provide final written report to ENGINEER detailing the location, date of installation, description of repair and color photographs showing pre- and post-installation conditions.

3.5 WARRANTY

A. The liner system shall include a 10-year warranty from the manufacturer and applicator against failure. "Failure" will be deemed to have occurred if the protective lining fails to (a) prevent the internal damage or corrosion of the structure (b) protect the substrate and environment from contamination by effluent. If any such failure within 10 years of initial completion of work on a structure, the manufacturer / applicator shall repair the damage and restore the lining at no cost to the OWNER within 60 days after written notification of the failure.

END OF SECTION

SECTION 33 05 50 - LAYING AND JOINTING BURIED PIPELINES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Installation of all underground pipelines. Provide pipeline materials, coatings and linings as specified and pipe of the types, sizes and classes shown or specified.

1. Use proper and suitable tools and appliances for the safe and convenient cutting, handling, and laying of the pipe and fittings.

2. Use suitable fittings where shown and at connections or where grade or alignment changes require offsets greater than those recommended and approved.

3. Lay all underground pipelines not supported on piles or concrete cradle in select fill bedding material.

4. Close off all lines with bulkheads when pipe laying is not in progress.

B. Related Work Specified in Other Sections Includes, But is Not Limited to, the Following:

1. Section 31 23 16 - Excavation - Earth and Rock
2. Section 31 23 23 - Backfilling

1.2 REFERENCES

A. Codes and standards referred to in this Section are:

1. ASTM C 12 - Practice for Installing Vitrified Clay Pipe Lines

2. ASTM D 2774 - Practice for Underground Installation of Thermoplastic Pressure Piping

3. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances

4. ASTM C 361 - Specification for Reinforced Concrete Low-Head Pressure Pipe

5. ASTM A 307 - Specification for Carbon Steel Bolts and Studs, 60000 psi Tensile

6. ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings, C25, 125, 250, 800

7. ASME B16.21- Nonmetallic Flat Gaskets for Pipe Flanges

8. AWWA C111/A21.11 -Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings

9. ASTM A 139 - Duplicate Entry, Specification Section 33 05 23

10. AWWA C115/A21.15 -Flanged Ductile-Iron Pipe With Threaded Flanges

11. AWWA C206 - Field Welding of Steel Water Pipe

12. ASTM E 165 - Practice for Liquid Penetrant Examination

13. ASTM E 709 - Practice for Magnetic Particle Examination

1.3 DELIVERY, STORAGE AND HANDLING

A. General: Deliver, store and handle all products and materials as specified in Division 1 and as follows:

B. Transportation and Delivery: Take every precaution to prevent injury to the pipe during transportation and delivery to the site.

C. Loading and Unloading: Take extreme care in loading and unloading the pipe and fittings.

1. Work slowly with skids or suitable power equipment and keep pipe under perfect control at all times.

2. Under no condition is the pipe to be dropped, bumped, dragged, pushed, or moved in any way that will cause damage to the pipe or coating.

D. Sling: When handling the pipe with a crane, use a suitable sling around the pipe.

1. Under no condition pass the sling through the pipe.

2. Use a nylon canvas type sling or other material designed to prevent damage to the pipe and coating.

3. When handling reinforced concrete pipe or uncoated steel or ductile iron pipe, steel cables, chain or like slings are acceptable.

E. Damaged Piping: If in the process of transportation, handling, or laying, any pipe or fitting is damaged, replace or repair such pipe or pipes.

F. Blocking and Stakes: Provide suitable blocking and stakes installed to prevent pipe from rolling.

1. Obtain approval for the type of blocking and stakes, and the method of installation.

G. Storage for Gaskets: Store gaskets for pipe joints in a cool place and protect gaskets from light, sunlight, heat, oil, or grease until installed.

1. Do not use any gaskets showing signs of checking, weathering or other deterioration.

2. Do not use gasket material stored in excess of six months without approval.

1.4 FIELD CONDITIONS

A. Repair of Sanitary Sewers and Services: Rebed, in compacted select fill material, sanitary sewers which cross over the new pipe or which cross under the new pipe with less than 12 inches clear vertical separation. Compact the bedding to densities required for new pipeline construction and extend bedding below the sewer to undisturbed earth. Reconstruct sewers damaged by pipeline construction.

1. Furnish and install all materials and do all work necessary for the reconstruction or repairs of sanitary sewers and services.

2. Provide pipe for reconstruction of sanitary sewers and services meeting the appropriate specification requirements.

3. Provide pipe of the same size as the existing sewer or when the same size is not available, use the next larger size of pipe. Obtain approval of joints made between new pipe and existing pipe.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 PREPARATION

A. Dry Trench Bottoms: Lay pipe only in dry trenches having a stable bottom.

1. Where groundwater is encountered, make every effort to obtain a dry trench bottom.

2. If a dry trench bottom has not been obtained due to improper or insufficient use of all known methods of trench dewatering, (then) (the order to) excavate below grade and place sufficient select fill material, crushed stone, or Class D concrete over the trench bottom (may be given).

3. If all efforts fail to obtain a stable dry trench bottom and it is determined that the trench bottom is unsuitable for pipe foundation, obtain an order, in writing, for the kind of stabilization to be constructed.

4. Perform trench excavation and backfill in accordance with Sections 31 23 16 and 31 23 23.

3.2 INSTALLATION

A. General: Install all piping in accordance with the manufacturer's recommendations and approved shop drawings and as specified in Division 1.

1. Arrange miscellaneous pipelines, which are shown in diagram form on the Plans, clear of other pipelines and equipment.

B. Code Requirements: Provide pipeline installations complying with AWWA C600 for iron pipe, AWWA Manual M11 for steel pipe, AWWA Manual M9 for prestressed concrete cylinder pipe, ASTM C 12 for clay pipe, ASTM D 2774 for thermoplastic pressure piping 6-inch and smaller, and as modified or supplemented by the Specifications.

C. Pipe Laying - General:

1. For pipelines intended for gravity flow, begin pipeline laying at the low end of a run and proceed upgrade.

2. Generally, lay all pipe with bells pointing ahead.

3. Carefully place each pipe and check for alignment and grade.

4. Make adjustments to bring pipe to line and grade by scraping away or filling in select fill material under the body of the pipe.

5. Wedging or blocking up the pipe barrel is not permitted.

6. Bring the faces of the spigot ends and the bells of pipes into fair contact and firmly and completely shove the pipe home.

7. As the work progresses, clean the interior of pipelines of all dirt and superfluous materials of every description.

8. Keep all lines absolutely clean during construction.

9. Lay pipelines accurately to line and grade.

D. Pipe Laying - Trenches:

1. Lay all pipelines in trench excavations on select fill bedding, Class D concrete cradle or other foundations as shown, specified or ordered in writing.

2. Properly secure the pipe against movement and make the pipe joints in the excavation as required.

3. Carefully grade and compact pipe bedding.

4. Bell Holes:

a. Cut out bell holes for each joint as required to permit the joint to be properly made and allow the barrel of the pipe to have full bearing throughout its length.

b. Thoroughly tamp bell holes full of select fill material following the making of each joint.

E. Other Foundations: Install pipelines laid on other types of foundations as specified for such other foundations or as ordered in writing.

F. Concrete Pipeline Joint Finishing: Provide the following finished joints for steel end ring concrete pipelines with rubber gaskets:

1. Exterior Joint Grouting:

a. Grout joints for concrete pipelines using rubber gaskets and steel end rings on the outside with cement mortar composed of 1 part Type II portland cement to 1 part sand by volume.

b. Thoroughly mix the materials to produce a uniform mortar with all aggregate particles well coated.

c. In grouting the exterior joint, use a cloth diaper to encase the outside diameter of the bell of the pipe and adequately straddle the joint recess to keep out dirt and to serve as a form for grouting.

d. Fill the joint space with cement mortar which is just thin enough to run around the joint.

e. Leave the diaper in place permanently.

f. Before the mortar has taken its initial set, examine the diaper, and if not completely filled, force additional mortar into the joint.

2. Interior Joint Grouting:

a. Place cement grout in the interior annular joint opening of all steel end ring concrete pipe for pipe sizes 30 inches and larger in diameter.

b. Perform interior joint grouting in two phases.

(1) Immediately following pipe laying.

(2) After backfilling the entire pipeline is complete.

3. Joints for Concrete Pipelines:

a. Do not grout joints on the outside of the joint for concrete pipelines using rubber gaskets with all-concrete pipe ends.

b. Fill the interior annular joint opening with cement mortar and trowel smooth for all pipe 30 inches and larger.

4. Alternative to Grouting:

a. In place of grouting, use a joint filler consisting of a preformed loop of urethane foam impregnated with unhydrated Portland cement to fill the outside joint recess in prestressed lined cylinder pipe.

b. Place the loop, sized to fit the spigot end of the pipe, around the spigot ring behind the gasket groove.

c. Draw the pipe joined as described herein home, compressing the rubber gasket and forcing the urethane foam loop to fill the outside annular joint recess.

G. Ductile Iron Pipe Mechanical Joints:

1. Assembly: In making up mechanical joints, center the spigot in the bell.

a. Thoroughly brush the surfaces with which the rubber gasket comes in contact with a wire brush just prior to assembly of the joint.

b. Brush lubricant over the gasket just prior to installation.

c. Place the gasket and gland in position, bolts inserted, and the nuts tightened fingertight.

d. Tighten the nuts with a torque wrench so that the gland is brought up toward the pipe evenly.

e. Prime all bolts by dipping with a bituminous coating, except the threads. Coat threads immediately prior to installation of nuts.

2. Torques: Apply bolt torques complying with AWWA C600.

3. Remaking of Joints: If effective sealing is not obtained at the maximum torque listed above, disassemble and reassemble the joint after thorough cleaning.

H. Ductile Iron Pipe Rubber Gasket Joints:

1. Assembly: In making up the rubber gasket joint, brush the gasket seat in the socket thoroughly with a wire brush and wipe the gasket with a cloth.

a. Place the gasket in the socket with the large round end entering first so that the groove fits over the bead in the seat.

b. Apply a thin film of lubricant to the inside surface of the gasket that will come in contact with the entering pipe.

c. Brush the plain end of the pipe to be entered thoroughly with a wire brush and place it in alignment with the bell of the pipe to which it is to be joined.

d. Exert sufficient force on the entering pipe so that its plain end is moved past the gasket until it makes contact with the base of the socket to make the joint.

2. Positioning: Before proceeding with backfilling, feel completely around the joint using a feeler gauge to confirm that the gasket is in its proper position.

    a. If the gasket can be felt out of position, withdraw the pipe and examine the gasket for cuts or breaks.

    b. If the gasket has been damaged, replace it with a new one before re-installing the pipe.

3. Optional Mechanical Joints: Use mechanical joint fittings that meet the requirements of Section 33 05 55 with the rubber gasket joint pipe when specified or when rubber gasket fittings are not available.

I. Concrete Pipe Rubber Gasket Joints: In making O-ring rubber gasketed joints, lubricate the gasket and the pipe socket with an approved rubber gasket lubricant, and stretch the gasket over the spigot and place gasket accurately in position.

1. Carefully center the spigot end in the socket of the preceding pipe to avoid displacement of the gasket and draw the pipe home fully compressing the gasket.

2. Make adjustments to line and grade in such a manner that the compressed rubber gasket will not be disturbed.

J. Steel Pipe Bell and Spigot Rubber Gasket Joints:

1. Assembly: Thoroughly clean the joint surfaces of both the bell and spigot ends before jointing steel pipe with bell and spigot rubber gasket joints.

    a. Stretch a clean rubber gasket, lubricated with an approved rubber gasket lubricant, over the spigot and place accurately in position in the spigot groove.

    b. After the gasket is placed in the spigot groove, adjust the gasket so the tension in the rubber is uniform around the circumference of the joint.

    c. Clean and lubricate the joint surface of the bell end.

    d. Center the spigot end in the bell, being careful to avoid dragging the spigot or displacing the gasket, and draw the pipe home, fully compressing the gasket.

    e. Assemble the joint with the longitudinal axis of the pipe lengths in straight alignment. Deflect joints to make adjustments to line and grade

after the joint has been completely assembled. Do not disturb the compressed rubber gasket when deflecting joints.

2. Positioning: Prior to backfilling, feel completely around the joint using a feeler gauge to determine whether the gasket is in its proper position.

   a. If the gasket can be felt out of position, withdraw the pipe and examine the gasket for cuts or breaks.

   b. If the gasket has been damaged, replace it with a new one before re-installing the pipe.

K. Steel Pipe Field Welded Lap Joints: For steel pipe 30 inches in diameter and larger, single weld field welded lap joints on the inside of the joint, except that, where restrained joints are shown, double weld the joints. For steel pipe less than 30 inches in diameter, single weld the field welded lap joints on the outside of the joint. Perform 1/4-inch throat fillet welds with a minimum of two passes. Provide adequate space for welding and inspection of the joints. Perform all welding in accordance with the requirements of AWWA C206.

1. Do all welding with skilled welders experienced in the welding methods to be used and with materials to be welded. Qualify the welding operator under the provisions of AWWA C206 not more than one year prior to commencing work on the pipeline. Use machines and electrodes during qualification tests similar to those used in the work.

2. During welding of the joints, protect the pipe coating to avoid damage to the coating by hot weld spatters. Do not make welding grounds on the coated part of the pipe.

3. Clean all dirt, slag and flux after each pass of deposited weld metal prior to making the next pass.

4. As soon as practicable after welding the joint, test the weld around the entire circumference of the joint by the liquid penetrant test method in accordance with ASTM E 165 or the magnetic particle examination method in accordance with ASTM E 709. Repair any defect disclosed by the test and retest the joint at no additional cost.

L. Steel Pipe Joint Coating: Wrap the exterior of all joints for buried steel pipe with a tape coating in accordance with AWWA C209. Provide tape a minimum of 6 inches wide. Apply tape by technicians certified by the manufacturer. Clean, prime and wrap each joint with two wraps of tape, 30 mils minimum thickness.

M. Ductile Iron Pipe and Steel Pipe Joint Lining: For cement mortar lined ductile iron pipe greater than 30 inches in diameter, fill all interior joint recesses with mortar and make recesses smooth and flush with adjacent pipe interior walls in accordance with AWWA C205, Appendix A.2. For cement mortar lined steel pipe 8 inches in diameter and larger, except sleeve type coupling joints, fill all interior joint recesses with mortar and make recesses smooth and flush with adjacent pipe interior walls in accordance with AWWA C205, Appendix A.2. Use Type II portland cement in mortar for interior joint finishing of wastewater pipelines.

N. Cast Iron Soil Pipe Joints:

1. Joints: Provide joints of lead and oakum or rubber gasket compression type.

a. Thoroughly caulk leaded joints with picked oakum and molten lead.

b. Use twelve ounces of soft pig or bar lead in each joint for each 1-inch of pipe diameter.

c. Pour all lead in at one time.

d. Finish the face of lead joints with the face of the hub and leave without putty, paint or cement.

e. Extend gasket on rubber gasket joints the full depth of the bell and overlap the face of the bell.

2. Connection: Provide leakproof and gastight joints.

O. Temporary Bulkheads: Provide temporary bulkheads at the ends of sections where adjoining pipelines have not been completed, and in connections built into pipelines where adjoining pipelines or structures have not been completed and are not ready to be connected.

1. Remove bulkheads encountered in connecting sewers or structures included in this Contract, or in pipelines or structures previously built, when they are no longer needed or when ordered.

P. Sleeve Type Couplings: For sleeve type couplings, equally tighten diametrically opposite bolts on the connection so that the gaskets will be brought up evenly all around the pipe.

1. Torque Wrenches: Do the final tightening with torque wrenches set for the torque recommended by the coupling manufacturer.

Q. Concrete Cradle

1. General: When a concrete cradle is shown, specified, or ordered in writing, lay the pipe to grade by supporting each section on concrete blocks located near each end.

    a. Shape the tops of the blocks to fit the outside diameter of the pipe.

    b. Set the blocks approximately 3/8 inch low.

    c. Place the pipe on the blocks on a layer of stiff mortar of sufficient thickness to bring the pipes to exact grade.

    d. Timber blocking, of a type approved, may be employed in place of concrete blocks.

2. Cradle: Place Class D concrete cradle, on one side only, until it has risen above the invert on the other side, after which deposit the remainder of the concrete on both sides to the pipe spring line.

    a. Prevent movement of the pipe during concrete placement.

R. Concrete Encasement: When concrete encasement is to be provided, as shown, specified, or ordered in writing, lay and block the pipeline and place concrete as specified for concrete cradle.

1. Continue the placing of concrete to provide complete encasement to the dimensions shown, specified, or ordered.

S. Jointing Concrete Pipe:

1. Preparation of Joint Surfaces: Before joining concrete pipe using flexible rubber gaskets, wipe clean the joint surfaces of both the bell and spigot ends.

    a. Repair any lumps, projections, burrs, or chips which would interfere with the proper compression of the gasket.

    b. Insert the spigot end into the bell with the gasket in place and with all surfaces lubricated as recommended.

    c. Apply pressure to seat the pipe properly in the bell.

2. Curve Offset: Construct curves for reinforced concrete pipelines with standard pipe where the opening of the joint on the outside of the curve is less than 1/2 inch.

3. Curve Fittings: Where greater opening of the joint would be required, construct curves using beveled or radius pipe with standard joints, short lengths of pipe, or plain end radius pipe with cast concrete collar joints, or continuous concrete encasement; or by monolithic construction.

T. Jointing Clay Pipe: Joint clay pipe with flexible plastic joints in accordance with the manufacturer's instructions and as specified.

1. Wipe the joint surface clean and coat with lubricant on both the bell and spigot ends.

2. Insert the spigot end in the bell and apply sufficient force to seat the pipe properly.

U. Valve Box Setting: Install valve boxes vertical and concentric with the valve stem.

1. Satisfactorily reset any valve box which is moved from its original position, preventing the operation of the extension valve stem.

2. Replace any extension valve stem which has been damaged so that it can be operated.

V. Jacking:

1. General: Perform jacking as shown. After jacking is completed, seal the ends of the casing pipe with brick masonry.

2. Jacking Pit: Provide jacking pit of adequate length to provide room for the jacking frame, the jacking head, reaction block, the jacks, rig, and jacking pipe.

a. Construct the pit to be sufficiently wide to allow ample working space on each side of the jacking frame and sufficiently deep so that the invert of the pipe will be at the elevation desired for the completed line when placed on the guide frame.

b. Tightly sheet the pit and keep it dry at all times.

c. Provide adequate protective railings at the top of the pit at all times.

3. Jacking Frame: Design the jacking frame so that it applies a uniform pressure over the entire pipe wall area of the pipe to be jacked.

4. Reaction Blocks: Adequately design the reaction blocks to carry the thrust of the jacks to the soil without excessive soil deflection in a manner which avoids any disturbance of adjacent structures or utilities.

5. Hydraulic Jacks: Use hydraulic jacks in the jacking operation, and take extreme care to hold the casing pipe to exact line and grade.

6. Advance Excavation: Advance excavation by augering.

7. Casing Pipe: Furnish steel casing pipe, unless otherwise specified, conforming to ASTM A 139 with wall thicknesses and pipe diameters shown on the Plans. Provide full penetration butt welded pipe joints.

8. Fill Material: Use fill material, consisting of 1-1/4 pounds of Bentonite per gallon of water, during jacking to fill any voids between the casing pipe and the earth.

W. Erection:

1. Anchorage: Place anchorage of pipelines and appurtenances as shown or as ordered.

a. Accomplish anchorage by placing concrete to the dimensions shown between undisturbed earth and the fitting to be anchored.

2. Valve Setting: Erect valves carefully in their proper positions, free from all distortion and strain, with flanged, mechanical or push-on joints, and pack and leave in satisfactory operating condition.

3. Short Tunnel Construction: Joint pipes to be placed in short tunnels prior to being placed into position.

a. Place the pipe into position in a manner which keeps joints tight.

3.3 FIELD QUALITY CONTROL

A. Testing: Test pipelines in accordance with Section 01 45 50.

1. Test valves in place, as far as practicable, and correct any defects in valves or connections.

B. Inspection: Clean, inspect, and examine each piece of pipe and each fitting and special for defects before it is installed.

1. Cut away any lumps or projections on the face of the spigot end or the shoulder.

2. Do not use any cracked, broken, or defective pieces in the work.

3. If any defective piece should be discovered after having been installed, remove and replace this piece with a sound piece in a satisfactory manner at no increase in Contract Amount.

3.4 CLEANING

A. General: Thoroughly clean all pipe before it is laid and keep it clean until it is accepted in the completed work.

B. Removal of Materials: Exercise special care to avoid leaving bits of wood, dirt, and other foreign particles in the pipe. If any particles are discovered before the final acceptance of the work, remove and clean the pipe.

3.5 DISINFECTION

A. General: Disinfect all pipelines that are to carry potable water in accordance with Section 33 13 00.

3.6 SCHEDULE

A. For specific pipe material and classification information refer to the plans. Ductile Iron pipe shall follow Specification 40 05 16 Section 2.2.J.
1. Below grade pipe shall have cement-lined interior, exterior primer and exterior asphaltic coating. Pipe above grade shall have cement-lined interior, exterior primer, exterior asphaltic coating, and a compatible two (2) mil thickness finish coat that is to be field applied.

B. Definitions: Abbreviations used in the schedule are:

1. Pipe Materials:

a.	Al	Aluminum
b.	Br	Brass
c.	C	Concrete
d.	CI	Cast-iron
e.	CISP	Cast-iron soil pipe
f.	Cl	Clay
g.	CPVC	Chlorinated Polyvinyl Chloride
h.	CU	Copper
i.	DI	Ductile Iron
j.	PCCP	Prestressed Concrete Cylinder Pipe
k.	PE	Polyethylene
l.	PVC	Polyvinyl Chloride
m.	RCP	Reinforced Concrete Pipe

n.	RCPP	Reinforced Concrete Pressure Pipe
o.	SS	Stainless Steel
p.	St	Steel

2. Joints:

a.	B&S	Bell and Spigot
b.	F	Flanged
c.	G	Grooved End
d.	H	Harnessed
e.	HSC	Hub and Spigot - Compression Gasket
f.	HSL	Hub and Spigot - Lead and Oakum
g.	MJ	Mechanical Joint
h.	PO	Push-on Joint
i.	RRG	Restrained Retainer Gland
j.	RS	Rubber and Steel
k.	Sd	Soldered
l.	Sl	Sleeve Type Coupling
m.	SW	Solvent Welded
n.	W	Welded

3. Coatings and Linings:

a.	BC	Bituminous - Cold Application
b.	CE	Concrete Encased
c.	CL	Cement-Mortar Lined
d.	E	Epoxy
e.	G	Galvanized
f.	GL	Glass Lined
g.	I	Insulated
h.	KL	Polyvinylidene Fluoride (PVDF or KYNAR®)
i.	P	Painted
j.	PEW	Polyethylene Wrapped
k.	PPL	Polypropylene Lined
l.	RC	Rubber Coated
m.	RL	Rubber Lined
n.	SL	Polyvinylidene Chloride (PVDC or SARAN ®)
o.	TC	Tape Coated
p.	W	Wrapped

END OF SECTION

(NO TEXT FOR THIS PAGE)

SECTION 33 31 13 - SANITARY SEWER

PART 1 – GENERAL

1.1 SUMMARY

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years' documented experience.
B. Inspection on Delivery: Accept materials on site in manufacturer's original packaging and inspect for damage.
C. Storage:
    1. Store materials according to manufacturer instructions.
    2. Store valves in shipping containers with labeling in place.
D. Protection:
E. Block individual and stockpiled pipe lengths to prevent moving.
F. Provide additional protection according to manufacturer instructions.

1.2 Submittals

A. Product Data: Manufacturer’s product data sheets including installation details, material descriptions, dimensions of individual components and profiles, any testing certifications, and finishes.

PART 2 – PRODUCT

A. All manufacturers must be Build America Buy America (BABA compliant).
B. Plastic Pipe:
    1. Material: Polyvinyl Chloride (PVC).
    2. Comply with AWWA C900 and ASTM D2241-96b, unless otherwise specified.
    3. Inside Nominal Diameter: As shown on drawings.
    4. End connections: Bell and spigot style, with rubber-ring-sealed gasket joint.
    5. Fittings: PVC.
    6. Joints:
        i. Elastomeric Gaskets.
        ii. Comply with ASTM F477.
        iii. Comply with ANSI A 21.11.
C. Ductile Iron Pipe: Ductile iron sewer pipe shall meet the requirements of ANSI/AWWA C151/A21.51.
    1. The chemical constituents shall meet the physical property recommendations of ASTM A536.
    2. All pipe and fittings shall be cement-lined in accordance with ANSI/AWWA C104/A21.4, cement-mortar lining for ductile iron and gray iron pipe and fittings. Ductile iron pipe and fittings hall be coated on the outside with an asphaltic coating specified in AWWA C151/A21.51 and AWWA C110/A31.10.
    3. Ductile iron pipe joints shall be mechanical joint in accordance with AWWA C111 and ANSI 21.11. Where river crossing pipe is required, pipe joints shall be river crossing type meeting the requirements of AWWA C151.

i. Where ductile iron pipe is installed as force main, use restrained mechanical joints.

4. Pressure Class: Unless otherwise shown on the plans, the required pressure class shall be 350 psi.
5. Rubber gaskets, lubricants, glands, bolts, and nuts: Comply with AWWA C111.

D. HDPE Pipe: HDPE sewer pipe shall meet the requirements of AWWA C906. Pipe shall meet type III, Class B or C, Category 5, and Grade P34 per ASTM D1248.
   1. HDPE must have three equally spaced horizontal colored marking stripes. Green stripes shall be used for sanitary sewer pipe.
   2. Molded fittings shall be manufactured in accordance with ASTM D3261 and will be so marked. Each production lot of molded fittings will be subjected to the tests required under ASTM D3261.
   3. HDPE pipe may be joined by means of flange adapters with back-up rings or mechanical coupling adapters designed for joining polyethylene pipe or for joining polyethylene pipe to another material. Flange and mechanical joint adapters shall be made with sufficient through-bore length to be clamped in a butt fusion joining machine without the use of a stub-end holder. Adapter shall be made from the same resin as the pipe, the sealing surface of the adapters shall be machined with a series of small V-shaped grooves to provide gasketless sealing. Adapters will be rated for full test pressure. For flange adapters, provide a full face neoprene gasket, conforming to ANSI B16.21.

E. Tracer Wire
   1. A green-coated number 12 AWG copper tracer wire shall be installed the entire length of the HDPE and plastic piping.
   2. Tracer wire shall be extended into all valve vaults and valve boxes a minimum of 5 feet from each direction.
   3. Continuity of tracer wire shall be documented by testing prior to acceptance.

F. Flexible Couplings
   1. Manufacturers:
      i. Fernco, Inc.
      ii. Approved Equal.
   2. Description:
      i. Resilient chemical-resistant elastomeric polyvinyl chloride (PVC) coupling.
      ii. Attachment: Two stainless-steel clamps, screws, and housings.

PART 3 - EXECUTION

A. Sewer Installation:
   1. Install PVC pipe, fittings, and accessories according to ASTM D2321, and seal joints watertight.
   2. Install all buried HDPE pipe and fittings in accordance with the manufacturer's recommendations.
   3. Any pipe showing a distinct crack with no evidence of incipient fracture beyond the limits of the visible crack, if approved, may have the cracked portion cut off by, and at the expense of, the contractor before the pipe is laid so that the pipe used is perfectly

sound. The cut shall be made in the sound barrel at a point at least 12 inches from the visible limits of the crack.

4. Cutting of the gravity sewer pipe shall be done in a neat and workmanlike manner without damage to the pipe lining. Unless otherwise authorized by the engineer, all pipe cutting shall be done by means of an approved type of power cutter. The use of hammer and chisel, or any other method with results in rough edges, chipped or damaged pipe, is prohibited.
5. Lay pipe to slope gradients as indicated on drawings.
6. Maximum variation from indicated slope: 1/8 inch in 10 feet.
7. Each pipe section shall be placed into position in the trench in such a manner and by such means required to cause no injury to the pipe, persons, or to any property.
8. Begin at downstream end and progress upstream.
9. Assemble and handle pipe according to manufacturer's instructions, except as may be modified on drawings or by engineer.
10. Keep pipe and fittings clean until work has been completed and accepted by engineer.
11. Furnish slings, straps, and/or approved devices to provide satisfactory support of the pipe when it is lifted. Transportation from storage areas to the trench shall be restricted to operations which can cause no damage to the pipe or lining.
12. The pipe shall not be dropped from trucks onto the ground or into the trench.
13. Damaged pipe coating and/or lining shall be restored and approved by the engineer before installation.
14. Polyethylene wrap: wrap all ductile iron pipe in polyethylene wrap conforming to the requirements of ANSI A21.5.
15. Cap open ends during periods of work stoppage.
16. Lay bell and spigot pipe with bells upstream.
17. Do not displace or damage pipe when compacting.
18. Connect pipe to existing sewer system as shown on drawings.

B. Request inspection by owner or owner's representative prior to and immediately after placing bedding.

END OF SECTION

(NO TEXT FOR THIS PAGE)

SECTION 40 05 06 - COUPLINGS, ADAPTERS, AND SPECIALS FOR PROCESS PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pipe penetrations.
2. Restrained joints.
3. Flexible connections.
4. Expansion joints.
5. Expansion loops.
6. Sleeve-type couplings.

B. Related Requirements:

1. Section 07 92 00 - Joint Sealants: Sleeve sealant for pipe penetrations.
2. Section 40 05 07 - Hangers and Supports for Process Piping

1.2 DEFINITIONS

A. Firestopping (Through-Penetration Protection System): The sealing or stuffing material or assembly placed in spaces between and penetrations through building materials to arrest movement of fire, smoke, heat, and hot gases through fire-rated construction.

B. FM: Factory Mutual Insurance Company; FM Global is the communicative name of the company.

C. WH: Warnock Hersey; indicates compliance to relevant building codes, association criteria, and product safety and performance standards.

1.3 REFERENCE STANDARDS

A. American Water Works Association:

1. AWWA C219 - Bolted, Sleeve-Type Couplings for Plain-End Pipe.

B. American Welding Society:

1. AWS D1.1/D1.1M - Structural Welding Code - Steel.

C. ASME International:

1. ASME A13.1 - Scheme for the Identification of Piping Systems.

2. ASME B31.3 - Process Piping.
3. ASME B31.9 - Building Services Piping.
4. ASME Boiler and Pressure Vessel Code (BPVC), Section IX - Welding, Brazing, and Fusing Qualifications.

D. ASTM International:

1. ASTM B251 - Standard Specification for General Requirements for Wrought Seamless Copper and Copper-Alloy Tube
2. ASTM D2000 - Standard Classification System for Rubber Products in Automotive Applications.
3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
4. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
5. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems.
6. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems.

E. Expansion Joint Manufacturers Association, Inc.:

1. EJMA Standards.

F. NSF International:

1. NSF 61 - Drinking Water System Components - Health Effects.
2. NSF 372 - Drinking Water System Components - Lead Content.

G. UL:

1. UL 263 - Fire Tests of Building Construction and Materials.
2. UL 1479 - Fire Tests of Through-Penetration Firestops.
3. UL 2079 - Tests for Fire Resistance of Building Joint Systems.

1.4 COORDINATION

A. Coordinate Work of this Section with installation of valves and equipment.

1.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data:

1. Submit manufacturer catalog information for each specified product.
2. Firestopping: Submit data on product characteristics, performance, and limitation criteria.

3. Flexible Pipe Connectors: Indicate maximum temperature and pressure rating, face-to-face length, live length, hose wall thickness, hose convolutions per foot and per assembly, fundamental frequency of assembly, braid structure, and total number of wires in braid.
4. Expansion Joints: Indicate maximum temperature, pressure rating, and expansion compensation.

C. Shop Drawings:

1. Indicate restrained joint details and materials.
2. Submit layout drawings showing piece numbers and location, indicating restrained joint locations.
3. Indicate layout of piping systems, including flexible connectors, expansion joints and compensators, loops, offsets, and swing joints.

D. Firestopping Schedule: Submit schedule of opening locations and sizes, penetrating items, and required listed design numbers to seal openings for maintenance of fire-resistance rating of adjacent assembly.

E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
1. Provide a certification that all ductile iron products furnished are manufactured in the United States in accordance with Exhibit C of the Contract Documents.

F. Welder Certificates: Certify welders and welding procedures employed on Work, verifying AWS qualification within previous 12 months.

G. Delegated Design Submittals: Submit signed and sealed Shop Drawings with design calculations and assumptions for:

1. Flexible connectors.
2. Expansion joints.
3. Pipe Restraints:

a. Determine restrained lengths and submit joint restraint details.
b. Use joint restraint devices specifically designed for applications as described in manufacturer data.

4. Firestopping Engineering Judgments: For conditions not covered by UL- or WH-listed designs, submit judgments by licensed professional engineer suitable for presentation to authority having jurisdiction to accept as meeting fire-protection code requirements.

H. Manufacturer Instructions: Submit special procedures and setting dimensions.

I. Source Quality-Control Submittals: Indicate results of factory tests and inspections.

J. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

K. Qualifications Statements:

1. Submit qualifications for manufacturer, installer, and licensed professional.
2. Submit manufacturer's approval of installer.
3. Welders: Qualify procedures and personnel according to AWS D1.1/D1.1M.

1.6 CLOSEOUT SUBMITTALS

A. Section 01 73 00 “Execution” and Section 01 77 00 “Closeout Procedures”: Requirements for submittals.

B. Project Record Documents: Record actual locations of piping appurtenances.

C. Identify and describe unexpected variations to pipe routing.

1.7 QUALITY ASSURANCE

A. Materials in Contact with Potable Water: Certified to NSF Standards 61 and 372.

B. Perform Work according to ASME B31.9 for installation of piping systems and according to AWS D1.1/D1.1M for welding materials and procedures.

C. Perform Work according to ASME B31.9 and as specified in Division 33 for installation of underground piping systems.

D. Through-Penetration Firestopping of Fire-Rated Assemblies:

1. Comply with ASTM E 814.
2. Minimum Positive Pressure Differential: 0.1-inch wg to achieve fire F-ratings and temperature T-ratings as indicated on Drawings, but not less than one hour.
3. Wall Penetrations: Fire F-ratings as indicated on Drawings, but not less than one hour.
4. Floor and Roof Penetrations:

    a. Fire F-ratings and Temperature T-ratings: As indicated on Drawings, but not less than one hour.
    b. Floor Penetrations within Wall Cavities: T-rating is not required.

E. Through-Penetration Firestopping of Non-fire-rated Floor and Roof Assemblies:

1. Materials to resist free passage of flame and products of combustion.
2. Noncombustible Penetrating Items: Noncombustible materials for penetrating items connecting maximum of three stories.
3. Penetrating Items: Materials approved by authorities having jurisdiction for penetrating items connecting maximum of two stories.

F. Fire-Resistive Joints in Fire-Rated Floor, Roof, and Wall Assemblies:

1. Comply with ASTM E 1966.
2. Rating: As indicated on Drawings for assembly in which joint is installed.

G. Fire-Resistive Joints between Floor Slabs and Exterior Walls:

1. Comply with ASTM E 119.
2. Minimum Positive Pressure Differential: 0.1-inch wg to achieve fire-resistance rating as indicated on Drawings for floor assembly.

H. Surface-Burning Characteristics: Maximum 25/450 flame-spread/smoke-developed index when tested according to ASTM E 84.

I. Maintain one copy of each standard affecting Work of this Section on Site.

1.8 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.

B. Installer: Company specializing in performing Work of this Section with minimum three years' documented experience and approved by manufacturer.

C. Welders: AWS qualified within previous 12 months for employed weld types.

D. Licensed Professional: Professional engineer experienced in design of specified Work and licensed in State of Indiana.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

C. Store materials according to manufacturer instructions.

D. Protection:

1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
2. Furnish temporary end caps and closures on piping and fittings and maintain in place until installation.
3. Provide additional protection according to manufacturer instructions.

1.10 EXISTING CONDITIONS

A. Field Measurements:

1. Verify field measurements prior to fabrication.

2. Indicate field measurements on Shop Drawings.

1.11 WARRANTY

A. Section 01 77 00 “Closeout Procedures”: Submittal of Project Warranties.

B. Furnish five-year manufacturer's warranty for products covered in this Section.

PART 2 - PRODUCTS

2.1 All manufacturers shall be Build America Buy America (BABA) compliant.

2.2 PIPE PENETRATIONS

A. Performance and Design Criteria:
1. Firestopping Materials:

a. Comply with ASTM E119 and ASTM E814 to achieve fire ratings as indicated on Drawings for adjacent construction, but not less than one hour.
b. Ratings may be three hours for firestopping in through-penetrations of four-hour fire-rated assemblies, unless otherwise required by applicable codes.

2. Firestop interruptions to fire-rated assemblies, materials, and components.
3. Firestopping: Provide certificate of compliance from authority having jurisdiction, indicating approval of materials used.

B. Sleeves:

1. Sleeves for Pipes through Non-fire-rated Floors:

a. Material: Galvanized steel.
b. Thickness: 18 gage.

2. Sleeves for Pipes through Non-fire-rated Beams, Walls, Footings, and Potentially Wet Floors:

a. 18-gage galvanized steel.

3. Sealant:

a. As specified in Section 07 92 00 - Joint Sealants.

C. Mechanical Sleeve Seals:

1. Manufacturers:

a. GPT Industries
b. Approved Equal.

2. Description:

a. Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between object and sleeve.
b. Connection: Bolts and pressure plates causing rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.

2.3 RESTRAINED JOINTS

A. As specified in the Contract Documents.

2.4 EXPANSION JOINTS

A. Manufacturers:

1. Metraflex.

2. Proco.

3. Or-equal.

B. Performance and Design Criteria:

1. Bellow Design: According to Section C of EJMA Standards.

2. Flexible pump connectors/expansion joints shall be of the molded twin spherical type reinforced with an external root ring between spheres. Neoprene and nylon construction with internal steel wire, molded within the raised face ends, for added strength. Pressure rated for 225 psi at 240°F, with a minimum 4 to 1 safety factor. Flanges shall be one-piece, free-floating, class 150 galvanized plate steel type with tapped or drilled holes as required. Control Units must be furnished in unanchored applications, or as recommended by the manufacturer. Connectors shall be “Double-sphere” as specified by the manufacturer.

C. Pipe Expansion Joints

1. Provide expansion joints that are of the single arch short type with flanged ends. Fabricate the body of EPDM rubber and reinforced with steel wire for strength. Provide full-pattern flanges drilled to mate with ANSI 125/150 flanges.

2.5 SLEEVE-TYPE COUPLINGS

A. Manufacturers:

1. Dresser.
2. Or-equal.

B. Description:

1. Comply with AWWA C219.
2. Gaskets:

a. Material: EPDM.
b. Comply with ASTM D2000.

3. Bolts: Stainless Steel.

C. Finishes:

1. Buried Couplings: Factory epoxy coated.

2.6 INSULATION

A. As indicated on Drawings.

2.7 FINISHES

A. Prepare piping appurtenances for field finishes as specified in Section 09 96 00, High Performance Coatings.

2.8 SOURCE QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Requirements for testing, inspection, and analysis.

1. Provide shop inspection and testing of completed assemblies.

B. Owner Inspection:

1. Notify Owner at least seven days before inspection is allowed.

C. Owner Witnessing:

1. Allow witnessing of factory inspections and test at manufacturer's test facility.
2. Notify Owner at least seven days before inspections and tests are scheduled.

D. Certificate of Compliance:

1. If manufacturer is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at manufacturer's facility conforms to Contract Documents.
2. Specified shop tests are not required for Work performed by approved manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 73 00 - Execution: Examination.

B. Verify that field dimensions are as indicated on Drawings and Shop Drawings.

C. Verify that openings are ready to receive sleeves and firestopping.

D. Verify that pipe plain ends to receive sleeve-type couplings are smooth and round for 12 inches from pipe ends.

E. Verify that pipe outside diameter conforms to sleeve manufacturer's requirements.

3.2 PREPARATION

A. Section 01 73 00 - Execution: Preparation.

B. Cleaning: Thoroughly clean end connections before installation.

C. Close pipe and equipment openings with caps or plugs during installation.

D. Surface Preparation: Clean surfaces to remove foreign substances.

3.3 INSTALLATION

A. Section 01 73 00 - Execution: Installation.

B. According to ASME B31.9.

C. Coating: Finish piping appurtenances as specified in Section 09 96 00, High Performance Coatings, for service conditions.

D. Pipe Penetrations:

1. Sleeves:

a. Exterior Watertight Entries: Seal with mechanical sleeve seals.
b. Set sleeves in position in forms and provide reinforcement around sleeves.
c. Size sleeves large enough to allow for movement due to expansion and contraction and provide for continuous insulation wrapping.
d. Extend sleeves through floors 1 inch above finished floor level and caulk sleeves.
e. Where piping penetrates floor, ceiling, or wall, close off space between pipe and adjacent Work with stuffing insulation and caulk airtight.

E. Firestopping:

1. Install material at fire-rated construction perimeters and openings containing penetrating sleeves, piping, and other items requiring firestopping.
2. Apply primer where recommended by manufacturer for type of firestopping material and substrate involved, and as required for compliance with required fire ratings.
3. Apply firestopping material in sufficient thickness and to uniform density and texture to achieve required fire and smoke rating.
4. Placement: Compress fibered material to maximum 40 percent of its uncompressed size.
5. Fire-Rated Surfaces:

    a. Seal opening at floor, wall, ceiling, and roof.
    b. Install sleeve through opening and extend beyond minimum of 1 inch on both sides of building element.
    c. Size sleeve, allowing minimum of 1-inch void between sleeve and building element.
    d. Pack void with backing material.
    e. Seal ends of sleeve with UL-listed, fire-resistive silicone compound to meet fire rating of structure penetrated.

6. Non-rated Surfaces:

    a. Seal opening through non-fire-rated floor, wall, ceiling, and roof.
    b. Install sleeve through opening and extend beyond minimum of 1 inch on both sides of building element.
    c. Size sleeve to allow minimum of 1 inch void between sleeve and building element.
    d. Install type of firestopping material recommended by manufacturer.
    e. Occupied Spaces:

        1) Where conduit penetrates non-fire-rated surfaces in occupied spaces, Link-Seal penetrations.
        2) Occupied spaces include rooms with finished ceilings and rooms where penetration occurs below finished ceiling.

    f. Exterior Wall Openings below Grade: Assemble rubber links of mechanical sealing device to size of piping and tighten in place according to manufacturer instructions.
    g. Interior Partitions:

        1) Seal pipe penetrations at laboratories, and electrical rooms.
        2) Link-Seal penetration to completely fill annular space between sleeve and conduit.

F. Restrained Joints: As specified in the Contract Documents.

G. Flexible Connections: Install flexible couplings at connections to equipment and where indicated on Drawings.

H. Expansion Joints:

1. Install flexible couplings and expansion joints at connections to equipment and where indicated on Drawings.
2. If expansion joint is supplied with internal sleeve, indicate flow direction on outside of joint.

I. Air Releases: Provide air release valves as indicated on Drawings.

J. Insulation: As indicated on Drawings.

K. Disinfection: Disinfect potable water piping as specified in Division 33.

3.4 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Requirements for inspecting and testing.

B. After installation, inspect for proper supports and interferences.

C. Repair damaged coatings with material equal to original coating.

3.5 CLEANING

A. Section 01 77 00 - Closeout Procedures: Final cleaning.

B. Keep equipment interior clean as installation progresses.

END OF SECTION

(NO TEXT ON THIS PAGE)

SECTION 40 05 07 - HANGERS AND SUPPORTS FOR PROCESS PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes requirements for pipe hangers and supports, hanger rods, structural attachments, pipe guides, and formed steel channels.

B. Related Requirements:

1. Section 03 10 00 - Concrete Formwork.
2. Section 03 30 00 - Cast-in-Place Concrete.
3. Section 09 96 00 - High Performance Coatings.

1.2 REFERENCE STANDARDS

A. American Society of Mechanical Engineers:

1. ASME B31.1 - Power Piping.
2. ASME B31.9 - Building Services Piping.

B. ASTM International:

1. ASTM A36 - Standard Specification for Carbon Structural Steel.
2. ASTM A47 - Standard Specification for Ferritic Malleable Iron Castings.
3. ASTM A576 - Standard Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality.
4. ASTM A181 - Standard Specification for Carbon Steel Forgings, for General-Purpose Piping.

C. American Welding Society:

1. AWS D1.1 - Structural Welding Code Steel - Reference Manual.

D. Manufacturers Standardization Society of the Valve and Fittings Industry:

1. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacturer, Selection, Application, and Installation.

1.3 COORDINATION

A. Coordinate Work of this Section with piping and equipment connections specified in the Drawings and other Sections.

1.4 SUBMITTALS

A. Section 01 33 00 “Submittal Procedures”.

B. Product Data: Submit manufacturer's catalog data including load capacity.

C. Shop Drawings: Indicate system layout with location - including critical dimensions, sizes, and pipe hanger and support locations - and detail of trapeze hangers, anchors, and guides.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Welders' Certificate: Submit welders' certification of compliance with ASME Section IX AWS D1.1, verifying qualification within previous 12 months.

F. Delegated Design Submittals:

1. Submit signed and sealed Shop Drawings with design calculations and assumptions for load carrying capacity of trapeze, multiple pipe, and riser support hangers.
2. Indicate calculations used to determine load carrying capacity of trapeze, multiple pipe, and riser support hangers.
3. Submit sizing methods and calculations sealed by a registered professional engineer.

G. Manufacturers' Instructions: Submit special procedures and assembly of components.

H. Qualifications Statements:

1. Submit qualifications for manufacturer, fabricator, installer, and licensed professional.
2. Submit manufacturer's approval of installer.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Section 01 77 00 “Closeout Procedures”.

B. Spare Parts:

1. Furnish one set of manufacturer's recommended spare parts.

C. Tools: Furnish special wrenches and other devices required for Owner to maintain equipment.

1.6 QUALITY ASSURANCE

A. Perform Work according to applicable authority (AWS D1.1) for welding hanger and support attachments to building structure.

B. Perform Work according to local, State and Federal standards.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this Section with minimum 3 years documented experience.

B. Fabricator: Company specializing in fabricating products specified in this Section with minimum 3 years documented experience.

C. Installer: Company specializing in performing Work of this Section with minimum 3 years documented experience and approved by Manufacturer.

D. Licensed Professional: Professional Engineer experienced in design of specified Work and licensed in the State of Indiana.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 “Product Requirements”.

B. Inspection: Accept materials on-site in original factory packaging, labeled with manufacturer's identification.

C. Protect products from weather and construction traffic, dirt, water, chemical, and damage by storing in original packaging.

1.9 AMBIENT CONDITIONS

A. Section 01 50 00 “Temporary Facilities and Controls”.

B. Provide ventilation in areas receiving solvent-cured materials.

1.10 EXISTING CONDITIONS

A. Field Measurements: Verify field measurements prior to fabrication. Indicate field measurements on Shop Drawings.

1.11 WARRANTY

A. Section 01 77 00 “Closeout Procedures”.

PART 2 - PRODUCTS

2.1 PIPE HANGERS AND SUPPORTS

A. Description:

1. Conform to ASME B31.9 and MSS SP58.
2. Provide means of vertical adjustment after erection.
3. Pipe Sizes 1/2 to 1-1/2 in: ASTM A36, steel, adjustable swivel, split ring.
4. Pipe Sizes 2 in and Larger: ASTM A36, steel, adjustable, clevis.
5. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
6. Wall Support for Pipe Sizes 3 in and Smaller: Cast iron J-hook.
7. Wall Support for Pipe Sizes 4 in and Larger: Welded steel bracket.
8. Vertical Support: Riser clamp.
9. Floor Supports: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

B. Performance and Design Criteria:

1. Pipe Hangers:

    a. Allow for expansion and contraction of piping while eliminating undue stress on piping appurtenances and equipment.
    b. Provide linkage to permit lateral or axial movement where anticipated.
    c. Where horizontal pipe movement is greater than 1/2 in, or where hanger rod deflection from the vertical is greater than 4 degrees from cold to hot position of pipe, hanger rod and structural attachment shall be offset to maintain rod vertical in hot position.

2. Heat Transmission: Design supports, hangers, anchors, and guides to prevent excessive heat from being transmitted to building structure, equipment, or piping appurtenances.
3. Riser Supports: Support risers on each floor with riser clamps and lugs, independent of connected horizontal piping.
4. Point Loads:

    a. Support plastic piping containing meters, valves, appurtenances, and other point loads on both sides.
    b. Avoid point loads on plastic piping by providing extra wide pipe saddles or stainless steel shields.

2.2 HANGER RODS

A. Hanger Rods:

1. ASTM A576, steel.
2. All-thread.
3. Diameter: ASME B31.1; as indicated on Drawings.

2.3 STRUCTURAL ATTACHMENTS

A. Concrete Inserts:

1. Description:

    a. Malleable iron case of stainless steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms.
    b. Size inserts to suit threaded hanger rods.

B. Mounting Brackets: ASTM A36, welded steel.

C. Beam Clamps:

1. ASTM A36, steel; MSS SP-58.
2. Clamp Size: Based on load to be supported and load configuration.
3. Anchoring: Locknuts and cup-point set screws.
4. Reversible top or bottom flange.

D. Riser Clamps:

1. ASTM A36, steel.

E. Offset Clamps:

1. Double leg, two-piece.

2.4 PIPE GUIDES

A. Intermediate Guides:

1. Pipes 6 in and Smaller: Pipe clamp with oversize pipe sleeve.
2. Pipes 8 in and Larger: U-bolts with double nuts.

B. Alignment Guides:

1. Pipes 8 in and Smaller: Stainless steel type.
2. Pipes 10 in and Larger: Stainless steel type.

2.5 FORMED STEEL CHANNEL

A. Description:

1. Stainless 12-gage -thick steel.
2. Include holes 1-1/2 in o.c.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify field dimensions as indicated on Shop Drawings.

3.2 INSTALLATION

A. Do not drill or cut structural members.

B. Inserts:

1. Install inserts for placement in concrete forms.
2. Install inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe 4 in and larger.
4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut flush with top of slab.

C. Pipe Hangers and Supports:

1. Install according to: ASME 31.9 and MSS SP 58.
2. Support horizontal piping as indicated on Drawings.
3. Install hangers with minimum 1/2 in space between finished covering and adjacent Work.
4. Place hangers within 12 in of each horizontal elbow.
5. Use hangers with 1-1/2 in minimum vertical adjustment.
6. Support horizontal cast iron pipe adjacent to each hub, with 5ft maximum spacing between hangers.
7. Support vertical piping at every floor. Support vertical cast iron pipe at each floor at hub.
8. Where piping is installed in parallel and at same elevation, provide multiple pipe or trapeze hangers.
9. Support riser piping independently of connected horizontal piping.
10. Design hangers for pipe movement without disengagement of supported pipe.
11. Support piping independently so that equipment is not stressed by piping weight or expansion in piping system.
12. Provide welded steel brackets where piping is to be run adjacent to building walls or columns.
13. Use beam clamps where piping is to be suspended from building steel.
14. Insulated Piping: Provide two bolted clamps designed to accommodate insulated piping.
15. Use offset clamps where pipes are indicated as offset from wall surfaces.
16. Do not exceed the following spacings when designing and installing the pipe support systems:

Type of Pipe and Diameter	Maximum Spacing (ft)
Steel	
10 inch and larger	20
8 inch	18
6 inch	16
4 inch	14
2 inch and smaller	10
Ductile Iron or PVC	
20 inch and larger	18
14 to 18 inch	16
10 to 12 inch	14
6 to 8 inch	12
3 to 4 inch	10
2 inch and smaller	6

17. Where piping of various sizes are to be supported together, space supports for smallest pipe size or install immediate supports for the smaller pipe diameter.
18. Provide minimum of two (2) pipe supports for each pipe run.
19. Where piping connects to equipment, support by pipe support and not be equipment, unless approved by equipment manufacturer.
20. Support piping to prevent undue strain on valves, fittings, or equipment. Provide pipe supports at changes in direction or elevation, adjacent to flexible couplings, adjacent to nonrigid joints, and where otherwise shown. Do not install pipe supports and hangers in equipment access areas.

D. Insulation:

1. Provide clearance in hangers and from structure and other equipment for installation of insulation.

E. Equipment Bases and Supports:
1. Provide housekeeping pads as detailed on Drawings.
2. Using templates furnished with equipment, install threaded rod anchor bolts and accessories for mounting and anchoring equipment.
3. Construct supports of steel members. Brace and fasten with flanges bolted to structure.
4. Provide rigid anchors for pipes after vibration isolation components are installed.

F. Prime Coat:

1. Prime coat exposed steel hangers and supports.
2. Conform to Section 09 96 00 “High Performance Coatings”.
3. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

END OF SECTION

(NO TEXT FOR THIS PAGE)

SECTION 40 05 16 – DUCTILE IRON PIPE AND FITTINGS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Requirements for providing ductile-iron pipe, fittings and appurtenances, except soil pipe.
   1. Provide ductile-iron pipe and fittings complete with all necessary jointing facilities and materials, specials, adapters and other appurtenances required for installation in and completion of the pipelines to be constructed.
   2. Provide flanged mechanical joint pipe sizes and classes shown or specified.

B. Related Work Specified In Other Sections Includes, But is Not Limited to, the Following:
   1. Section 09 96 00 - High Performance Coatings

1.2 REFERENCES

A. Codes and standards referred to in this Section are:

1. AWWA C104/A21.4 - Cement-Mortar Lining for Ductile-Iron and Gray-Iron Pipe and Fittings for Water AWWA C104/A21.4

2. AWWA C105/A21.5 - Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids AWWA C105/A21.5

3. AWWA C110/A21.10 - Ductile-Iron and Gray-Iron Fittings 3 inches through 48 inches, for Water and Other Liquids AWWA C110/A21.10

4. AWWA C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings AWWA C111/A21.11

5. AWWA C115/A21.15 - Flanged Ductile-Iron and Gray-Iron Pipe with Threaded Flanges AWWA C115/A21.15

6. AWWA C151/A 21.51 - Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water and Other Liquids AWWA C151/A21.51

7. AWWA C153/A21.53 - Ductile-Iron Compact Fittings, 3 inches through 12 inches, for Water and Other Liquids AWWA C153/A21.53

8. AWWA C606 - Grooved and Shouldered Type Joints AWWA C606

9. ASTM A 307 - Specification for Carbon Steel bolts and Studs

1.3 SYSTEM DESCRIPTION

A. Design Standards: Provide ductile-iron pipe meeting the requirements of AWWA C 151/A21.51.

1. Place pipe in structures using a minimum wall thickness of Thickness Class 52 for sizes up to and including 12-inch diameter and Thickness Class 51 for larger sizes, except provide Thickness Class 53 for pipe with threaded flanges or grooved-type joints.

2. Construct concrete encasement where shown.

1.4 SUBMITTALS

A. General: Provide all submittals, including the following, as specified in Division 1.

B. Submit the following shop drawings:

1. Pipe joints and fittings, sleeves, cleanouts and couplings. Where special designs or fittings are required, show the Work in large detail and completely describe and dimension all items.

2. Fully dimensioned layout of pipes, fittings, couplings, sleeves, cleanouts, expansion joints, harnessing, valves, supports, anchors and equipment. Label pipe size, materials, type, and class on drawings and include schedule.

3. Cross sections showing elevations of cleanouts, pipes, fittings, couplings, sleeves, valves, supports, anchors and equipment.

4. Catalog data for pipe, fittings, couplings, sleeves, harnessing and cleanouts.

C. Quality Controls: Submit certificates of compliance for pipe, fittings, gaskets, lining, polyethylene encasement, coatings, specials, couplings, sleeves and cleanouts in accordance with this Section.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle all pipe, fittings and couplings as specified in Division 1.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable manufacturers are listed below. Manufacturers of equivalent product may be submitted.

1. Ductile-iron pipe and fittings.

a. American Cast Iron Pipe Company
b. McWane Incorporated
c. United States Pipe and Foundry

2. Ductile-iron retainer glands.

    a. 3-inch through 24-inch diameter
        (1) Nappco, Inc. Series 1246
        (2) Ebba Iron, Inc., Series 100

    b. larger than 24-inch diameter
        (1) Ebba Iron, Inc., Megalug

3. Sleeve-type couplings.

    a. 12-inches in diameter and smaller
        (1) Dresser Industries, Style 153
        (2) Smith-Blair, Type 441 Omni Coupling System

    b. larger than 12-inches in diameter
        (1) Dresser Industries, Style 38
        (2) Smith-Blair, Type 411

    c. Gaskets.
        (1) Dresser Plain Grade 27
        (2) Smith-Blair 003

4. Restrained push-on joints.

    a. U.S. Pipe, TR Flex
    b. McWane Incorporated, Super-Lock
    c. American Cast Iron Pipe Company, Lok-Ring or Flex-Ring

5. Gaskets.

    a. John Crane, Inc.
    b. Garlock Packing Company
    c. U.S. Rubber Company
    d. American Cast Iron Pipe Company
    e. United States Pipe and Foundry
    f. McWane Incorporated

6. Coatings and Linings

    a. Kop-coat
    b. Tnemec
    c. American Cast Iron Pipe Company
    d. United States Pipe and Foundry

2.2 MATERIALS

A. FITTINGS:

1. GENERAL: PROVIDE ALL FITTINGS MEETING THE REQUIREMENTS OF ANSI A21.10, UNLESS SHOWN OR SPECIFIED OTHERWISE. FITTINGS 14 INCHES AND LARGER REQUIRE A PRESSURE RATING OF 250 PSI, OR AS SPECIFIED, WHICHEVER IS GREATER.

2. FLANGED: WHERE LONG RADIUS FLANGED FITTINGS AND OTHER FLANGED FITTINGS NOT COVERED IN ANSI A21.10 ARE SHOWN OR INDICATED, PROVIDE ITEMS MEETING THE REQUIREMENTS OF ANSI A21.10 AND HAVING LAYING LENGTHS CONFORMING TO ANSI B16.1 FOR 350 PSI AMERICAN STANDARD FITTINGS.

3. NONFLANGE: WHERE COMPACT MECHANICAL JOINT OR RUBBER GASKET JOINT FITTINGS ARE SHOWN OR INDICATED, PROVIDE ITEMS MEETING THE REQUIREMENTS OF AWWA C153/A21.53.

B. Flanged Joints

1. Threaded Flanges: Provide threaded, ductile-iron, long hub flanges meeting the requirements of AWWA C115/A21.15.

   a. Screw flanges pipe on the threaded end of the pipe in the shop.

   b. Reface the face of the flange and the end of the pipe together.

   c. Design the flanges to prevent corrosion of the threads from the outside and to prevent leakage through the pipe threads.

2. Facing and Drilling: Provide flanges faced and drilled to the requirements of AWWA C115/A21.15, unless special drilling is called for or required. Face flange accurately at right angles to the pipe axis. Drill flanges smooth and true, and cover machined faces with zinc dust and tallow or equivalent material.

3. Taps: Tap flanges where tap or stud bolts are required.

4. Fasteners: Provide bolts, stud bolts, and nuts meeting the requirements of ASTM A 307, Grade B.

5. Gaskets: Provide full-face gaskets for flanged joints on 12-inch diameter and smaller pipe and gaskets of the ring type for flanged joints on larger pipe. Provide flange gaskets meeting the requirements of AWWA C115/A21.15 except make gaskets for gas lines with neoprene and aramid.

C. Rubber Gasket Joints

1. Provide mechanical joints and push-on type joints meeting the requirements of AWWA C111/A21.11.

D. Harnessing

1. General: For ductile-iron pipe and fittings with mechanical joints that require harnessing, provide ductile-iron mechanical joint retainer glands.

2. Joint Assemblies: Design the joint assemblies to resist pullout of the joints at the test pressures specified.

E. Wall Pipes and Sleeves

1. Wall Pipes

a. Where wall pipes are shown or specified, provide ductile iron wall pipes that meet the requirements of AWWA C110/A21.10 with end connections that are 1) of the types shown and 2) flush with the surfaces of the walls or floors. Unless otherwise shown or specified, provide wall pipes with intermediate collars located at the centers of the walls or floors.

2. Sleeves

a. Where pipes pass through exterior walls or floors or wetted interior walls or floors of structures and where wall pipes are not to be provided, provide ductile-iron sleeves meeting the requirements of AWWA C110/A21.10, with ends that are flush with the wall or floor surfaces and with intermediate collars located at the centers of the walls or floors. Unless noted otherwise on the plans, ductile iron sleeves per AWWA C110/A21.10 are acceptable for above-grade and exposed process piping.

b. Where pipes pass through non-wetted interior walls or floors and where wall pipes are not to be provided, provide ductile-iron sleeves meeting the requirements of AWWA C110/A21.10; steel pipe sleeves meeting the requirements of Section 40 05 17 or as shown or specified otherwise. Provide sleeves with ends that are flush with the wall or floor surfaces. Where shown or specified, provide intermediate collars located at the centers of the walls or floors.

c. Provide sleeves having large enough diameters to accommodate the passage of pipe joints, if required.

d. Where shown or specified, provide modular, mechanical sleeve seals, meeting the requirements in Section 40 05 18, in the annular spaces between pipes and sleeves. In all other locations, see drawings for details.

F. Sleeve-Type Couplings

1. General: Manufacture middle rings to the following sizes.

a. At least 1/4 inch thick and 5 inches wide for 8-inch diameter and smaller pipe.

b. 3/8 inch thick and 7 inches wide for 10- through 30-inch diameter pipe.

c. 1/2 inch thick and 10 inches wide for 36-inch diameter and larger pipe.

2. Design: Manufacture middle rings without a pipe stop. Provide follower rings of proper thickness. Provide molded rubber gaskets.
3. Refer to Specification 40 05 06 Couplings, Adapters, and Specials for Process Piping for additional information.

G. Cleanouts

1. General: Provide cleanouts where shown or specified.

2. Size: Provide not less than 6 inch diameter cleanout openings for pipe 8 inches in diameter or larger. Provide cleanout openings for pipe 6 inches in diameter or smaller of the same diameter as the pipe.

3. Cleanout Covers: Provide cleanout covers which are blind flanges meeting the requirements of AWWA C110/A21.10, except where conformation is required with the inside curvature of the pipeline, in which case the covers are flanged plugs of proper shape with American Standard flange drilling.

a. Fasten covers by means of steel studs and bronze nuts. Drill and tap covers for a 1-1/2-inch diameter pipe connection.

4. Plugs: Equip the flange of conformed plugs with a dowel or other suitable means to provide proper setting.

H. Connecting Pieces, and Special Fittings

1. Connecting Pieces: Provide connecting pieces, such as bell and bell, bell and spigot, bell and flange, flange and flange, flange and spigot, and flange and flare, meeting the requirements of AWWA C110/A21.10.

2. Special Fittings : Provide special fittings, where required, of an approved design that have the same diameters and thicknesses as standard fittings, unless otherwise required, but their laying lengths and other functional dimensions are determined by their positions in the pipeline and by the particular piping materials to which they connect.

I. Temporary Bulkheads: Provide temporary bulkheads at the ends of pipeline sections where adjoining pipelines have not been completed and are not ready to connect.

1. Removal: Remove all temporary bulkheads when they are no longer needed.

J. Coatings and Linings

1. Cement Lining: Provide all ductile-iron pipe and fittings having a cement-mortar lining not less than standard thickness meeting the requirements of ANSI A21.4, unless shown or specified otherwise.

2. Exterior Primer: Shop coat ductile-iron pipe and fittings on the outside with one coat of Kop-Coat 340 Gold Primer, 2.0 mils minimum dry thickness, for use in exposed locations, such as inside buildings, where finish painting or insulating is required.

3. Asphaltic Coating: Coat pipe ~~for use not exposed to view~~ with the standard asphaltic outside coating specified in AWWA C151/A21.51.

4. Encased Pipe: Do not coat or paint the outside of fittings and pipe which are to be encased in concrete where watertightness is to be obtained.

5. Labels: Paint the weight and class designation conspicuously in white on the outside of each pipe, fitting, and special casting after the shop coat has hardened.

6. Grooved-type Couplings: Shop coat couplings with Kop-Coat 340 Gold Primer, 2.0 mils minimum dry thickness.

7. Flange Joints: Immediately after facing and drilling, coat the back of the flanges and bolt holes with asphaltic coating meeting the requirements of AWWA C151/A21.51, Section 51-8.1.

8. Sleeve-type Couplings:

a. Shop coat couplings with Dresser Industries Red D or Smith-Blair Standard Blue shop coat.

b. Provide an additional shop coat of Kop-Coat Hi-Guard epoxy or Tnemec Pota-pox on the interior of the middle ring.

c. Finish coat exterior of sleeve-type coupling after installation with the same coating specified in Section 09 96 00 for the pipeline of which it is a part.

d. Ensure shop coats and finish coats are compatible.

e. Refer to Specification 40 05 06 for additional information.

K. Drip Pans: Provide drip pans constructed of 16-gauge Type 304 stainless steel.

PART 3 EXECUTION

3.1 INSTALLATION

A. General: Install all ductile-iron pipe and fittings in accordance with the manufacturer's recommendations and approved shop drawings and as specified in Division 1.

B. Insulation: Where shown or specified provide insulation, as specified in Section 40 42 00, for pipes and fittings that are exposed to atmosphere after installation.

C. Drip Pans: Provide drip pans under all ductile-iron pipelines installed over electrical equipment and motors and properly connect to the drainage system with 3/4-inch red brass pipe. Make leak tight connection between the drip pan and the drain pipe. Pitch pans uniformly toward the drain pipe not less than 1/8-inch per lineal foot.

3.2 LEAKAGE TESTING

A. Cleaning: Flush clean and test all pipes after installation.

B. Testing: Test pipes for leaks and repair or tighten as required.

C. Procedures: Conduct tests in accordance with Section 01 45 50.

END OF SECTION

SECTION 40 05 18 – MISCELLANEOUS PIPE AND FITTINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Requirements for providing miscellaneous pipe and fittings as indicated. Miscellaneous pipe and fittings include all aluminum, copper, brass, plastic, cast-iron soil and lined steel pipe and fittings.

B. Related Work Specified In Other Sections Includes, But is Not Limited to, the Following:

1. Section 09 96 00 - High Performance Coatings

2. Section 40 05 16 - Ductile Iron Pipe and Fittings

1.2 REFERENCES

A. Codes and standards referred to in this Section are:

1. ASTM A 74 - Specification for Cast Iron Soil Pipe and Fittings

2. ASTM B 26/B26M - Aluminum Alloy Sand Castings

3. ASTM B 32 - Specification for Solder Metal

4. ASTM B 42 - Specification for Seamless Copper Pipe, Standard Sizes

5. ASTM B 43 - Specification for Seamless Red Brass Pipe, Standard Sizes

6. ASTM B 108 - Specification for Aluminum Alloy Permanent Mold Castings

7. ASTM B 241 - Specification for Aluminum and Aluminum Alloy Seamless Pipe and Seamless Extruded Tube

8. ASTM C 564 - Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings

9. ASTM D 1784 - Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds

10. ASTM D 1785 - Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120

11. ASTM D 2464 - Specification for Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80

12. ASTM D 2564 - Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems

13. ASTM D 2855 - Recommended Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings

14. ASTM F 491 - Specification for Poly (Vinylidene Fluoride) (PVDF) Plastic-Lined Ferrous Metal Pipe and Fittings

15. ASTM F 492 - Specification for Propylene and Polypropylene (PP) Plastic-Lined Ferrous Metal Pipe and Fittings

16. ASTM F 599 - Specification for Poly (Vinylidene Chloride) (PVDC) Plastic-Lined Ferrous Metal Pipe and Fittings

17. ASME B1.20.1 - Screw Threads - Pipe Threads, General Purpose (Inch)

18. ASME B16.15 - Cast Bronze Threaded Fittings, Classes 125 and 250 (Includes Revisions Service)

19. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings (Includes Revision Service)

20. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fitting (Includes Revision Service)

21. ASME - Boiler and Pressure Vessel Codes, Section IX - Qualification Standard for Welding and Brazing Procedures, Welders, Brazers, and Welding and Brazing Operators.

22. AWWA C151/A21.51 - Ductile-Iron Pipe Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids

23. CISPI 301 - Hubless Cast Iron Sanitary System

24. CISPI 310 - Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications

25. AWS A5.8 - Brazing Filler Metal

1.3 SUBMITTALS

A. General: Provide all submittals, including the following, as specified in Division 1.

B. Shop Drawings: Submit the following Shop Drawings.

1. Submit complete detailed shop drawings in conformance with the specified requirements.

2. Include drawings that show the piping layouts and schedules of all pipe, fittings, valves, expansion joints, flexible couplings, hangers, supports and other appurtenances.

3. When any work is of special design show in large detail and completely describe and dimension.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle all products and materials as specified in Division 1.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted.

1. Pipe and Fittings:

a. Aluminum Pipe and Fittings
(1) ALCOA, Pittsburgh, PA
(2) ALCAN Aluminum Corp., Cleveland, OH

b. Brass Pipe and Fittings
(1) Metalloy Industries, Inc., Ft. Lauderdale, FL
(2) Nibco, Elkhart, IN

c. Cast-Iron Soil Pipe and Fittings
(1) U.S. Pipe and Foundry Co., Birmingham, AL
(2) Tyler Pipe Industries, Tyler, TX
(3) Charlotte Pipe and Foundry, Charlotte, NC

d. Copper pipe and Fittings

(1) Mueller Industries, Inc., Wichita, KS
(2) Nibco, Elkhart, IN

e. PVC and CPVC Pipe and Fittings

(1) United States Plastic Corp., Lima, Ohio

(2) Harvel Plastics Inc., Easton, Pennsylvania

f. Lined Steel Pipe and Fittings

(1) Polyvinylidene Chloride (PVDC) lined pipe and fittings

(a) Ameriform Manufacturing, Inc., Milton, KY

(2) Polypropylene-lined pipe and fittings

(a) Performance Plastics Products, Houston, TX
(b) Crane Resistoflex Co., Bay City, MI

(3) Polyvinylidene fluoride (PVDF or Kynar®) lined pipe and fittings

(a) Performance Plastics Products, Houston, TX
(b) Crane Resistoflex Co., Bay City, MI

g. Wall Sleeve Annular Seals

(1) Thunderline Corp. (Link-Seal), Belleville, MI

2. Dielectric Insulating Fittings:

a. Walter Vallett Co., Detroit, MI
b. EPCO, Inc., Cleveland, OH

2.2 MATERIALS

A. Aluminum Pipe and Fittings

1. Pipe: Provide aluminum pipe of Alloy 6061 and T6 temper conforming to ASTM B 241.

2. Welding and Threaded Fittings: Provide aluminum forged welding fittings or cast threaded fittings conforming to ASTM B 26/B26M or B 108.

3. Flanged and Coupling Connections: Provide joints that are made with aluminum mechanical couplings in combination with grooved, flared or plain end pipe or that are flanged.

a. When grooved couplings are used, roll the grooves into the pipe in conformance with the coupling manufacturers specifications.

b. Do not use cut grooves.

4. Lubricating Compound: Carefully assemble fittings and couplings with an approved lubricating compound to prevent seizing of the connection and overstressing of the pipe.

    a. Provide a lubrication compound which both lubricates and seals, for pipelines subject to internal pressure.

5. Supports: Use aluminum, hot-dipped galvanized steel or other approved type.

B. Brass Pipe and Fittings

1. Pipe: Provide red brass pipe that meets the requirements of ASTM B 43.

    a. Provide pipe sizes, wall thicknesses and dimensions that meet the ASTM B 43 Table 2 requirements for regular pipe.

2. Fittings: Provide brass pipe fittings that meet the ASME B16.15 requirements.

    a. Provide fittings rated for steam working pressures up to 125 psig.

    b. Provide unions made entirely of brass or bronze.

    c. Provide screwed type joints with clean cut, tapered and smooth threads that meet ASME B1.20.1 requirements.

3. Finish: Provide piping with a rough finish, unless otherwise specified.

C. Cast-Iron Soil Pipe and Fittings

1. Pipe and Fittings: Provide service weight, hub and spigot, cast-iron soil pipe and fittings meeting the requirements of ASTM A 74 or hubless cast iron soil pipe and fittings meeting the requirements of CISPI 301. Do not use hubless pipe and joints for buried pipe.

2. Protective Coatings: Provide interior protective coatings (linings) and exterior protective coatings for pipe and fittings in the finished work as follows and as indicated in the piping schedules:

    a. For pipe and fittings not exposed in the finished work, provide an interior bituminous lining and an exterior bituminous coating that meet AWWA C151/A21.51 requirements.

    b. For pipe and fittings exposed in the finished work, provide an interior bituminous lining that meets AWWA C151/A21.51 requirements.

(1) If the pipe schedules indicate that the pipe exterior is to be painted, paint in accordance with the requirements in Section 09 96 00.

(2) If the pipe schedules indicate that the pipe exterior is to have a bituminous coating, coat the pipe in accordance with the requirements in AWWA C151/A21.51.

3. Joints: Provide lead and oakum joints or neoprene gasket, compression type joints in accordance with ASTM C 564 for hub and spigot pipe. Consult the piping schedules. Provide hubless couplings for hubless pipe. Compose hubless couplings of a stainless-steel shield, clamp assembly and an elastomeric sealing sleeve conforming to CISPI 310.

4. Cleanouts: Provide cleanouts where shown or specified, and meeting the requirements of Section 22 10 00, unless otherwise specified.

D. Copper Pipe and Fittings

1. Small Copper Piping: For copper pipe 3 inches in diameter and smaller, provide Type K hard drawn copper tubing that meets ASTM B 88 requirements.

a. Fittings: Provide ASME B16.18, cast copper alloy or ASME B16.22 wrought copper and copper alloy fittings.

b. Joints: Threaded or ASTM B 32 lead-free soldered joints.

c. Fittings: Provide solder type fittings of the same material as the pipe.

d. Joints: Use threaded or brazed joints.

2. Potable Water Piping: Use ASTM B 32 alloy Grade 95TA (95 percent tin and 5 percent antimony) solder for piping carrying potable water.

3. Unacceptable Uses: Do not use copper pipe with soldered joints for transporting fuel oil or other flammable or toxic liquids inside buildings.

E. Lined Steel Piping

1. Polyvinylidene Chloride (PVDC) Lined: Provide PVDC lined steel pipe and fittings meeting the requirements of ASTM F 599, except provide PVDC liner that has a minimum elongation at yield of 5 percent.

2. Polypropylene Lined: Provide Type I polypropylene lined steel pipe and fittings meeting the requirements of ASTM F 492.

3. Polyvinylidene Fluoride (PVDF) Lined: Provide PVDF lined steel pipe and fittings meeting the requirements of ASTM F 491.

F. Wall Pipes and Sleeves for Miscellaneous Pipe and Fittings

1. Wall Pipes

a. Where wall pipes are shown or specified, provide ductile iron wall pipes that meet the requirements of AWWA C110/A21.10 with end connections that are 1) of the types shown and 2) flush with the surfaces of the walls or floors. Unless otherwise shown or specified, provide wall pipes with intermediate collars located at the centers of the walls or floors.

2. Sleeves

a. Where pipes pass through exterior walls or floors or wetted interior walls or floors of structures and where wall pipes are not to be provided, provide ductile-iron sleeves meeting the requirements of AWWA C110/A21.10 with ends that are flush with the wall or floor surfaces and with intermediate collars located at the centers of the walls or floors.

b. Where pipes pass through non-wetted interior walls or floors and where wall pipes are not to be provided, provide ductile-iron sleeves meeting the requirements of AWWA C110/A21.10; steel pipe sleeves meeting the requirements of Section 40 05 17 or as shown or specified otherwise. Provide sleeves with ends flush with the wall or floor surfaces. Where shown or specified, provide intermediate collars located at the centers of the walls or floors.

c. Provide sleeves having large enough diameters to accommodate the passage of pipe joints, if required.

d. HDPE Sleeves: Where shown or specified, provide molded HDPE sleeves as manufactured by the Thunderline Corporation, or approved equal, with integrally formed intermediate collars or waterstops.

e. Where shown or specified, provide modular, mechanical sleeve seals, meeting the requirements of this Section, in the annular spaces between pipes and sleeves. In all other locations, see drawings for details.

G. Modular, Mechanical Sleeve Seals: Provide modular, mechanical type seals consisting of interlocking, synthetic-rubber links shaped to continuously fill the annular space

between the pipe and the sleeve. Provide an elastomeric sealing element that is of the size, quantity, type and material that the manufacturer recommends for the intended service and that will provide an effective hydraulic seal. Provide stainless steel bolts and nuts.

H. Supports and Anchors: Provide all pipelines with supporting and anchoring devices as specified in Section 40 05 07.

PART 3 EXECUTION

3.1 INSTALLATION

A. General: Install all miscellaneous pipe and fittings in accordance with the specifications contained herein and in accordance with the manufacturer's recommendations and approved shop drawings and as specified in Division 1.

B. Connections Between Dissimilar Metals: Where connections are to be made between pipelines or equipment of corrosion causing dissimilar metals make the connections using dielectric insulating couplings, unions or other approved dielectric insulating devices.

C. Couplings: Only use couplings to join standard lengths of pipe and as required to complete a straight run of pipe. Do not use couplings to join random lengths of pipe and cuttings from standard lengths.

D. Reducing Fittings: Use reducing fittings for all changes in pipe size. Do not use bushings.

E. Pipe Flexibility: Make ample provisions for flexibility in all pipelines.

F. Drip Pans: Provide drip pans under all metallic pipelines installed over electrical equipment and motors and properly connect to the drainage system with 3/4-inch red brass pipe. Make leaktight connection between the drip pan and the drain pipe. Pitch pans uniformly toward the drain pipe not less than 1/8-inch per lineal foot.

3.2 CLEANING AND PAINTING

A. Cleaning: Flush all process and potable water pipelines with clean water.

B. Leakage: Test pipes at the pressures specified in the piping schedules located in Section 33 01 30.13, Section 33 05 52, Section 33 14 13, and section 33 31 13.

C. Paint in accordance with Section 09 96 00, unless otherwise specified.

3.3 DISINFECTION

A. Disinfect all potable water pipelines in accordance with Section 33 13 00.

END OF SECTION

(NO TEXT THIS PAGE)

SECTION 40 05 20 – VALVES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Requirements for furnishing and installing all valves and operators, except special regulating valves, telescopic valves, flap valves and valves specified in the Contract Documents.

1. Where valve operators are installed in NEC Class I, Group D, Division 1 or 2 hazardous locations (as specified), provide operator-related electrical equipment and appurtenances that are UL, Inc. approved for use in such areas.
2. Provide valve operators complete, including a suitable enclosure, with all appurtenances necessary for the operator to perform its intended function. Such appurtenances include, but are not limited to, anchor bolts and other mounting hardware, control switches, limit switches, pressure switches, torque switches, gauges, control valves, electrical supply connections, internal electric wiring and controls, terminal blocks, air supply piping, solenoid valves, miscellaneous valves, regulating controls, push button controls, miscellaneous controls, extension stems, local and remote indicators, operating nuts, purge water service with all associated piping, indicating lights, floor boxes, direct burial valve boxes and other such items.

B. Related Work Specified in Other Sections Includes, But is Not Limited to, the Following:

1. Section 05 05 15 - Galvanizing
2. Section 09 96 00 - High Performance Coatings
3. Section 26 05 00 – Common Work Results for Electrical
4. Section 26 05 19 - Wires and Cables
5. Section 40 05 18 - Miscellaneous Pipe and Fittings

1.2 REFERENCES

A. Codes and standards referred to in this Section are:

1. ASME B1.20.1 - Pipe Threads, General Purpose

2. ASME B1.20.7 - Hose Coupling Screw Treads

3. ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings

4. ASTM A 27/A27M - Specification for Steel Castings, Carbon, for General Application

5. ASTM A 29/A29M - Specification for Steel Bars, Carbon and Alloy, Hot Wrought and Cold-Finished, General Requirements

6. ASTM A 48 - Specifications for Gray Cast Iron Castings

7. ASTM A 126 - Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings

8. ASTM A 197 - Specification for Cupola Malleable Iron

9. ASTM A 276 - Specification for Stainless and Heat-Resisting Steel Bars and Shapes

10. ASTM A 278 - Specification for Gray Iron Castings for Pressure-Containing Parts for Temperatures Up to 650 F

11. ASTM A 395 - Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures

12. ASTM A 436 - Specification for Austenitic Gray Iron Castings

13. ASTM A 479/A479M - Specification for Stainless and Heat Resisting Steel Wire Bars, and Shapes for Use in Boilers and Other Pressure Vessels

14. ASTM A 536 - Specification for Ductile Iron Castings

15. ASTM A 564/A564M - Hot Rolled and Cold Finished Age Hardening Stainless and Heat Resisting Steel Bars and Shapes

16. ASTM A 572/A572M - Specification for High Strength Low Alloy Columbium Vanadium Steels of Structural Quality

17. ASTM A 743/A743M - Specifications for Castings, Iron-Chromium, Iron-Chromium - Nickel, and Nickel-Base Corrosion-Resistant for General Application

18. ASTM A 744/A744M - Specification for Castings, Iron-Chromium-Nickel, Corrosion-Resistant, for Severe Service

19. ASTM B 30 - Specification for Copper Base Alloys in Ingot Form

20. ASTM B 62 - Specification for Composition Bronze or Ounce Metal Castings

21. ASTM B 148 - Specification for Aluminum-Bronze Castings

22. ASTM B 584 - Specification for Copper Alloy Sand Castings for General Applications

23. AWWA C500 - Metal Seated Gate Valves for Water and Sewerage Systems

24. AWWA C502 - Dry-Barrel Fire Hydrants

25. AWWA C504 - Rubber-Seated Butterfly Valves

26. AWWA C508 - Swing Check Valves for Waterworks Service, 2 inch through 24 inch NPS

27. AWWA C509 - Resilient-Seated Gate Valves for Water Supply Service

28. AWWA C540 - Power-Actuating Devices for Valves and Sluice Gates

29. MSS SP-70 - Cast Iron Gate Valves, Flanged and Threaded Ends

30. MSS SP-71 - Cast Iron Swing Check Valves, Flanged and Threaded Ends

31. MSS SP-80 - Bronze, Globe, Angle and Check Valves

32. NACM - Welded and Weldless Chain Specifications

33. SAE J356 - Welded Flash Controlled Low-Carbon Steel Tubing Normalized for Bending, Double Flaring, and Beading

34. SAE J524 - Seamless Low-Carbon Steel Tubing Annealed for Bending and Flaring

35. SAE J525 - Welded and Cold-Drawn Low-Carbon Steel Tubing Annealed for Bending and Flaring

1.3 SUBMITTALS

A. General: Provide all submittals, including the following, as specified in Division 1.

B. Shop Drawings: Submit the following:

1. Complete detailed drawings of all valves

2. Working drawings, including arrangement and erection drawings of the operators and control equipment; schematic control diagrams, electrical connection diagrams, and complete description of the control system; and operating characteristics

3. Certified shop test report for the hydraulic power unit.

C. Quality Control Submittals: Submit the following:

1. If requested, manufacturer's certified performance and material records.

2. If requested, complete calculations for each size of motor operator indicating the force required to operate the valve, the operator force provided, full load and locked rotor current, and horsepower.

D. Operation and Maintenance: Submit operation and maintenance manuals for the valve operators.

1.4 QUALITY ASSURANCE

A. Furnish all valves of the same type from the same manufacturer. Provide parts that are interchangeable for all valves of the same type and size.

1.5 DELIVERY, STORAGE AND HANDLING

A. General: Deliver, store and handle all products as specified in Division 1 and as follows.

B. Historical Performance: Furnish and install eccentric plug valves of a type that has shown successful performance for a minimum of ten years. If requested, submit documentation of successful installations in which eccentric plug valves of the proposed type have been in operation for at least ten years.

C. Tests: Furnish a letter confirming that all plug valves have been satisfactorily tested as specified, prior to shipment.

D. Storage and Erection: Pack and store all valves in satisfactory operating condition. Carefully erect all valves in their respective positions, free from all distortion and strain.

1.6 SPARE PARTS

A. For electric motor operators:

1. One motor of each size
2. One torque switch of each size
3. One limit switch assembly of each size
4. Six push buttons
5. Six color caps of each color
6. Twenty indicating lamps
7. One reversing starter of each size

8. One overload relay of each size

PART 2 PRODUCT

2.1 MANUFACTURERS

A. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted. Manufacturers must be Build America, Buy America Act Compliant.

1. Gate Valves:

a. American Flow Control
b. M&H Valve Company
c. Mueller Company
d. NIBCO, Inc.
e. Stockham
f. United States Pipe and Foundry

2. AWWA Butterfly Valves:

a. American Flow Control
b. DeZurik
c. Keystone
d. Pratt

3. Eccentric Plug Valves:

a. DeZurik

4. Lubricated Plug Valves:

a. Crane (2 inches in diameter and smaller)
b. DeZurik (2 inches in diameter and smaller)
c. Homestead (2-1/2 inches in diameter and larger)
d. Rockwell (2-1/2 inches in diameter and larger)
e. Walworth (2-1/2 inches in diameter and larger)

5. Single Disc Swing Check Valves:

a. American Flow Control
b. Clow Valve Company
c. M&H Valve Company
d. Mueller Company

6. Double Disc Check Valve:

    a. Crane Stockham Valve Ltd.
    b. APCO

7. Solenoid:

    a. Automatic Switch Company
    b. Magnetrol

8. Globe and Angle Valves:

    a. NIBCO, Inc.
    b. Stockham

9. Electric Motor Operator - Nonmodulating:

    a. E-I-M Company
    b. Limitorque Corporation
    c. Rotork, Inc.
    d. Or-equal.

10. Electric Motor Operator - Modulating:

    a. E-I-M Company
    b. Limitorque Corporation
    c. Rotork, Inc.
    d. Or-equal.

2.2 MATERIALS

A. General:

1. Fabricate valves of materials resistant to corrosion for the required service.

2. Unless other materials are needed for corrosion resistance or are specified elsewhere, fabricate valves that are to be installed in metal pipelines and that are 2 inches in diameter and smaller of all brass or bronze, except fabricate the handwheel of ASTM A 197 malleable iron. Fabricate valves that are to be installed in metal pipelines and that are 2-1/2 inches in diameter and larger of the materials specified herein.

3. Fabricate gate, globe and angle valves with a minimum steam working pressure rating of 125 psig and a minimum nonshock cold water, oil or gas pressure rating of 200 psig, unless otherwise specified.

4. Fabricate operators of materials resistant to corrosion for the required services. Provide operator materials as specified.

5. Operator housings and pedestal handwheels:

a.	Cast iron	ASTM A 126, Class B ASTM A 48, Class 30 or 35
b.	Ductile iron	ASTM A 395 ASTM A 536, Grade 65-45-12
c.	Cast steel	ASTM A 27/A27M

6. Operator worms, steel — ASTM A 29/A29M Grade Designation 8620

7. Operator gears, steel (spur & helical) — ASTM A 572/A572M

8. Worm gears, bronze — ASTM B 148, Alloy C95400 or C95500
ASTM B 584, Alloy C86300

B. Valve Joints

1. Fabricate valves 2 inches in diameter and smaller of the threaded or solder end type for valves to be installed in copper pipelines, and of the threaded end type for valves to be installed in metal pipelines.

2. Fabricate all valves 2-1/2 inches in diameter and larger, except bronze valves 2-1/2 and 3 inches in diameter, with flanged ends, unless otherwise specified.

3. Fabricate bronze valves 2-1/2 and 3 inches in diameter with solder or threaded type ends for valves installed in copper pipelines and threaded type ends for all other pipelines.

4. For metallic flanged joints, provide flanges that are faced accurately at right angles to the axis of the casting. Face and drill flanges and shop coat with a rust-preventive compound before shipment.

5. For flanged joints, provide flanges whose dimensions and drillings meet the requirements of ASME B16.1, 125 pounds as a minimum. For valves installed in pipelines with test pressure requirements higher than 125 psi, provide flanges whose pressure ratings equal or exceed the specified test pressure of the pipeline. Furnish special drillings where required. For valves having

flanges that do not conform with the thickness requirements of ASME B16.1, test each valve in accordance with the hydrostatic shell test pressure requirements of ASME B16.1.

C. Operating Force: Fabricate valves to limit the maximum force required to operate all manual valves, including but not limited to valves with wrench operated nuts, levers, handwheels and chainwheels, to 40 pounds. Limit the overall length of each wrench or single-arm lever to 18 inches. Limit the overall length of each dual-arm lever to 36 inches.

D. Handwheel: Mark each valve handwheel with an arrow and the word OPEN. Mark each nut with an arrow.

E. Manually Operated Valves: Equip all manually operated valves that have operating nuts, levers or handwheels and that are more than 7 feet above the floor with chain operated levers or chainwheels. Extend chains to 7 feet above the floor.

2.3 GATE VALVES

A. Materials: Unless otherwise shown or specified, furnish and install gate valves meeting the following requirements:

Nominal Valve Size, Inches	Standard	Type
3 and smaller	MSS SP-80	Solid wedge
4 thru 12, except for HVAC Service	AWWA C509	Resilient seat
16 and larger, except for HVAC Service	AWWA C500	Double disc

B. Rising Stems: Manufacture all gate valves with rising stems, unless otherwise shown or specified. Design all gate valves to open when the nut or handwheel is turned counterclockwise.

C. Nonrising Stem: For buried service, furnish nonrising stem gate valves. Equip nonrising stem valves, except for buried or submerged service, with externally visible indication of the disc position at all points of travel.

D. Stem Seals: Use the following types of stem seals:

Valve Type	Stem Seal
Nonrising stem	O-ring
Rising stem (Outside stem and yoke)	Stuffing box
Geared	
Nonrising stem	O-ring or stuffing box
Rising stem (Outside stem and yoke)	Stuffing box

E. Packing: Provide nonasbestos braided, twisted or formed ring type packing suitable for the pressure-temperature ratings of the valve.

F. Bonnet: Provide 3-inch and smaller gate valves with threaded bonnets. Provide 4-inch and larger gate valves with outside screw and yoke bonnets.

G. Accessories: Provide zinc plated bonnet bolts, studs and nuts. except for submerged service. Provide stainless bonnet bolts, studs and nuts for submerged service. Make wedging devices bronze to iron or bronze to bronze. Provide glands which are bronze or bronze bushed and bronze gland bolts and nuts.

2.4 BUTTERFLY VALVES

A. General:

1. Provide butterfly valves 4 inches and smaller of the full lug pattern with drilled and tapped bolt holes.

2. Provide butterfly valves 6 inches and larger of the full flanged pattern that meet the requirements of AWWA C504.

3. Provide butterfly valves of the rubber-seated, tight-closing type.

4. For fluid temperatures equal to or less than 180 degrees F, provide Buna-N seats. For fluid temperatures greater than 180 degrees F, provide EPDM or Viton seats. For fluid temperatures exceeding the temperature ratings of EPDM and Viton, provide seats that are appropriate for the intended service.

B. Materials:

1. For butterfly valves 4 inches and smaller, provide valve materials as specified below or as required for the service.

2. Valve bodies:
   a. Cast iron ASTM A 126, Class B

   b. Valve shafts:
      (1) Stainless steel - ASTM A 564, Type 630 (17-4PH stainless steel) ASTM A 276 Grade 316

   c. Valve discs:
      (1) Aluminum Bronze - ASTM B 148
      (2) Bronze -ASTM B 30

   d. Bearings: TFE coated stainless steel

3. For butterfly valves 6 inches and larger, provide valve materials as specified below or as required for the service:

   a. Valve bodies:
      (1) Cast iron ASTM A 126, Class B, ASTM A 48, Class 40

   b. Valve shafts:
      (1) ASTM A 276 or A 479/A479M, Type 304, stainless steel
      (2) carbon steel with A 276 or A 479, Type 304 stainless steel journals

   c. Valve discs:
      (1) Cast iron - ASTM A 48, Class 40
      (2) Alloy cast iron - ASTM A 436, Type 1
      (3) Ductile iron - ASTM A 536, Grade 65-45-12
      (4) Bronze - AWWA C504 Grade A, D or E

   d. Mating seat surface:
      (1) Stainless steel (castings) - ASTM A 743/A743M, A 744 Grade CF-8 or CF-8M
      (2) Stainless steel - ASTM A 276 or A479,Type 304
      (3) Alloy cast iron - ASTM A 436, Type 1

   e. Seats:
      (1) Buna-N (Wastewater)
      (2) New natural rubber or Buna-N (Water)
      (3) Neoprene (Air)

C. General AWWA C504 Construction: For butterfly valves 6 inches and larger, manufacture valves and all accessories, including operators, to meet the requirements of AWWA C504, except as otherwise specified. Provide valve bodies of the short-body flanged type or mechanical joint-end type, as shown or specified. Wafer body type valves without lugs are not acceptable.

D. Pressure: Provide butterfly valves of pressure classes that are not less than Class 25B, that exceed the pipeline test pressure in which the valve is installed, or that are as specified, whichever is greater.

E. Shafts: If stub shafts are furnished, extend the shafts a minimum of 1-1/2 diameters into the discs and provide clearance between the shaft and discs not exceeding the following:

Shaft Diameter (Inches)	Maximum Radial Clearance (Inches)
1/2 to 1-1/2	.002

2 to 4	.0025
5	.003
6	.004

F. Extended Necks: Provide butterfly valves in insulated lines with extended necks to clear insulation.

2.5 ECCENTRIC PLUG VALVES

A. General: Provide quarter turn valves having an eccentric action that causes the plug to rise off the seat contact during the opening movement rather than sliding from its seat.

B. Plugs: Provide plug valves with Neoprene or Buna-N faced plugs.

C. Materials: Construct plug valves of cast iron or semi-steel at least equal to ASTM A 126, Class B. For valve sizes 3-inch and larger, construct the body seats with a welded-in overlay, of not less than 90 percent pure nickel, on all surfaces contacting the plug face. For valve sizes under 3-inch provide uncoated or epoxy coated body seats. Make the overlay a minimum of 1/16-inch thick for valve sizes 20-inch and smaller and a minimum of 1/8-inch thick for valve sizes 24-inch and larger. Provide zinc plated bonnet bolts, studs and nuts.

D. Seat Adjustment: Make the water-tightness or gas-tightness of the valve seating adjustable. Provide a seating adjustment device that is external to the valve and that can be used without the need to remove the valve from the piping and with the valve under pressure.

E. Lubrication: Furnish plug valves with oil impregnated, permanently lubricated, Type 316 stainless steel bearings in the upper and lower journals.

F. Stem Seal: Provide a stem seal consisting of multiple, self-adjusting and replaceable chevron type packing rings and a packing gland or provide two replaceable, self-adjusting, U-cup seals. Make the stem seal adjustable and replaceable without removing the valve from the piping and without the need to disassemble the valve and operator. For buried or submerged service, provide a sealed enclosure to keep the stem seal clean.

G. Valve Port: Unless otherwise specified, construct the valve with a minimum port area of 80 percent of the full area of the pipe in which the valve is installed.

H. Multiport: Provide 3 and 4-way valve configuration when shown or specified.

I. Position Indicator: Equip plug valves, except for buried or submerged service, with external visible indication of the plug position.

J. Operators: Unless otherwise shown or specified, equip 6-inch and smaller valves with wrench or lever operators and 8-inch and larger valves with gear operators. Equip all valves in low pressure gas service with gear operators. Furnish one wrench for each size valve in each individual room or space in which valves are located. House gear operators for submerged or buried service in a watertight enclosure. For buried or submerged service, equip valve operators with stainless steel external bolting.

2.6 LUBRICATED PLUG VALVES

A. General: Design semisteel lubricated plug valves for operating pressures of not less than 125 pounds steam or 200 pounds water, oil, or gas. Provide port opening areas not less than 80 percent of the pipe area. Provide plugs that rotate 90 degrees from full open to full closed and that are equipped with stops. Design the valves so that excessive lubricant pressure cannot be built up and lubricant cannot be forced into the pipeline. Provide lubrication through Alemite fittings on the body of the valve.

B. Seals: Accomplish sealing at the operating end of the plug by means of a teflon gasket held in leakproof contact between the plug and body by means of a coil spring at the base of the plug or by means of resilient packing and a bolted gland or plastic packing applied under pressure. If resilient or plastic packing is used, provide for replacing the packing while the valve is under pressure.

C. Lubricants: Provide lubricants suitable for use with the fluid handled through the valve. Furnish not less than two pounds of lubricant for each valve after the initial lubrication has been made.

D. Operators: Equip 6-inch and smaller lubricated plug valves with wrench-operators and 8-inch and larger valves with gear-operators, unless otherwise shown or specified. Furnish one wrench for each size of valve in each individual room or space in which valves are located.

2.7 SINGLE DISC SWING CHECK VALVES

A. General: Provide single disc swing check valves designed to allow a full diameter passage and to operate with a minimum loss of pressure. Provide 1/8 through 3 inch check valves that meet the requirements of MSS SP-80. Except as specified herein, provide 4 inch through 24 inch check valves that meet the requirements of AWWA C508. For heating, ventilating or air conditioning service, provide 4 inch through 24 inch check valves that meet the requirements of MSS SP-71.

B. Design: Equip check valves with bronze renewable seat rings, bronze discs or disc rings and bronze disc hinge bushings and pins. Carefully mount discs and provide discs that swivel in disc hinges. Provide pins, discs and other parts that are noncorrosive, nonsticking and properly cured to operate satisfactorily within a

temperature range of 34 to 100 degrees Fahrenheit and with the fluids or gases specified.

C. Levers and Weights: Equip 6 inch and larger check valves with outside levers and weights.

2.8 DOUBLE DISC CHECK VALVE

A. General: Provide double disc check valves that are of the double plate and flat seat design with a center located, vertical hinge pin. Design the valves for tight shutoff under all reverse flow and head conditions.

B. Working Pressure: Design the valves for a minimum working pressure of 125 pounds per square inch. Provide end connections that are designed to fit between ASME B16.1 flanges.

C. Construction Materials: Construct the valve body and discs of cast iron. Provide Buna-N seal materials. Use stainless steel Type 316 springs.

2.9 SOLENOID VALVES

A. Provide solenoid valves of the direct acting, all electric, normally closed, packless type with full area ports, unless otherwise shown or specified. Design valves to not require a pressure assist from the process fluid to open or close. Size the solenoids in accordance with the pressure conditions in the pipeline in which valves are installed. Construct the valve body and bonnet of forged brass and construct the solenoid core of stainless steel. Design solenoid the coils for 115-volt, 60-hertz operation. Embed solenoid coils in molded plastic and install coils in NEMA Type 1 general purpose enclosures, except as shown or specified.

2.10 HOSE VALVES

A. General: Provide globe or angle type hose valves with rising stems, cap, chain and rubber composition discs for cold water pressures up to 200 psi, nonshock.

B. Construction: Manufacture hose valves of all bronze or brass, except the handwheels which may be malleable iron. Conform hose threads to ANSI B2.4.

2.11 GLOBE AND ANGLE VALVES

A. General: Provide globe and angle valves that meet the requirements of MSS SP-80.

B. Disc and Seats: Equip gate and globe valves with renewable bronze discs and renewable seats.

C. Bonnet: Equip globe and angle valves with threaded bonnets.

D. Packing: Provide nonasbestos braided, twisted or formed ring type packing suitable for the pressure-temperature ratings of the valve.

2.12 MANUAL BUTTERFLY VALVE OPERATORS

A. General: Provide operators as an integral part of the valve. Manufacture manual operators of the enclosed, hand-lever, traveling-nut or worm-gear type, as shown or specified.

B. Hand-Lever Type: Fabricate hand-lever type operators of cast-iron or steel construction with a nonmetallic, nonslip handgrip. Equip the lever with a locking device to secure the valve disc in the fully open or fully closed position, or at a minimum of 5 intermediate positions at 18 degree intervals. Provide mechanical stop-limiting devices to prevent overtravel of the disc in either direction. Permanently lubricate operators or provide operators with grease fittings.

C. Traveling-Nut Type: Fabricate traveling-nut type operators with a threaded steel screw and a bronze nut. Provide a slotted-lever or link-lever system to transfer the applied torque to the disc shaft. Equip all rotating shafts, screws and links with separate bearings. Provide thrust bearings.

D. Worm-Gear Type: Fabricate worm-gear type operators with a worm gear and matching drive worm. Provide bearings for each rotating member.

E. Stop-Limiting Devices: Provide stop-limiting devices on traveling-nut and worm-gear type operators to prevent overtravel of the disc in either direction. Design the operator to hold the disc in any position without flutter or wear on the valve or operator. House the operator in a watertight enclosure. Pack operators with grease or with oil. For buried or submerged service, equip valve operators with stainless steel external bolting.

F. Position Indicators: For buried or submerged service, equip manually operated butterfly valves, with externally visible indication of the disc position.

2.13 FLOOR AND BENCH STANDS

A. General: Provide floor and bench stands for valves smaller than 12 inches of the wheel operated type without gears. Provide stands for 12- to 20-inch valves of single crank, single speed operated. Provide stands for 24-inch and larger valves of single crank, single speed or 2-speed operated as specified.

B. Materials: Use materials in floor and bench stands meeting the applicable requirements of the "General" specifications subsection. Provide frames of cast iron or fabricated steel of heavy and substantial design with smooth exterior and neat appearance. Make adequate provision for lubrication and protect all operating parts.

C. Nameplate and OPEN Indication Marking: Equip each stand with a nameplate stating the valve controlled by the stand and also stamp the operator with an arrow and the word OPEN to indicate the direction of rotation.

D. Rising Stems: Fit rising stem floor and bench stands with ball or roller bearings designed to take the thrust. Equip rising stem stands with a transparent plastic cover to protect the stem. Provide the cover with labels and other attachments that will facilitate its use as an indicator of valve position.

E. Nonrising Stems: Fit nonrising stem floor and bench stands with thrust ball or roller bearings. Provide an indicator to show the position of the valve.

F. Operating and Lift Nuts: Provide operating nuts or lift nuts of bronze meeting the requirements of ASTM B 62, finished all over, suitably splined to connect with the handwheel or gear and with threads which will engage smoothly with those of the lifting shaft.

G. Crank-Operated Stands: Provide crank-operated stands with a crank that will open the valve when the crank is turned counterclockwise. Locate the center of the crank approximately 36 inches above the operating floor. Provide gears which are bevel or worm, of hardened steel or manganese bronze, with machine cut teeth and enclosed in a cast-iron body. Equip the crank with a brass or bronze sleeve-type handgrip rotating freely on the handle. Utilize a gear ratio that will enable the stand to operate the valve with a maximum force of 40 pounds on the crank at single or low speed.

H. Handwheel-Operated Stands: Provide handwheel-operated stands with handwheels that open the valve when the wheel is turned counterclockwise. Locate the center of the handwheel approximately 36 inches above the operating floor. Provide a handwheel of sufficient diameter so that the stand will operate the valve with a maximum pull on the handwheel of 40 pounds.

I. Manually Operated Bench Stands: Equip manually operated bench stands located more than 7 feet above the floor with chains and chainwheels that meet the requirements of the subsection headed "Chainwheel Operators".

2.14 ELECTRIC MOTOR OPERATORS – NONMODULATING

A. Refer to Section 40 05 57.

2.15 ELECTRIC MOTOR OPERATORS - MODULATING

A. General: Provide modulating motor operators that meet the requirements for nonmodulating operators, except as specified herein. In addition to the other

equipment specified for nonmodulating operators, provide an electronic control module and a solid state reversing starter.

B. Control Module: Provide a solid-state type control module with a comparator circuit which senses the error between the input command signal and the position feedback signal. Mount the control module within the operator switch compartment.

Accept a 4-20 mAdc input command signal. Provide zero and span adjustments to align minimum and maximum valve position with zero and 100 percent values of the input command signal. Provide deadband adjustment from 0.16 to 1.0 percent to eliminate excessive motor movement due to minor variation in the process variable signal.

Activate the solid state reversing starter to drive the actuator in the proper direction necessary to reduce the error to zero. Provide proportional band adjustment from 5-40 percent. When the error is outside the proportional band, run the actuator motor continuously toward set point. When the error is within the proportional band, pulse the actuator motor toward set point to prevent overshoot.

Provide actuator to open the valve when command input signal increases.

On loss of command input signal, have valve fail (open) (closed) (in last position). On loss of feedback signal, have valve fail in last position.

C. Selector Switch and Push Buttons: Where the operator is 7 feet or less from the floor and in an accessible location, integrally mount a 3-position AUTO-OFF-MANUAL selector switch plus two push buttons marked OPEN and CLOSE on the operator housing. Where the operator is located more than 7 feet from the floor or in an inaccessible location, connect all internal control and indication wiring to a terminal block and provide a separate control station for remote mounting.

D. Auto and Manual Operations: Provide operators that, when in the AUTO position, will respond to the automatic signal as described above. Provide operators that, when in the MANUAL position, will be operable by either push buttons or handwheel.

E. Motor Design: Design the motor specifically for valve operator service and to be continuous rated for continuous modulating duty. Provide motor insulation of at least Class H.

2.16 EXTENSION STEMS, VALVE BOXES AND FLOOR BOXES

A. Equip all direct burial valves and valves in vaults or manholes with operating nuts and extended shafts to grade, unless otherwise shown or specified. Equip all direct burial valves with adjustable type, cast-iron, valve boxes and extended shafts to grade. Equip all valve boxes and floor boxes with ground level valve position indicators,

unless otherwise shown or specified. Provide two tee wrenches for each size and type of operating nut.

2.17 SOURCE QUALITY CONTROL

A. Eccentric Plug Valve Leakage Test: Perform a plug leakage shop test on each eccentric plug valve with the plug in the closed position. Unless otherwise specified, perform the leakage test with a minimum pressure of 150 pounds per square inch (gauge) applied sequentially to both the upstream and downstream faces of the plug. Perform the test for a minimum duration of 15 seconds. Demonstrate that there is no leakage past the plug.

B. Eccentric Plug Valve Hydrostatic Test: Give each eccentric plug valve hydrostatic shop pressure tests with the plug open and with the plug closed. Perform the hydrostatic tests with a minimum pressure that is at least equal to the test pressure specified for the pipeline in which the valve is installed. Perform the test for a minimum duration of 30 seconds. Demonstrate with the hydrostatic tests that the valve is structurally sound and that there are no leaks through the external surfaces of the valve.

C. Hydraulic Power Unit Shop Test: Prior to shipping the fluid power unit, conduct a shop test that demonstrates that the unit fulfills the operating requirements of the Specifications.

2.18 VALVE SCHEDULE

A. Note that all existing and proposed equipment within the enclosed area for the post-aeration, blowers, and UV system will be considered a non-classified area per NFPA 820. See below for the valve schedule on this project:

TAG	LOCATION	VALVE/ACTUATOR DESCRIPTION	SIZE (Inches)	NOTES
BV1001	Post-Aeration Tank	Post-Aeration Air Flow Pipe from Blowers	4	Modulating – Actuator Only
GV2001	RAS/WAS Wet Well	RAS/WAS From Clarifier #1 Telescoping Valve	6	Modulating – Actuator Only
GV2002	RAS/WAS Wet Well	RAS/WAS From Clarifier #2 Telescoping Valve	6	Modulating – Actuator Only
BV1002	BLOWERS	Blower Main Header to Digester Tanks Isolation Valve	6	Non-Modulating – Actuator Only
BV1003	BLOWERS	Blower Main Header to Aeration Tanks Isolation Valve	6	Non-Modulating – Actuator Only

BV1004	Aeration Tank #1	Aeration Tank Air Control Valve from Blowers	4	Modulating – Actuator Only
BV1005	Aeration Tank #2	Aeration Tank Air Control Valve from Blowers	4	Modulating – Actuator Only
BV1006	Digester Tank #1	Digester Tank Air Control Valve from Blowers	4	Modulating – Actuator Only
BV1007	Digester Tank #2	Digester Tank Air Control Valve from Blowers	4	Modulating – Actuator Only
PV2007	Digester Tank #1	WAS Feed Line to Digester Tank #1 Control Plug Valve	4	Non-Modulating – Actuator Only
PV2008	Digester Tank #2	WAS Feed Line to Digester Tank #2 Control Plug Valve	4	Non-Modulating – Actuator Only
PV2009	Flow Splitter Box	RAS Line to Aeration Tanks Main Shutoff Plug Valve	4	Non-Modulating – Actuator Only
PV2010	Flow Splitter Box	WAS Line to Digester Tanks Main Shutoff Plug Valve	4	Non-Modulating – Actuator Only

PART 3 EXECUTION

3.1 INSTALLATION

A. General: Install valves in accordance with the manufacturer's recommendations and approved shop drawings and as specified in Division 1.

B. Eccentric Plug Valves: Unless otherwise shown or specified for eccentric plug valves installed in horizontal piping, orient the valve such that the shaft is in the horizontal position, the seat is in the downstream position and when the valve is in the open position the plug is up. Unless otherwise shown or specified, for eccentric plug valves installed in vertical piping, orient the valve with the plug up when the valve is in the closed position.

C. Floor and Bench Stands: Accurately center floor and bench stands over the valve. Solidly bolt stands to the floor or support structure, with through-bolts wherever possible. Place approximately 3/4 inch of nonshrink cement grout beneath stands mounted on concrete or similar construction to assure uniform support. For stands installed within the area of a removable type floor, platform, or grating, securely

mount them on their own support structure independent of the removable element, unless otherwise shown or specified.

3.2 PAINTING AND COATING

A. General: Unless otherwise specified, coat the inside iron or steel surfaces of all valves and exterior surfaces of valves and operators that are to be buried in the ground or immersed in sewage or water with two coats of asphalt varnish. Paint exterior surfaces of other valves and operators as specified in Section 09 96 00.

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Services: Furnish the services of a qualified representative of each of the various manufacturers to provide instruction on the proper installation of the equipment, inspect the completed installation, make any necessary adjustments, participate in the startup of the equipment, participate in the field testing of the equipment and place the equipment in trouble-free operation, as specified in Division 1.

B. Tests: After installation of the valves, control equipment and all appurtenances, subject the units to a field running test, as specified in Division 1, under actual operating conditions. Operate each valve through one complete open-close cycle under the maximum pressure differential practical.

3.4 OPERATION DEMONSTRATION

A. Manufacturer's Field Services: Furnish the services of a qualified representative of each of various manufacturers to demonstrate the proper operation and instruct plant personnel in the equipment's operation and maintenance, as specified in Division 1.

3.5 PAINTING

A. Paint the equipment in accordance with the requirements in Section 09 96 00.

END OF SECTION

(NO TEXT FOR THIS PAGE)

SECTION 40 05 53 - IDENTIFICATION FOR PROCESS PIPING AND EQUIPMENT

1.1 SUMMARY

A. Section Includes:

1. Nameplates.
2. Tags.
3. Stencils.
4. Pipe markers.
5. Ceiling tacks.
6. Labels.

1.2 REFERENCE STANDARDS

A. American Society of Mechanical Engineers:

1. ASME A13.1 - Scheme for the Identification of Piping Systems.

B. 10 State Standards.

1.3 SUBMITTALS

A. Section 01 33 00 “Submittal Procedures”: Requirements for submittals.

B. Product Data: Submit manufacturer's catalog literature for each product required.

C. Shop Drawings: Submit list of wording, symbols, letter size, and color-coding for mechanical identification and valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.

D. Samples: Submit two labels for each size used on Project. Submit samples of each color, lettering style, and other graphic representation required for each identification material or system. Provide a mock-up type sample installation.

E. Manufacturer's Installation Instructions: Indicate installation instructions, special procedures, and installation.

F. Maintenance Data: Include product data and schedules in the appropriate operation and maintenance manuals.

G. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

H. Qualifications Statement:

1. Submit qualifications for manufacturer.

1.4 CLOSEOUT SUBMITTALS

A. Section 01 77 00 - Closeout Procedures: Closeout submittals.

B. Project Record Documents: Record actual locations of tagged valves; include valve tag numbers.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Section 01 77 00 “Closeout Procedures”: Maintenance material submittals.

B. Extra Stock Materials: Furnish two containers of spray-on adhesive. Furnish a minimum of 5% extra stock of each mechanical identification material required, including additional numbered valve tags (not less than 3) for each piping system, additional plastic laminate engraving blanks of assorted sizes.

C. Tools: Furnish special tools and other devices required for Owner to reinstall tags.

1.6 QUALITY ASSURANCE

A. Conform to ASME A13.1 for color scheme for identification of piping systems and accessories.

1.7 QUALIFICATIONS

A. Manufacturer: Provide the specified items from firms specializing in manufacturing identification devices of types and sizes required in this Section, whose products have been in satisfactory use in similar service for not less than 5 years.

PART 2 - PRODUCTS

2.1 NAMEPLATES

A. Manufacturers:

a. Red Valve Company

b. Approved Equal

2. Furnish materials according to ASME A13.1.

B. Description: Laminated three-layer plastic with engraved white letters on black, contrasting background color.

2.2 TAGS

A. Valve Tags:

1. Manufacturers:

a. Red Valve Company
b. Approved Equal

2. Description:

a. Brass 19-gauge construction; stamped ¼-inch high letters with sequence valve numbers ½-inch high. Provide a 5/32-inch hole for the fastener.
b. Fill tag engraving with black enamel.
c. Minimum tag size and Configuration: 1-1/2-inch diameter with finished edges.
d. Fasteners: Provide the manufacturer's standard solid brass chain wire link or beaded type, or solid brass S-hooks of the sizes required for proper attachment of the tags to valves, and manufactured specifically for that purpose.

B. Plastic Tags:

1. Manufacturers:

a. Red Valve Company

b. Approved Equal

2. Description:

a. Provide the manufacturer's standard pre-printed accident-prevention tags, of plasticized card stock with a matte finish suitable for writing, which are approximately 3 ¼-inch x 5 5/8-inch, with brass grommets and wire fasteners, and with appropriate pre-printed wording including large-size primary wording (as example: DANGER, CAUTION, DO NOT OPERATE).

C. Metal Tags:

1. Manufacturers:

a. Red Valve Company

b. Approved Equal

2. Description:

a. Brass construction; stamped letters.
b. Minimum Tag Size and Configuration: 1-1/2 inches; square with finished edges.

D. Information Tags:

1. Manufacturers:

a. Red Valve Company

b. Approved Equal

2. Description:

a. Clear plastic with printed WARNING message.
b. Minimum Tag Size: 3-1/4 by 5-5/8 inch.
c. Furnish grommet and self-locking nylon ties.

3. Tag Chart: Typewritten, letter-size list of applied tags and location, in anodized aluminum frame.

2.3 PIPE MARKERS

A. Color-Coding: Conform to 10 State Standards Section 2.14.

B. Lettering Size: Conform to ASME A13.1.

C. Plastic Pipe Markers (applies to piping not continuously color coded):

1. Manufacturers:

a. Red Valve Company

b. Approved Equal

2. Pressure-Sensitive Type: Provide the manufacturer's standard pre-printed, permanent adhesive, color-coded, pressure-sensitive vinyl pipe markers, complying with ASME A13.1

3. Insulation: Furnish 1-inch thick molded fiberglass insulation with jacket for each plastic pipe marker to be installed on uninsulated pipes subjected to fluid temperatures of 125 degrees F or greater. Cut the insulation length to extend 2 inches beyond each end of the plastic pipe markers.

4. Small Pipes: For external diameters less than 6 inches (including insulation if any), provide full-band pipe markers, extending 360 degrees around the pipe at each location fastened by one of the following methods:

a. Adhesive lap joint in pipe marker overlap.
b. Laminated or bonded application of pipe marker to pipe or insulation.
c. Taped to the pipe (or insulation) with color-coded plastic adhesive tape, not less than ¾-inches wide; full circle at both ends of pipe marker, tape lapped 1-1/2 inches.

5. Large Pipes:

    a. May have maximum sheet size with spring fastener.
    b. For external diameters of 6 inches or larger (including insulation if any) provide either full-band or strip-type pipe markers, but not narrower than 3 times the letter height (and of required length), fastened by one of the following methods:

        1) Laminated or bonded application of pipe marker to pipe (or insulation).
        2) Taped to pipe (or insulation) with color-coded plastic adhesive tape, not less than 1-1/2 inches wide; full circle at both ends of pipe marker, tape lapped 3 inches.
        3) Strapped-to-pipe (or insulation) application of semi-rigid type, with the manufacturer's stainless steel bands.

6. Lettering: Comply with the piping system lettering nomenclature as specified, scheduled or shown, and abbreviate only as necessary for each application length.

    a. Arrows: Print each pipe marker with arrows indicating the direction of flow, either integrally with the piping system service lettering (to accommodate both directions), or as a separate unit of plastic.

D. Plastic Tape Pipe Markers:

1. Manufacturers:

    a. Brady ID.
    b. Allen Systems, Inc.
    c. Seton Name Plate Corp.
    d. Approved Equal.

2. Description: Flexible, vinyl film tape with pressure-sensitive adhesive backing and printed markings.

E. Plastic Underground Pipe Markers:

1. Manufacturers:

    a. Red Valve Company

    b. Approved Equal

2. Description:

    a. Brightly colored, continuously printed plastic ribbon tape.
    b. Minimum 6 inches wide by 4 mil thick.
    c. Manufactured for direct burial service.

d. Provide multi-ply tape consisting of solid aluminum foil core between 2 layers of plastic tape.

F. Engraved Plastic-Laminate Signs

1. Provide engraving stock melamine plastic laminate, complying with FS L-P-387, in the sizes and thicknesses required, engraved with the engraver's standard letter style of the sizes and wording indicated, punched for mechanical fastening except where adhesive mounting is necessary because of the substrate.
2. Provide tags 1/8-inch thick.

2.4 LABELS

A. Manufacturers:

a. Red Valve Company

b. Approved Equal

B. Description:

1. Laminated Mylar construction.
2. Minimum Size: 1.9 by 0.75 inches.
3. Adhesive backed, with printed identification.

2.5 LOCKOUT DEVICES

A. Lockout Hasps:

1. Manufacturers:

a. Red Valve Company

b. Approved Equal

2. Description:

a. Anodized aluminum construction.
b. Furnish hasp with erasable label surface.
c. Minimum Size: 7-1/4 by 3 inches.

B. Valve Lockout Devices:

1. Manufacturers:

a. Red Valve Company

b. Approved Equal

2. Description:

    a. Nylon construction.
    b. Furnish device preventing access to valve operator and accepting lock shackle.

PART 3 - EXECUTION

3.1 PREPARATION

A. Section 01 73 00 - Execution.

B. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

A. Process Equipment

1. Identify equipment with engraved plastic nameplates on or near each major item of mechanical equipment and each operational device as specified. Provide signs for the following general categories of equipment and operational devices:

    a. Main control and operating valves.
    b. Meters.
    c. Pumps, compressors, blowers, and similar motor-driven units.
    d. Tanks.
    e. Chemical feed skids.
    f. Granulated activated carbon skid unit.
    g. Oxidation/filtration skid unit.

2. Lettering Size: Use a minimum 1/4 inch high lettering for name of unit where viewing distance is less than 2 feet 0 inches, 1/2-inch for distances up to 6 feet 0 inches, and proportionately larger lettering for greater distances. Provide secondary lettering of 2/3 to 3/4 of the size of the principal lettering.
3. Text of Signs: In addition to the name of the identified unit, provide lettering to distinguish between multiple units, inform the operator of operational requirements, indicate safety and emergency precautions.

B. Identify every valve with a valve tag.

C. Identify control panels and major control components outside panels according to Section 26 05 53 – Identification for Electrical Systems.

D. Install identifying devices after completion of coverings and painting.

E. Install plastic nameplates with corrosion-resistant mechanical fasteners or adhesive.

F. Labels:

1. Install labels with sufficient adhesive for permanent adhesion and seal with clear lacquer.
2. For unfinished covering, apply paint primer before applying labels.

G. Tags:

1. Install tags using corrosion-resistant chain.
2. Number tags consecutively by location.

H. Install underground plastic pipe markers 6 to 8 inches below finished grade, directly above buried pipe.

I. Identify valves in main and branch piping with tags.

J. Piping:

1. Identify piping, concealed or exposed, with plastic tape pipe markers.
2. Use tags on piping 3/4-inch (20-mm) diameter and smaller.
3. Identify service, flow direction, and pressure.
4. Install in clear view and align with axis of piping.
5. Locate identification not to exceed 20 feet on straight runs, including risers and drops, adjacent to each valve and tee, at each side of penetration of structure or enclosure, and at each obstruction.

3.3 ADJUSTING AND CLEANING

A. Adjusting: Relocate any mechanical device which has become visually blocked by the Work of this division or other divisions.

B. Cleaning: Clean the face of identification devices.

END OF SECTION

SECTION 40 05 57 - ACTUATORS FOR PROCESS VALVES AND GATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Electric motor valve actuators.

B. Related Requirements:

   1. Section 01 -General Conditions (Submittals, Sequencing, Pre-work meeting, etc.)
   2. Section 26 – Electrical Requirements
   3. Section 40 – Process Control System Requirements

1.2 REFERENCE STANDARDS

A. American Bearing Manufacturers Association:

   1. ABMA 9 - Load Ratings and Fatigue Life for Ball Bearings.
   2. ABMA 11 - Load Ratings and Fatigue Life for Roller Bearings.

B. American Water Works Association:

   1. AWWA C500 - Metal-Seated Gate Valves for Water Supply Service.
   2. AWWA C541 - Hydraulic and Pneumatic Cylinder and Vane-Type Actuators for Valves and Slide Gates.
   3. AWWA C542 - Electric Motor Actuators for Valves and Slide Gates.

C. NFPA:

   1. NFPA 70 - National Electrical Code.

1.3 COORDINATION

A. Section 013000 - Administrative Requirements: Requirements for coordination.

B. Coordinate Work of this Section with installation of valves and accessories.

1.4 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit manufacturer information for actuator with model number and size indicated.

C. Shop Drawings:

1. Indicate parts list, materials, sizes, position indicators, limit switches, actuator mounting, wiring diagrams, control system schematics, and on assembly drawings.
2. Submit actuator Shop Drawings with valve submittal.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Manufacturer Instructions: Submit special procedures and placement requirements.

F. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

G. Qualifications Statements:

1. Submit manufacturer's approval of installer.

1.5 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Record actual locations and types of actuators.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.

B. Installer: Company specializing in performing Work of this Section with minimum three years' documented experience and approved by manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

C. Store materials according to manufacturer instructions.

D. Protection:

1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.

2. Furnish temporary end caps and closures on piping and fittings and maintain in place until installation.
3. Provide additional protection according to manufacturer instructions.

1.8 EXISTING CONDITIONS

A. Field Measurements:

1. Verify field measurements prior to fabrication.
2. Indicate field measurements on Shop Drawings.

1.9 WARRANTY

A. Section 017000 - Execution and Closeout Requirements: Requirements for warranties.

B. Furnish five-year manufacturer's warranty for actuators.

PART 2 - PRODUCTS

2.1 DESCRIPTION

A. Furnish gear and power actuators with position indicators.

B. Manufacturers:
1. AUMA Actuators, Inc.
2. Approved equal

2.2 ELECTRIC MOTOR ACTUATORS

A. Description:

1. Motor, reduction gearing, limit switches or positioning potentiometers.
2. Comply with AWWA C542.
3. The actuators shall be suitable for use on a 120-volt 1-phase 60 Hz power supply and must include motor, integral reversing starters, local controls and terminals for remote control and indication housed within a self contained, sealed enclosure. Set-up of the actuator shall be carried out without the removal of any covers. Actuator calibration shall be by integral pushbuttons and selector switch. No separate special commissioning tools shall be required. In addition, provision shall be made for the protection of configured actuator settings by means of a password.
4. The actuator shall be sized to guarantee valve closure at the specified torque and/or thrust requirement as indicated by the valve manufacturer or supplier. The actuator must be adequately sized to provide the torque required to operate the valve at 90% of the nominal voltage with the option of operation at up to -30% undervoltage conditions. One actuator size (same outside dimensions) shall be available covering output speeds

from 4.8 to 216 rpm for a given torque range, to avoid over sizing and unnecessary weight load on valve stem, flange and yoke. An increase of actuator size caused by higher actuator output speed is not acceptable. The operating speed shall provide valve closing and opening as indicated in the valve list for quarter turn valves. Quarter-turn valves shall be furnished with mechanical stops that restrict the valve/actuator travel.

5. Actuators shall be suitable for indoor and outdoor use. The actuator shall be capable of functioning in an ambient temperature ranging from -13°F to +158°F (-25°C to +70°C), up to 100% relative humidity.

B. Enclosure:

1. Actuators shall be 0-ring sealed, watertight to NEMA 4X/6 and submersible to IP 68-8 (26 feet (8meters) for 96 hours)) in accordance with EN 60529. During submersion it must be possible to operate the actuator at least 10 times. Enclosure must allow for temporary site storage without the need for electrical supply connection. All external fasteners shall be of stainless steel. Gear case shall be cast iron. In order to prevent condensation, a heater must be installed inside the actuator, suitable for continuous operation. Actuator must provide an alarm signal in case of failure of anti condensation heater. When required, actuators for hazardous locations shall be certified explosion proof for Class I, Division 2.

2. Mounting: Attached actuator housing using flanged motor adapter.

C. Motors:

1. The electric motor shall be Class F insulated, with a duty rating of at least 10 minutes at 104°F (40°C) ambient temperature at an average load of at least 35% of rated actuator torque. Motor shall be specifically designed and built by the actuator manufacturer for electric actuator service characterized by high starting torque, low stall torque and low inertia. Commercially available motors shall not be acceptable. Electrical disconnection of the motor shall be by means of a plug and socket and motor removal shall be possible without loss of lubricant. The actuator must include a device to ensure that the motor runs with the correct rotation for the required direction of valve travel regardless of the connection sequence of the power supply.
2. The following criteria shall be provided for motor protection:
   a. The motor shall be de-energized without damage in the event of a stall condition when attempting to move a jammed valve.
   b. The motor shall be de-energized in the event of an overtorque condition.
   c. Thermal devices (one for each phase of power) shall be imbedded in the motor windings to de-energize the motor in case of overheating.

D. Gearing

1. The actuator gearing shall be totally enclosed in a grease-filled cast iron gearcase suitable for operation in any orientation. Oil lubrication is not permitted. The gearcase shall contain sensors capable of continuously recording temperatures and vibration within the actuator. Actuator gearing shall be hardened steel with alloy bronze worm wheel. Where required per application, electric actuators will be provided with worm gearboxes. The

worm gearboxes shall be supplied with bronze or ductile iron worm wheels and end-of-travel mechanical stops.

E. Manual Operation
1. Manual operation shall be by handwheel which shall not rotate during motor operation. Return from manual to electric mode of operation will be automatic upon motor operation. A seized or inoperable motor shall not prevent manual operation.

F. Drive Nut and Thrust Base Assembly
1. For multi turn rising stem applications, the drive nut shall be installed in a detachable thrust base. The design shall allow actuator removal from the thrust base, leaving the thrust base attached to the valve to retain valve position. Thrust bearings shall be lubricated by means of an easily accessible grease fitting.

G. Valve Position and Torque Calibration
1. Position and torque shall be sensed by absolute encoder using hall effect sensors. Position and torque settings will be stored in permanent non-volatile memory.
Torque and travel adjustment parameters are to be as follows:
a. Position setting range 1 to 500 or 10 to 5,000 turns, with resolution of 2.81 degrees and accuracy to 5.0 degrees of actuator output.
b. Torque setting: 40% to 100% of rated torque.
2. Torque switch bypass to be provided for the torque sensing system to inhibit torque switch trip during unseating or during starting in mid travel against high inertia loads.

H. Electrical Characteristics:
1. Voltage: At contractor's option, provide actuator motors of sufficient torque that are coordinated with the Control System and either:

a. 120 V, single phase, 60 Hz.

I. Limit Switches:

1. Type: Heavy duty, open contact.
2. Actuation: Rotor cam.

J. Electric Actuator Control (contact closure / discrete signals or analog signals)
1. Actuator Status Indication
a. Six contacts shall be provided. The contacts shall have a minimum rating of 5A, 250VAC.
1) one contact dedicated for collective fault (phase failure, motor protection tripped, torque fault) or one of eight other fault groups
2) five additional indication contacts selectable from a list of at least 45 parameters including, but not limited to: end position CLOSED, end position OPEN, selector switch in REMOTE mode, torque fault in CLOSED direction, and torque fault in OPEN direction.
2. Local Indication
a. The actuator shall include a digital position indicator with a display from fully open to fully closed in 1% increments. Indicating lights will be included.
3. Remote Position and Torque Feedback

a. Actuator shall provide a 4 to 20 mA analog position feedback signal.
b. Actuator shall provide a 4 to 20 mA analog torque feedback signal corresponding to required valve torque for diagnostics and preventive maintenance

4. Integral Starter and Transformer
   a. The starter shall be suitable for up to 60 starts per hour for open/close service and up to 1500 starts per hour for direct mount actuators used in modulating service. The applicable number of starts per hour depends on actuator size and output speed.
   b. A removable plug and socket controls housing containing LCD operations and diagnostics display, blue tooth interface, reversing starters or thyristors, power supply/control transformer and local controls capable of:
      1) Being mounted integrally with the actuator and capable of being reoriented at 90° increments, so that push buttons and indication lights will face the operator.
         Controls wall mounted remotely up to 330 ft (100m). Cabling/wiring to be supplied by contractor using three separate conduits/cables per the following wire specifications:
         a) Power wiring utilizing 12 AWG conductors.
         b) Thermal/heater wiring utilizing 18 AWG conductors.
         c) Encoder wiring utilizing 20 AWG CAN-Bus conductors.
      2) Manufacturer provided wall mount assembly must include seal protection on both ends to ensure IP-68 protection against possible submergence.
5. Integral Local Controls and Control Mode Selector
   a. The actuator shall include local Open/Stop/Close/Reset pushbuttons and a Local/Off/Remote selector switch lockable in any of the three positions. The Reset pushbutton shall be provided to facilitate actuator commissioning. It shall be possible to select maintained or non-maintained control independently for either the local or remote modes. It shall be possible to program the output direction of the actuator (clockwise or counterclockwise to close) without removal of any covers. It shall be possible to re-orient local pushbutton controls in 90° increments.
6. Control Capabilities for Control By Contact Closure / Discrete Signals
   a. The following control capabilities must be available:
      1) Input remote control signals for:
         a) Open/stop/close (maintained contacts or emergency)
         b) Open/close ‘push to run’ (momentary)
         c) Programmable emergency input for fail to any intermediate or end of travel positions when required.
   b. Programmable electronic torque switch bypass initialized in end and intermediate positions. Settable from 0-5 seconds.
   c. Separate open and close direction pulse timer (stepping mode) circuits capable of initializing at any position (open, close or intermediate).
   d. It shall be possible to reverse valve travel without the necessity of stopping the actuator. The starter contactors shall be protected from excessive current surges during travel reversal by an automatic time delay on energization of the contactor coils.
   e. The internal circuits associated with the remote control and monitoring functions are to be designed to withstand simulated lightning impulses of up to 1.1 kV.
7. Communications

a. Communications shall be via Ethernet I/P gateway in the actuator.

8. Monitoring Facilities
   a. Facilities shall be provided for monitoring actuator operation and availability as follows:
      1) Liquid Crystal Display (LCD) – minimum four lines back-lit for setting menu showing status indication and diagnostic information.
      2) Monitoring capability via Bluetooth® connection.
      3) Retrievable (lifetime and re-settable) data logs including:
         a) Motor run time
         b) Total number of cycles
         c) Number of torque trips in each direction of travel
         d) Number of limit switch trips at each end of travel
         e) Total torque trip faults
         f) Motor thermal overloads.
      4) Diagnostic capability, which will store and enable download of historical actuator operation, torque data to permit analysis of actuator, valve in-service performance and status signals according to NAMUR recommendation NE 107 via local display. Data download shall be carried out without removing any covers and all shall be available locally at the actuator or accessible via laptop computer.
      5) Actuators installed in critical applications, shall be optionally equipped with a sensor package, consisting of torque, temperature and vibration diagnosis. In this case actuators shall also have a real time clock for event recording to support asset management functions and life cycle analysis.
9. Wiring and Terminals
   a. Internal wiring shall be tropical grade insulated stranded cable of appropriate size for the control and main power.
   b. All external wiring shall terminate in a removable plug and socket head, which allows easy disconnection of all power and control voltages. Actuators furnished without plug and socket terminal connections must have power and control disconnect switches for ease of maintenance and safety. A double seal shall be provided to prevent water ingress from the actuator terminal compartment to the actuator.

2.3 SOURCE QUALITY CONTROL

A. Section 014000 - Quality Requirements: Requirements for testing, inspection, and analysis.

B. Provide shop inspection and testing of completed assemblies.

C. Owner Witnessing:

1. Allow witnessing of factory inspections and test at manufacturer's test facility.
2. Notify Owner at least seven days before inspections and tests are scheduled.

D. Certificate of Compliance:

1. If manufacturer is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at manufacturer's facility conforms to Contract Documents.
2. Specified shop tests are not required for Work performed by approved manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.

B. Verify that field dimensions are as indicated on Shop Drawings.

3.2 INSTALLATION

A. Securely mount actuators using brackets or hardware specifically designed for attachment to valves.

B. Extend chain actuators to 5-1/2 feet above floor level. (not applicable)

C. Provide chain storage if location impedes pedestrian traffic. (not applicable)

D. Contractor to attach tagging system to appropriate actuators and return tagging system to Owner.

3.3 FIELD QUALITY CONTROL

A. After installation, inspect for proper supports and interferences prior to system commissioning.

B. Repair damaged coatings with material equal to original coating.

C. Commissioning
1. Each actuator will be provided with a commissioning kit consisting of a wiring diagram and installation and operation manual. No special commissioning tools or parts will be required for start-up. In order to prevent loss of screws during commissioning or maintenance, all covers shall be fixed with captive screws. In order to minimize the number of spare parts required, parts such as covers, plug and sockets, parts must be interchangeable throughout all model sizes

D. Performance Test Documentation
1. Each actuator shall be performance tested. Thes documentation can be provided if required indicating the following:
   a. Torque sensing tripping points in both the open and closed directions of travel.
   b. Current at the maximum torque tripping point

c. Actuator output speed
d. High voltage test

E. Non-intrusive Capability

1. In order to maintain the integrity of the enclosure, setting of all actuator parameters including the torque levels, position limits, configuration of the indication contacts and positioner functionality shall be accomplished without removing covers from the actuator control assemblies or housing. Settings shall be made by entering the set-up mode and following menu prompts appearing in the LCD window. The LCD window shall have four lines of data clearly indicating the set-up options. Set up shall be accomplished by using the actuator integral selector switch and pushbuttons - without the need for a hand-held setting device. Actuator parameters may also be set by means of laptop computer via a two-way information infrared interface or laptop or PDA via Bluetooth® interface. No special setting tools or devices will be accepted.

END OF SECTION

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SECTION 43 21 22 – SUBMERSIBLE CENTRIFUGAL PUMPS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Requirements for furnishing and installing submersible sewage pumping units, together with base elbows, guide rail systems, and all appurtenances necessary for a complete installation.

B. Related Work Specified in Other Sections Includes, But is Not Limited to, the Following:

1. Section 09 96 00 - High Performance Coatings
2. Section 25 13 00 - Instrumentation and Control
3. Section 25 30 00 - Field Mounted Instruments
4. Section 25 30 10 - Instrument Panel Construction
5. Section 25 30 20 – Process Controllers and Computer Systems
6. Section 26 29 23 – Variable Frequency Motor Controllers

1.2 REFERENCES

A. Codes and standards referred to in this section are:

1. American Society for Testing and Materials (ASTM)
   a. ASTM A48-Standard Specification for Gray Iron Castings.
   b. ASTM A126- Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings

2. Hydraulic Institute Standards

3. Institute of Electrical and Electronics Engineers

   a. IEEE 82 - Test Procedure for Impulse Voltage Tests on Insulated Conductors

4. National Electrical Manufacturers Association
   a. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum)

5. National Electric Code (NEC)

6. Anti Friction Bearing Manufacturers Association

   a. AFBMA 9 - Load Ratings and Fatigue Life for Ball Bearings
   b. AFBMA 10 - Specifications for Metal Balls

1.3 SYSTEM DESCRIPTION

A. General: Provide pumps of the heavy duty, nonclog, close-coupled, submersible type, each driven by submersible electric motor mounted as an integral part of the pump. Arrange the pumping equipment guide rails and base elbow for installation in the spaces shown without appreciable revision of the piping or structure.

B. Operating Conditions: Provide pumps to operate at the capacities and heads and over the range of operating conditions specified without overloading, cavitation, and vibration. Furnish the pumps in accordance with the following requirements:

Table 1.1 Bank Lift Station Pump Item Descriptions

Item Description	Value
Number of Pumps	2
Pump Designations	Bank Lift Station
Pump Type	Submersible
Capacity at rating point, gpm (per pump)	142.15
Total dynamic head at rating point, minimum, feet	126.24
Required Shutoff head, feet	163.66
NPSH Required, ft	20.26
Pump guaranteed efficiency at design point, minimum, percent	44
Pump discharge diameter, maximum, inches	3
Motor speed, maximum, RPM	3600
Motor Horsepower, max HP	12
Diameter of sphere that will pass through pump, inches	3
Voltage & Phase Requirements	230V, 3 phase
Operational Conditions	Bank Lift Station pumps operate only when Kelly Lift Station pumps are operational.

Table 1.2 Short Street Lift Station Pump Item Descriptions

Item Description	Value
Number of Pumps	2
Pump Designations	Short Street Lift Station
Pump Type	Submersible
Capacity at rating point, gpm (per pump)	200
Total dynamic head at rating point, minimum, feet	59
Required Shutoff head, feet	110
NPSH Required, ft	9.5
Pump guaranteed efficiency at design point, minimum, percent	56
Pump discharge diameter, maximum, inches	4
Motor speed, maximum, RPM	3440
Motor Horsepower, max HP	6.5
Diameter of sphere that will pass through pump, inches	3
Voltage & Phase Requirements	230V, 3 phase

Short Street lift station parameters were not designed by DCCM. The capacity and TDH are based on historical data provided by the Owner and A Triad Associates (March 2024) Wastewater System Improvements Project Preliminary Engineering Report for the Town of Sweetser. The remaining pump item descriptions are based on coordination with vendors given the current pump plate data.

C. Pump Curve: Design each pump to have a continuously rising characteristic curve from the rating point to shutoff which passes through the rating point, and which meets or exceeds the specified heads and capacities, all within the Hydraulic Institute tolerances.

D. Provide submersible units capable of sustaining full reverse runaway speed without damage.

1.4 SUBMITTALS

A. General: Provide all submittals, including the following, as specified in Section 01 33 00 – Submittal Procedures.

B. Shop Drawings: Submit shop drawings, including arrangement and erection drawings of the equipment and equipment operating characteristics. Include the following:

a. Manufacturer catalog data for slide rail assembly, discharge piping and fittings, and valves.
b. Manufacturer pump catalog data, performance curve, breakaway fittings data, and access frame data.
c. Certificate of compliance with the drawings and specifications, noting all deviations from the drawings and specifications.
d. Dimensional cross section drawings of pumps.
e. Parts list with materials of construction identified.
f. Equipment weights and lifting points.
g. Painting procedure.
h. Warranty.
i. ISO 9001 Certification.

2. Pump performance curves. Draw the curves for the specified conditions (including those at reduced speed). Plot head, input kilowatts, and overall efficiency, as a function of capacity from zero to maximum capacity.

C. Quality Control Submittals: Submit 6 certified copies of the Shop Test results. Submit written report showing that factory pump inspections and tests have been successfully performed.

D. Operation and Maintenance: Submit the Operation and Maintenance manuals for the pumping equipment, panel systems, valves, and installation procedures.

E. Source Quality–Control Submittals: Indicate results of shop tests and inspections. Provide certified performance curves for each pump. Results shall be certified by a registered Professional Engineer.

F. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

1.5 CLOSEOUT SUBMITTALS

A. Section 01 73 00 - Execution
B. Section 01 77 00 - Closeout Procedures
C. Submit executed certification of pump after performance testing.

1.6 QUALITY ASSURANCE

A. Qualifications: Provide pumping equipment produced by a manufacturer who regularly engages in the design, manufacture, assembly and production of submersible sewage pumping equipment of the size and type as specified for not less than five years.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle all products and materials as specified in Section 01 60 00.
B. Accept materials on Site in manufacturer’s original packaging and inspect for damage.
C. Store materials according to manufacturer's instructions.
D. Protection:
    a. Protect materials from moisture and dust by storing in clean, dry location remote from construction operation areas.
    b. Provide temporary end caps and closures on piping and fittings, and maintain in place until installation.
    c. Provide additional protection according to manufacturer instructions.

1.8 PARTS

A. General: Provide the following spare parts for each pump:

1. One set of mechanical seals - upper and lower
2. One set of cable entry grommets
3. One set of "O"-rings
4. One set of Motor Bearings
5. One set of Wear Rings

B. Special Tools: Furnish a complete set of special wrenches, spanners, eyebolts and other special tools sufficient to completely dismantle and reassemble each kind and size of pumping unit. Provide tools of forged steel, case hardened, and full finished. Furnish the sets with a metal tool case with a handle and provision for padlocking.

1.9 WARRANTY

A. General: The manufacturer is to warranty the equipment supplied to the Owner against defects in material and workmanship for a period of at least five (5) years. Warranty period commences at the date of Substantial Completion.
B. A copy of the warranty statement shall be submitted with the approval drawings.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted.

1. Flygt-Xylem
2. Grundfos
3. Gorman-Rupp Pumps
4. Approved Equal

2.2 GENERAL CONSTRUCTION

A. Materials: Provide stainless steel fasteners, bolts, nuts and washers where exposed to the pumped liquid.

B. Component Joints: Provide machined metal-to-metal joints on component parts that are assembled together. Fit with an "O" ring seal where watertight joints are required. Arrange the "O" ring seal for automatic compression and sealing without adjustment or bolt torquing procedures. Do not use flat gaskets or sealing compounds to obtain watertight joints. Furnish machined rabbet fits on component joints as required to provide automatic alignment of rotating parts.

2.3 CASING

A. General: Provide pump casing of the centrifugal single volute, centerline discharge type. Do not use diffusion vanes.

B. Materials: Construct pump casing of ASTM A48 cast iron.

C. Wear Ring: Construct renewable wear rings of stainless steel.

2.4 IMPELLER

A. General: Design impeller of the enclosed nonclog type. Provide pump-out vanes or a back ring, arranged with minimum clearances so as to preclude solids and stringy material from damaging the mechanical seal, on the back of the impeller.

B. Materials: Construct the impeller of cast iron ASTM A48.

C. Balance: Dynamically balance the impellers.

D. Wear Ring: Construct renewable impeller wear ring of stainless steel.

E. Assembly: Secure the impeller to the shaft with a stainless steel key and lock nut in such a way that it cannot unscrew or become loosened due to rotation in either direction.

2.5 OIL CHAMBER

A. General: Provide an oil chamber to function as a buffer between the pumped liquid in the casing and the motor. Arrange the oil chamber to accommodate thermal expansion of the oil. Furnish an oil chamber drain plug that is accessible from outside the pump unit and permits changing oil without dismantling pump components.

B. Materials: Construct the oil chamber of ASTM A48 cast iron.

2.6 MECHANICAL SEAL

A. Design: Provide each pump with a double or tandem mechanical seals. Design the upper seal unit, between the oil chamber and motor housing, with one stationary ceramic or tungsten-carbide ring and one positively driven rotating carbon ring. Design the lower seal unit, between the pump casing and oil chamber, with one stationary ring and one positively driven rotating ring. Furnish these rings made of either tungsten-carbide or ceramic. Use stainless steel for metal parts. Protect the spring element of the lower seal from solids contained in the pumped liquid. Do not rely upon the pumped liquid for lubrication. No seal damage is to result from operating the pumping unit out of its liquid environment.

2.7 MOTOR

A. General: Provide submersible pump motor of 230-volt, 3-phase, 60-hertz.

B. Ratings: Design the motor to have suitable output torque and speed characteristic to start and operate the pump over the range of specified conditions. For constant speed pumping units do not exceed the nameplate horsepower rating under maximum load conditions. For pumping units operated from variable frequency drives, provide a motor nameplate horsepower rating at least 15 percent greater than the maximum load conditions. Base the nameplate horsepower rating on an 80 degrees C temperature rise above an ambient temperature of 40 degrees C. Design the motor for continuous load operation and continuous on-off cycling.

C. Insulation: Provide the motor with a minimum of NEMA Class F (155 degrees C) moisture resistant insulation. Construct stator coils with NEMA Class H (180 degrees C) insulated winding wire. Apply impregnation resin to stator assembly in three dip and bake steps.

D. Stator Housing: Provide the motor with an ASTM A48 cast iron stator housing. For motors that employ cooling water jackets, design the water jacket passages to preclude clogging by solids contained in the pumped liquid.

E. Cables: Provide the motor cable entry with a mechanical locking ring or compression type cord grip to protect the cable jacket from being pulled out of the motor. Do not use epoxy for this purpose. Arrange the cable entry so as to provide a watertight seal. Isolate the cable entry leads from the internal motor leads to prevent entry of water into the motor chamber by leakage or wicking. Provide cables suitable for submersible pump applications and conforming to NEC specifications for cable sizing.

F. Shaft

1. Design: Provide a one piece, fully machined pump and motor shaft. Design the shaft to limit shaft deflection under maximum pumping load to .002 inches at the lower mechanical seal face and to obtain a rotating assembly first critical speed of not less than 150 percent of the rated speed.

2. Material: Provide shafts of either carbon steel or stainless steel. Protect carbon steel shafts from exposure to the pumped liquid by employing a stainless steel sleeve or chrome plating.

G. Bearings

1. Design: Provide two antifriction bearing assemblies. Design one assembly to carry only radial loads and to be free to float axially within the frame. Design the other assembly to carry both radial and axial loads and to be restrained from axial movement.

2. Bearing Life: Select bearings in accordance with AFBMA 9 and AFBMA 10, Load Ratings and Fatigue Life for Ball and Roller Bearings, to have a 20,000 hours minimum L_{10} bearing life at maximum pumping load that occurs under the specified operating conditions.

2.8 PROTECTION MONITORING SYSTEM

A. General: Provide each pumping unit with a monitoring system to protect critical machine functions during operation.

B. Motor Winding Temperature: Provide three thermoswitches, one per phase, to protect against overheating. Initiate an alarm and motor shutdown on high temperature.

C. Lower Seal Failure: Provide a moisture sensor in the oil chamber to protect against damage from water contamination. Initiate alarm and motor shutdown upon sensing moisture.

D. (Thrust Bearing Temperature: Provide a thermistor or RTD to protect against thrust bearing overheating. Initiate an alarm and motor shutdown upon sensing high temperature.)

E. Sensor Monitoring Device: Provide a monitoring device or devices designed to be compatible with the sensors and motor controls.

2.9 GUIDE RAIL SYSTEM AND BASE ELBOW

A. Design: Provide each pump with a base elbow and guide rail system. Design the guide rail system to permit installation and removal of the pump from its base elbow discharge connection without requiring personnel to enter the wet well.

Guide Rail System: Provide a cast iron guide bracket which is an integral part of the pump casing and permits sliding the pumping unit, along two unthreaded stainless steel guide rails. Provide the guide rails of Schedule 40 stainless steel pipe connected to the base elbow at the bottom. Support the guide rails at intermediate locations

and at the top with stainless steel brackets bolted to the wall of the wet well or concrete slab . Fit each pump with a stainless steel cable of adequate length and strength to permit the raising and lowering of the pump for inspection and removal.

B. Base Elbow: Provide a cast iron base elbow arranged for automatic pump connection. Provide the pump casing with a machined discharge flange which, when the pump is lowered into the pumping position, will automatically align and mate with the plain-end of the base elbow. Design the discharge connection such that no motion other than vertical is required to seat the mating flange of the casing to the base elbow. Accomplish sealing of the pump connection by metal to metal contact or by a positive resilient seal of Buna-N attached to the pump casing discharge flange. Design the base elbow to support the weight of the pumping unit and prevent it from bearing directly on the wet well floor.

C. Mounting Accessories: Provide anchor bolts, nuts, washers, and accessories and other adapter equipment necessary for mounting the pumping equipment and appurtenances. Construct anchor bolts, nuts, washers, accessories and adaptor equipment of Series 300 stainless steel.

2.10 OPERATION AND CONTROL

A. Related Work Specified in Other Sections Includes, But is Not Limited to, the Following:

1. Section 25 13 00 - Instrumentation and Control
2. Section 25 30 00 - Field Mounted Instruments
3. Section 25 30 10 - Instrument Panel Construction
4. Section 25 30 20 – Process Controllers and Computer Systems

2.11 SOURCE QUALITY CONTROL

A. Shop Tests: Perform a shop test on each pumping unit in accordance with the test code of the Hydraulic Institute, except as modified herein. Test the pumps in the position that they will be installed.

1. Test at rated speed to determine the curves of head, electric input kilowatts, and overall efficiency, wire to water, as a function of capacity. Take a minimum of six points, including shutoff. Take one point as near as possible to each specified condition of head and capacity. Take the remaining points at capacities necessary to provide a uniform distribution of data. Express capacity in gallons per minute and express head in feet. Furnish with the certified shop test curves the raw test data, calculated results and sufficient information for computation and plotting of the curves.
2. Subject each pump to a hydrostatic test in the shop. Use a test pressure of not less than 1.5 times the shutoff head of the pump as shown by the characteristic curve. Under this test pressure, demonstrate that no part shows undue deflection or leakage or other defects. Provide certification of the hydrostatic tests.

B. Section 01 40 00 – Quality Requirements
C. Inspection:
    a. Verify that motor voltage and frequency are as shown on nameplate.
    b. Verify that motor and cable insulation test for moisture content or insulation defects comply with UL 83.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install all equipment in accordance with the manufacturer's recommendations and approved shop drawings and as specified in Division 1. Complete all wiring and piping and make all necessary adjustments to equipment to provide a complete operational pumping installation.

3.2 FIELD QUALITY CONTROL

A. Manufacturer's Field Services: Furnish the services of a qualified representative of the manufacturer to provide (instruction on proper installation of the equipment,) (inspect the completed installation,) (make any necessary adjustments,) (participate in the startup of the equipment,) (participate in the field testing of the equipment) (and place the equipment in trouble-free operation), as specified in Division 1.

B. Tests: After installation of the pumping units, control equipment and all appurtenances, subject each unit to a field running test as specified in Division 1, under actual operating conditions. Perform the field tests in the presence of and as directed by the ENGINEER. Demonstrate that under all conditions of operation each unit:

1. Has not been damaged by transportation or installation.
2. Has been properly installed.
3. Has no mechanical defects.
4. Has been properly connected.
5. Is free of overheating of any parts.
6. Is free of overloading of any parts.

Test the pumps to demonstrate that the pumps and control system operate as specified. Promptly correct any defects in the equipment or failure to meet the requirements of the Specifications.

3.3 CLEANING AND PAINTING

A. Paint as specified in Section 09 96 00.

END OF SECTION

SECTION 46 21 16 – FINE MECHANICAL SCREENING EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Requirements for furnishing and installing one fine mechanical screen, designed for continuous duty, complete with all motors, drives, housing, controls, accessories and appurtenances necessary for a complete operable system. Provide equipment and wiring, meeting the requirements for NEC Class I, Group D, Division 2 hazardous locations as applicable.

1.2 REFERENCES

A. Codes and standards referred to in this Section are:

1. ASTM - American Society of Testing Materials
2. AISI - American Iron and Steel Institute
3. NEC - National Electrical Code

1.3 SYSTEM DESCRIPTION

A. Design Requirements:

1. General: The rotary self-cleaning screen unit will consist of a headbox assembly, cylinder, solids discharge doctor blade assembly, cylinder drive system, solids discharge chute and internal water spray. Provide a screen capable of intermittent operation in order to form a mat of material to provide maximum screenings removal.

   The liquid/solids mixture to be screened will be introduced to the external surface of the wedgewire cylinder with the solids being retained on the surface of the cylinder until removed by the doctor blade. The fluid will pass down through the cylinder resulting in self-cleaning continuous backwash of the cylinder as it rotates.

   The screen will have a capacity of 0.85 MGD peak flow at an influent suspended solids concentration of 200 mg/l. The influent to the screen will be raw municipal sewage.

2. Discharge Chutes: Design the chute to deposit screens directly into the dumpster below.

B. Performance Requirements: Provide each screen in accordance with the following requirements:

Minimum Flow, mgd	0.2
Design Flow, mgd	0.865
Design influent concentration (mg/l)	200
Inlet Size, in	10
Outlet Size, in	10
Elevation of Drum Screen Outlet	855’-2”
Screen Spacing, inches	0.06

1.4 SUBMITTALS

A. General: Provide all submittals, including the following, as specified in Division 1.

B. Shop Drawings: Submit working drawings, including physical drawings of the equipment and control equipment, materials of construction, schematic control diagrams, electrical connection diagrams, a complete description of the control system, and equipment operating characteristics.

C. Quality Control Submittals: Submit manufacturers certified performance and material records.

D. Operation and Maintenance: Submit Operation and Maintenance Manuals as specified in Division 1.

1.5 QUALITY ASSURANCE

A. General: Consideration will be given only to products of manufacturers who can demonstrate that equipment fully complies with the requirements of the Contract Documents.

B. Codes: The following codes and standards apply:

1. NEC - Class I, Group D, Division 1, Relating to Explosion-proof Equipment and Wiring

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle all products and materials as specified in Division 1 except for the following:

1. Shipping: Ship all items as complete assemblies except where partial disassembly is required by transportation regulations or for protection of components.

1.7 SPARE PARTS

A. General: Provide the following spare parts for each screen:

1. 1 pair cylinder rim seals with clips and springs
2. 1 wiper seal
3. 2 doctor blades

B. Special Tools: Provide a complete set of tools necessary for maintenance and service of the equipment supplied for a minimum of three years of operation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable manufacturers are listed below.

1. Parkson Corporation, Hycor Rotostrainer Externally Fed Rotary Screen, Model RSA 2524.
2. Lakeside.
3. Approved Equal.

2.2 MATERIALS AND CONSTRUCTION

A. HEADBOX ASSEMBLY WITH INTEGRAL DISCHARGE BASE The headbox assembly including headbox, integral discharge base and support legs will be ruggedly constructed of 12 gauge type 304 stainless steel.

1. INFLUENT PIPE. The headbox will be equipped with a 10.75 inch OD influent pipe stub of 12 gauge construction.

2. WIPER BLADE. The influent will enter the headbox and flow over a wiper blade of UHMW polyethylene that makes direct contact with the rotating cylinder.

3. CLEANOUT PORT. The headbox will be fitted with a 6 inch diameter cleanout port, having a polyurethane sealing ring and a removable polypropylene plug.

4. INTERNAL BAFFLE. The headbox assembly will be equipped with a removable internal baffle for the purpose of flow dampening and distribution. The baffle will be vertical, and be top-mounted to the inside of the inlet headbox, so as to provide an underflow or U-path design. This baffle will be minimum 12 gauge type 304 stainless steel and run the full length of the headbox.

5. EFFLUENT PIPE. The headbox will be equipped with a 10.75 inch OD effluent pipe stub of 12 gauge construction.

B. CYLINDER: The screen cylinder will be constructed of type 304 stainless steel and consist of a continually helical wound spiral peripheral wedge-shaped wire with a minimum face width of 0.060 inch and a minimum height of 0.100 inch with a 26 degree included taper angle. This will be resistance welded to each of the longitudinal supporting members placed on 1 inch (maximum) centers within the inside diameter of the cylinder. The longitudinal support members will be 0.210 inch high (minimum) and 0.122 inch wide (minimum at widest point). Chordal effect between supports will not exceed 0.004 inch. A minimum of 120 support rods will be provided. Cylinder construction methods using tie rods internal to the cylinder are specifically excluded and will not be used.

The opening between the wedge-shaped wire will be .060 inches at the face or exterior/screening surface of the wire.

1. CYLINDER SUPPORT SYSTEM: The cylindrical screen will be supported on both ends by a spider hub assembly bolted to rings which are welded to the interior ends of the cylinder. Each support rod will be welded to the end rings. Units that do not have all support rods welded to the end ring will not be acceptable due to the possibility of early failure due to fatigue loading. Each spider hub assembly has a bolted-on support shaft which is supported by self-aligning, greaseable pillow block housed bearings.
2. The bearings will be outside of the fluid flow.
3. CYLINDER RIM SEALS: Replaceable rim seals will be of UHMW 1900 polyethylene, retained in position by clips. The seals will continuously self-adjust up to the edge of the cylinder end plates, by means of two torsion springs per seal. Seals will not make contact with cylindrical screen surfaces.

4. INTERNAL CYLINDER BAFFLE: The cylinder will be equipped with an internal baffle of 18 gauge type 304 stainless steel. The baffle will be suspended within the cylinder, mounted in a stationary position to an internal support pipe. The baffle will be designed to eliminate splashing as water passes through the inside bottom of the wedgewire cylinder. The baffle will be the approximate full width and length (minus required clearance tolerances) of the inside of the cylinder, for maximum effect.

C. SOLIDS DISCHARGE DOCTOR ASSEMBLY: The solids discharge doctor assembly will be constructed of type 304 stainless steel with the exception of a composite Bronze or FRP doctor blade. The doctor blade will be designed to effectively remove solids from the cylindrical screen surface and will be easily removable. It will have sufficient travel so as to clear the cylinder and flanges for changing or inspection. Pressure of the doctor blade against the cylindrical screen surface will be controlled with a countrweight assembly. The doctor blade holder and assembly can pivot clear of the cylinder and flanges, allowing for doctor blade change or inspection.

The doctor blade holder will be a machined, slotted, open-jaw design, which allows the doctor blade to evenly contact the screen surface along its entire length. Designs incorporating doctor blades bolted to the holder will not be used.

D. AUTOMATIC DOCTOR BLADE CLEANER: An automatic doctor blade cleaner (ADBC) assembly will be furnished and mounted above the solids discharge doctor blade to aid removal of solids from the primary blade. The ADBC will be mounted above the primary blade and will wipe the primary blade in an upward sliding motion once per screen cylinder revolution. The cleaning action will be continuous and automatic whenever the machine is in operation.

The ADBC blade will be of composite material, and the blade holder and pivot end bearing will be of type 304 stainless steel. Tension springs will hold the ADBC against the discharge doctor blade. The ADBC will wipe the discharge doctor blade once per screen cylinder revolution by means of screen cylinder mounted greaseable camrol bearings. The ADBC will be hinged to allow for cleaning or replacement.

E. CYLINDER DRIVE SYSTEM – EXPLOSION PROOF: The cylinder drive system will consist of a single-speed, single winding, dual voltage motor direct coupled to a gear reducer via an AM adapter. The electric motor will be 1/3 HP, (1800 RPM) 208 Volts, 3 phase, 60Hz power supply. The motor will be suitable for Class I, Division 1, Group D environment. Service factor will be 1.0. The gear reducer will be shaft mounted directly on the cylinder drive shaft and have an output speed of 11 RPM.

F. SOLIDS DISCHARGE CHUTE: A 6 inch long solids discharge chute of 12 gauge type 304 stainless steel construction mounted at 45 degrees from horizontal will be attached to the chassis beneath the doctor blade assembly. The chute will have 1.75-inch high sides.

G. INTERNAL SPRAY SYSTEM: A spray system will be provided within the cylinder to assist in cleaning. Twelve (12) spray nozzles will be installed to deliver 8.4 GPM of water at 40 psig to the cylinder. A drop leg will be integral to the piping, so that spray nozzles are not more than 5 inches from the inside surface of the cylinder. An external 3/4-inch NPT coupling will be furnished for connection with customer's spray source.

H. SURFACE FINISH

1. The Rotostrainer unit will be properly prepared and coated for the purposes intended. All stainless steel components will remain unpainted but adequately cleaned of all commercial and shop markings during fabrication.

2. The gearmotor and pillow block bearings will remain the manufacturer's standard finish for severe environment. All plastic parts will remain unfinished.

2.3 OPERATION AND CONTROL

A. CONTROLS: The following controls will be provided for the unit:

1. A 208 volt U.L. listed and U.L. labeled primary control panel will be provided in a remotely located NEMA 4X 304 stainless steel enclosure suitable for wall mounting. It will contain the following logic devices for proper operation of the equipment:

   a. Relays and timers to monitor equipment mounted electrical devices to perform necessary logic functions.
   b. Emergency Stop push button.
   c. Hand-Off-Auto selector switches for the drive and water spray.
   d. Control power and run indicating lights.
   e. Fault light.
   f. Auxiliary output contacts for customer use.

2. A flange mounted disconnect breaker, NEMA rated motor starter and a step-down control transformer will be provided.
3. Provide a 2-hole NEMA 7 local control station what includes a selector switch for Hand-Off-Auto and an E-stop pushbutton.

B. SEQUENCE OF OPERATION

1. HAND OPERATION: When HAND mode is selected, the Rotostrainer will run continuously. When the spray wash HAND mode is selected, the spray wash will run continuously.
2. AUTOMATIC OPERATION: The drive motor and spray wash will be controlled automatically when the selector switches are placed in the AUTO position.
   a. The Rotostrainer motor starts after the remote customer start contact closes. When this contact opens, the Rotostrainer motor will continue to run for an adjustable time period.
   b. The internal spray solenoid will cycle per its setting on its repeat cycle timer whenever the Rotostrainer motor is running.
3. EMERGENCY STOP: The unit can be deactivated at any time by pressing either the control panel mounted or unit mounted Emergency Stop push buttons.

4. FAULT CONDITIONS: Excessive motor current will trip the starter overload relays, immediately stop the drive motor. Pushing the reset button on the motor starter thermal overload will reset this fault.

2.4 ELECTRICAL EQUIPMENT AND WIRING

A. ELECTRICAL DEVICES: In addition to the drive motor, the following electrical devices will be furnished with the unit:

1. EMERGENCY STOP LOCAL PUSH BUTTON STATION: A NEMA 7 emergency stop push button station will be mounted to the headbox and will have provision for 1/2 inch conduit.
2. SPRAY SOLENOID VALVE: While the unit is in operation, the water spray will be actuated by a 115 volt, single phase, normally closed, solenoid valve with one inch NPT pipe connections. Electrical housing will be rated NEMA 7.

PART 3 EXECUTION

3.1 INSTALLATION

A. General: Install all screens in accordance with the manufacturer recommendations and approved shop drawings and as specified in Division 1.

B. Anchor Bolts: The installing contractor will furnish ½”-13UNC by 5-1/2 inch long stainless tell expansion anchors.

C. Electrical Wiring: Terminate all wiring on the rake mechanism on barrier-type terminal strips in a cast enclosure mounted at a point four feet above the operating floor.

3.2 FIELD QUALITY CONTROL

A. Manufacturer Field Services: Furnish the services of a qualified representative of the manufacturer to provide instruction on the proper installation of the equipment, inspect the completed installation, make any necessary adjustments, participate in the startup of the equipment, participate in the field testing of the equipment, and place the equipment in trouble-free operation, as specified in Division 1.

B. Tests: After installation of the screens, control equipment and all appurtenances, subject the units to a field running test, as specified in Division 1, under actual operating conditions.

3.3 OPERATION DEMONSTRATION

A. Manufacturer Field Services: Furnish the services of a qualified representative of the manufacturer to demonstrate the proper operation and instruct plant personnel in the equipment's operation and maintenance, as specified in Division 1.

B. In addition to the normal Installation, Operation and Maintenance Manuals required by contract, a spare manual will be shipped with the unit in order to allow for proper operation of equipment prior to release of all final Installation, Operation and Maintenance Manuals to the end user.

3.4 CLEANING AND PAINTING

A. Paint the screen equipment meeting the requirements of Section 09 96 00.

END OF SECTION

SECTION 46 71 46 – THICKENING SCREW PRESS AND SHAFTLESS SCREW CONVEYOR

PART 1 GENERAL

1.1 WORK INCLUDED

A. There shall be furnished a dewatering system including dewatering screw press, flocculation tank, polymer makedown system, sludge feed pump and local control panel all integrally mounted, pre-piped and pre-wired to each other on an aluminum skid as specified in this Section and scheduled below. Equipment should also include a shaftless screw conveyor (loose and separate). All equipment shall be provided by a single manufacturer. The dewatering screw press skid shall be capable of processing municipal waste activated sludge.

1.2 REFERENCES

A. American Bearing Manufacturers Association (ABMA)

B. American Gear Manufacturers Association (AGMA)

C. American Society of Mechanical Engineers (ASME)

D. Institute of Electrical and Electronics Engineers, Inc. (IEEE)

E. American Welding Society (AWS) D1.1, Structural Welding Code.

F. National Electric Code (NEC).

G. National Electrical Manufacturers Association (NEMA).

H. American National Standards Institute (ANSI).

I. Conveyor Equipment Manufacturers Association (CEMA)

1.3 DEWATERING EQUIPMENT SKID DESCRIPTION

A. Manufacturer to design, engineer and fabricate one (1) dewatering screw press skid assembled with the following components Screw Press

1. Flocculation Tank

2. Sludge Feed Pump

3. Polymer Makedown System

4. Local Control Panel

5. Instrumentation

6. Aluminum Skid

7. Conveyor System - Shaftless Screw Conveyor (loose and separate)

B. All equipment mounted on the skid shall be pre-piped and pre-wired to each other.

1.4 SCREW PRESS DESCRIPTION

A. Screw press system shall be capable of municipal waste activated sludge described below.

B. This Conveyor System shall be capable of handling sludge and consist of screw conveyor, discharge chute, supports, and accessories for a complete functional system. The manufacturer shall furnish all components and accessories for the system including chutes to connect to the screw press, support systems, brackets, and components necessary for ease of operation and maintenance.

C. Dewatering screw press with components as specified in this Section and shown on the Drawings and as required for a complete and functional screw press system, including:

1. Screw press with all 304 stainless steel wetted parts.

2. Sludge inlet headbox.

3. Removable split drums.

4. Removable drum covers.

5. Three screen spray showers.

6. Speed reducer.

7. Galvanized carbon steel base.

8. Flanged filtrate outlet.

9. Back pressure cone.

10. Flocculation tank with mixer.

11. Equipment Motors.

12. Pressure transducer type level element with indicating transmitter and high level probe.

D. Design Requirements:

1. Screw Press Minimum Performance Requirements

Type of Sludge	Aerobic Digested Sludge
Feed Solids, % total solids (TS)	1.0 %
Discharge Solids, % TS	15 - 18 % with polymer addition
Design Inlet Capacity	15 gpm at 1.0% TS
Design Capacity	75 dry lbs per hour

2. Motor Characteristics – as described in this Section.

1.5 SUBMITTALS

A. Submit as specified in Division 01.

B. Product Data:

1. Submit data completely describing product including plan and section views and listings of materials of construction.

2. Submit surface preparation and finishes to be applied to all equipment.

C. The Conveyor System

1. Descriptive literature, bulletins, and catalog cuts of the equipment.

2. Materials of Construction.

3. Sequence of operation or functional narrative.

4. Complete wiring diagram.

5. Complete installation instructions with points of electrical and requirements clearly shown.

6. Assembly and Electrician’s installation checklist (written by manufacturer) necessary to be completed by Contractor before manufacturer provides start-up services.

7. Motor Data.

8. Instrumentation and wiring diagram.

9. Shop drawings showing layout and necessary details of construction, including dimensions of major components; discharge chutes length, width and opening; size and location of connections to other work, access, material thickness, structural support members, sizes and locations, and locations of each equipment assembly.

10. Cross sectional details including dimensions and complete cross-referenced list of materials and part numbers.

11. Screw Conveyor

    a. Trough dimensions

    b. Screw diameters, flight diameter, width, thickness and pitch, rotating speed, material certificate and mill test report.

12. Weight of each major component along with total weight of equipment.

13. A list of manufacturer's recommended lubricants.

14. List of spare parts and special tools.

D. Shop Drawings:

1. Complete manufacturer fabrication/assembly drawings.

2. Certified drawings showing dimensions, weights, loading information and location of all components; Include details on interconnecting piping, supports, and control panel.

3. Wiring, control schematics, and control logic diagrams for all electrical and control components furnished.

4. Manufacturer's Drawings shall be coordinated with the Contract Drawings, including equipment numbers and piping designations.

5. List of Recommended Spare Parts with price information

E. Resume of Technician to perform screw press adjustments, inspections, observations of test operations, supervision of functional and performance testing, and training.

F. Operating and Maintenance Manuals: Include complete lubrication, maintenance, and operation instructions, including initial start-up instructions, and unloading and handling methods.

G. Operations and Maintenance Data (Conveyor System)

1. The contractor shall furnish no later than thirty (30) days prior to shipment of the equipment, one (1) complete set of operation and maintenance (O&M) manuals to the Owner.

2. Complete set of equipment arrangements and dimension drawings.

3. Installation instructions.

4. Preventative maintenance instructions detailing lubrication procedures and detailed maintenance instructions which describe procedures for adjustment, disassembly, and reassembly etc.

5. Complete parts list keyed to sectional drawings of the equipment.

6. Start-up checklist, maintenance inspection checklist, and performance data sheets.

H. Manufacturer's references

I. Quality Control Submittals:

1. Special shipping storage, protection, and handling instructions

2. Manufacturer's Installation Instructions

3. Factory Test Results

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Consideration will be given only to the equipment of Manufacturers who are regularly engaged in such work and thoroughly experienced in the design and manufacture of screw press equipment specifically manufactured for municipal, secondary treated, waste activated sludge.

B. Certifications: The dewatering equipment supplier must provide the "Certification of Compliance" (COC) letter with their priced equipment proposal to the general contractor(s) bidding the project. The general contractor must include the dewatering equipment supplier COC in their bid proposal submitted to the OWNER at bid closing.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Contractor shall unload, store, and handle the equipment per the manufacturer's instructions.

1.8 WARRANTY

A. Warranty shall extend for 12 months after start-up or 18 months after delivery, whichever comes first.

B. Warranty shall include all parts, labor, and coatings for repairing or replacing equipment that fails during the warranty period. Defects occurring within the warranty period shall be repaired or replaced by the manufacturer at no cost to the OWNER.

C. Equipment manufactured by others but supplied by screw press Manufacturer will have the equipment warranty as supplied by the manufacturer which is typically 12 months from delivery of the equipment.

1.9 PROJECT CONDITIONS

A. Deliver the dewatering skid as completely assembled as practical to minimize field assembly. All equipment mounted on the dewatering skid shall be pre-piped and pre-wired to each other at the factory. Contractor shall be responsible for unloading and any necessary field assembly. Contractor shall contact manufacturer for screw press field assembly requirements during bid.

1.10 SEQUENCING AND SCHEDULING

A. Coordinate work with restrictions as specified.

1.11 INSTALLATION EQUIPMENT

A. Special Tools: Provide standard manufacturer supplied toolbox with all tools needed to assemble and disassemble the screw press.

PART 2 PRODUCTS

2.1 SCREW PRESS

A. MANUFACTURER

1. Manufacturer: FKC Co., LTD. or approved equal.

a. The screw press and all other components mounted on the dewatering skid shall be supplied by one manufacturer and delivered as a complete dewatering system.

2. Where a manufacturer's standard equipment name and/or model number is listed, the equipment system shall be provided as modified to conform to the performance, functions, features, and materials of construction as specified herein.

B. MATERIALS

1. Wetted Parts: Stainless Steel, Type 304, unless otherwise indicated.

2. Drive Unit: As scheduled.

3. Galvanized carbon steel base

4. Other parts: Coated carbon steel

5. Miscellaneous hardware, including bolts, nuts, washers, and fastener clips in the wetted area: Stainless steel.

C. HOUSING

1. Housing shall be rigid Type 304 stainless steel weldment, supported by structural carbon steel base and shall have removable Type 304 stainless steel covers for screen access.

2. Sludge feed connections and filtrate discharge connections shall respectively be Type 304 stainless steel pipe stub and flanged meeting ANSI/ASME B 16.1, Class 125, or ANSI/ASME B 16.5, Class 150; provide higher pressure class as required to meet Design Working Pressure.

3. Press shall have Type 304 stainless steel discharge box with hinged lid. Dimensions as indicated on the Drawings.

4. Housing shall be designed for noise reduction, to act as a protective guard and to provide a complete enclosure for odor containment.

5. The screw press shall be provided with Type 304 stainless steel spray covers on the top and sides of the screw press drums where necessary for sanitation and personnel protection. Side covers shall be easily removable by a single person.

6. Headbox shall include hinged top inspection door.

D. DRIVE SYSTEM

1. Drive system shall consist of an electric motor suitable to use with a variable speed drive system as required to provide full load capacity and also to withstand the full starting torque of the system. VFD shall be provided as part of the Dewatering Control Panel.

2. Screw speed shall be electronically controlled by means of a VFD in a NEMA 4X enclosure. Maximum screw speed shall be 0.6 rpm or lower.

3. Speed Reducer:

   a. Provide speed reducer rated for uniform shock load classification.

   b. Speed reducer shall be Sumitomo Cyclo Reducer or equal.

4. Shaft Seals shall be Musashi double lip spring-loaded Nitrite oil seal or equal.

E. BEARINGS

1. Screw press shall be designed so that the entire rotating assembly is supported on the discharge end by a grease lubricated ball or spherical roller type bearing. The bearing shall be conservatively designed to withstand all stresses of the service specified. Main bearings shall have a minimum B-10 life rating of 500,000 hours at standard operating speeds.

2. Bearings for the screw shall be anti-friction with grease lubrication.

F. Flexible connectors for the drive motor and screw press junction boxes shall be furnished by the installing Contractor such that all local electrical codes are met.

G. SCREW PRESS MOTOR

1. Provide inverter rated, severe duty motor, 1.15 SF, NEMA Premium Efficiency, cast iron frame with manufacturer's standard, corrosion resistant, epoxy finish.

2. Max screw press motor requirements of 2 HP, (208V/3 phase)

H. SCREW

1. Screw Shell: Stainless steel, Type 304.

2. Helical flight welded to screw shell: Stainless steel Type 304 flight.

a. Brushes, squeegees and other wear items attached to the screw flight are not acceptable.

b. Screw flight shall be machined for clearances to have no contact with the drums.

3. The screw shall be supported at the discharge by a radial bearing.

I. SCREENS

1. Type 304 stainless steel panels with punched holes.

2. Wedge wire screens are not acceptable.

3. Oscillating or moving rings are not acceptable.

J. SHOWER HEADERS

1. Type 304 stainless steel pipe, fittings and shower nozzles.

2. Shower headers shall be provided along the entire length of the drum set, beneath the headbox, and along the edge of the filtrate pan on the discharge end.

3. Operating pressure for all shower headers shall be 30 to 45 psi. Showers requiring higher pressures or booster pumps are not acceptable.

4. Shower headers shall be stationary and remain in a fixed position. Moving or rotational showers within the wetted, sludge dewatering area or underneath the press covers are not permitted.

K. DRUM ASSEMBLY

1. Drums shall be 0.5 to 1.0 meters in length and split into two, removable drum halves.

2. Inner diameter of drums shall be no less than 0.4 meters.

3. Drum configuration shall allow maintenance work in the screw press flight area without removal of the screw from the press.

L. BACK PRESSURE CONE

1. Pneumatic or motorized control of back pressure cone movement is not acceptable. Back pressure cone will be free of electrical and air connection requirements.

M. PRESS ASSEMBLY

1. Screw press assembly shall be such that clearances around the entire perimeter of the unit for maintenance work shall not exceed 36 inches.

N. SURFACE PREP & COATINGS

1. Surface preparation of carbon steel surfaces on the screw press and flocculation tank shall be in accordance with SSPC-SP6 standards and shall be coated as follows:

2. Prime Coat: 5 mils of Carboline 890

3. Top Coat: 2 mils of Carboline 890 (if outdoors & exposed to direct sunlight), 5 mils (if indoors or covered outdoors)

4. Motor and gearbox for the screw press shall be prepared and coated with the manufacturer's standard surface preparation, prime coat and top coat for corrosion resistance.

2.2 FLOCCULATION TANK

A. Flocculation tank wetted parts shall be constructed of 304 stainless steel throughout.

B. Flocculation tank shall be designed for a retention time of 2 to 5 minutes under the average design flow rate. The inlet of the tank shall be located at the bottom of the tank and conditioned sludge shall overflow from the discharge pipe located near the top of the tank. Provide discharge pipe stub with flexible rubber hose sleeve connection.

C. Flocculation tank shall be supplied complete with an agitator. The agitator gearbox shall be an SEW. Agitator speed shall be adjusted electronically via VFD in the control panel.

D. Flocculation tank, agitator, and agitator drive shall be designed to handle the entire flow capacity range of the screw press.

E. Motor for the drive shall be a minimum of 1.0 hp, 208 V / 3-phase unit. Motor shall have an aluminum cast frame. Motor efficiency will be 82% or greater.

F. Provide split flocculation tank cover with a hinged inspection port.

G. Motor and gearbox for the flocculation tank shall be prepared and coated with the manufacturer's standard surface preparation, prime coat and top coat for corrosion resistance.

H. Polymer mixing valves, other mixing energy apparatus or piping configurations that does not allow for full view and testing of flocculated material by the operator is not acceptable.

2.3 POLYMER MAKEDOWN SYSTEM

A. MANUFACTURER

1. Manufacturer: FKC, Velodyne, or equal.

B. DESGN CRITERIA

1. Polymer Type: Emulsion
2. Polymer Activity (percent active): 30 to 75
3. Solution Concentration Range: 0.1% to 1% based on neat polymer
4. Solution Concentration Design Point: 0.5% based on neat polymer

Neat Polymer Flow Range (GPH)	Dilution Water Range (GPH)
0.3 – 3.0	60 – 600

C. POLYMER ACTIVATION & BLENDING CHAMBER

1. These specifications are based on a multi-stage, multi-zone, Hydro-Mechanical polymer activation & blending technology. Alternate technologies will only be considered if proven to provide an equal level of performance, versatility, reliability and quality, otherwise the following technology will be provided without exception.
2. In order to provide control and versatility to optimize the performance of the wide range of polymers available and to optimize system reliability, a multi-stage Hydro-Mechanical polymer blending technology shall be provided with both a non-mechanical and mechanical mixing stage:
    a. Non-Mechanical Stage: To optimize reliability, the device shall be capable of activating and blending polymer based on plant water pressure alone at 30 psid or greater. Polymer shall be injected directly into a water jet by means of an injection quill positioned such that the non-mechanical mixing energy is in no way diminished prior to polymer and water contact. The non-mechanical zone

shall be designed such that the velocity of the mixing energy producing water jet is maintained or increases as flow decreases.

b. Hydro-Mechanical mixing Stage: In order to provide optimal polymer performance under all operating conditions and to provide total control over mixing energy, in addition to the non-mechanical mixing stage the device shall be capable of producing its mixing energy independent of plant water pressure through a variable intensity, controllable stainless steel hydro-mechanical mixer. The mixing impeller shall be fully controllable and capable of inducing ultra high, non-damaging mixing energy at all flow rates. This shall be accomplished by controlling mixing intensity and preventing over exposure to, or damaging recirculation through the impeller. The polymer mixing impeller shall be designed to produce both axial and radial flow to optimize mixing effectiveness and to effectively inducing high, non-damaging mixing energy over the systems full flow range.

c. Mixers that rely solely on plant water pressure and or flow for mixing energy will not be acceptable. Mixers where performance is affected by flow rate and therefore retention time resulting in under or over exposure to mixing energy, or which rely on constant speed impellers or that rely on close tolerances for blending shall not be acceptable.

3. In order to prevent polymer build-up, the mixing chamber shall maintain high velocity in the entire chamber - at no time shall there be low velocity within any portion of the mixing chamber.

4. The mixing impeller shall be controlled by VFD motor controller and driven by a wash-down duty AC motor. The motor shall be mounted horizontally. Motors mounted under the mixing chamber where seal failure or leaks can damage the motor shall not be acceptable

5. The mixer drive shaft shall be sealed by a mechanical seal which shall have an integrally mounted and factory plumbed seal flush. A drain hole behind the seal shall be provided in the mixing chamber to drain the polymer solution in case of a seal failure. The seal shall be easily accessible for replacement. Systems without a seal flushing system shall not be considered. All bearings shall be external from the mixing chamber. Internal bearings shall not be acceptable.

6. Both mechanical and non-mechanical mixing zones shall be clear polycarbonate to view the mixing action and blending effectiveness. Acrylic chambers prone to becoming brittle over time and cracking, or opaque pipe shall not be acceptable to meet this requirement. The clear cover shall have a stainless steel reinforced gusseted flange with a stainless steel discharge connection in order to handle maximum operating pressures.

7. The mixing chamber shall have a maximum rated pressure of 100 psi. Provide a pressure relief on the mixing chamber factory set at 75 psi.

8. Provide a neat polymer check valve specifically designed to isolate neat polymer from dilution water.

D. DILUTION WATER ASSEMBLY

1. The dilution water flow rate shall be monitored by a rotameter flow meter having the range as specified under paragraph 1.02 above. Unions or flanges shall be provided on the flow meter to allow easy removal for cleaning.

2. The unit shall have an electric solenoid valve for on/off control of total dilution water flow.

3. A differential pressure type low water differential pressure alarm shall be provided. The switch shall be adjustable between 25 and 100 psid. Static working pressure, 500 psi. The pressure switch shall be as manufactured by Ashcroft.

4. Provide a 2-1/2” stainless steel liquid filled pressure gauge to monitor dilution water inlet pressure.

E. POLYMER METERING PUMP

1. The unit shall have one (1) neat polymer metering pump(s) integrally mounted on the systems skid. The metering pump(s) shall have a range as specified under paragraph 1.02 above. The pump shall be a positive displacement, progressive cavity type constructed of stainless steel and Viton. The shaft seal shall be mechanical seals, packing type shall not be used. A 208 VAC wash-down duty motor shall drive the pump. DC motor are not acceptable. A gear reducer shall be provided to produce a maximum pump shaft speed of not more than 545 RPM. The motor shall be controlled by an VFD located in the system control panel.

2. Provide a calibration column with two full port PVC ball valves having Viton o-rings. The column shall be calibrated for a one-minute draw-down at maximum pump rate and read in GPH and milliliters. The calibration column shall be rigidly mounted to the systems frame with a minimum of two heavy duty brackets. Mounting the calibration to the neat polymer inlet piping shall not be acceptable. Provide a breather plug in the top of the calibration column designed to allow adequate displacement of air during calibration while preventing water or other foreign material from entering the calibration column.

3. Provide a thermal type loss of polymer flow sensor. The flow sensor shall include a stainless-steel plumbing assembly with a stainless-steel full port ball valve for draining during cleaning.

F. SOLUTION DISCHARGE ASSEMBLY

1. Provide a 2-1/2” stainless steel liquid filled pressure gauge to monitor system discharge pressure.

G. CONTROLS

1. A control panel integral to the systems frame shall be provided. The enclosure shall be rated NEMA 4X and constructed of FRP. The control panel shall consist of all controllers, digital displays, potentiometers, switches, lights, relays, and other control devices required for a complete operable system. The control panel and all components shall be industrial duty. All skid mounted electrical components interconnected to the control panel shall terminate at numbered and labeled terminal blocks. The terminal blocks shall be sized for 14 ga. wire. Wires shall be neatly run through wire raceway and numbered with shrink tubing type labels. Adhesive labels shall not be used. The control panel shall be positioned such that there are no obstructions in front of the control panel per related NFPA requirements. Control.

2. Power: 120 VAC, 1Ph, 60/50 Hz.

3. Operator Interface – Discrete Selector Switch:

    a. System ON / OFF (reset) / Remote

    b. One-Turn Potentiometer – Mixer Speed

    c. Ten-Turn Potentiometer – Progressive Cavity Metering Pump Control

4. Status / Alarm Indicators:

    a. Main Power ON

    b. Display of Metering Pump Rate (diaphragm pump only: located on diaphragm metering pump face)

    c. Low Water Differential Pressure Alarm

    d. Low Polymer Flow Alarm

5. Inputs (signals by others):

    a. Remote Start / Stop (discrete dry contact)

    b. Pacing Signal Based on Process Flow (4-20mA)

6. Outputs:

    a. System Running (discrete dry contact)

    b. Remote Mode (discrete dry contact)

    c. Common Alarm (discrete dry contact)

H. POLYMER EQUIPMENT SKID

1. The system's frame shall be of rugged 304 stainless steel construction. No mild steel shall be used. All piping shall be rigidly supported.

2. Under no circumstance shall the pump suction exceed 5” from the bottom of the skid for progressive cavity pumps.

3. The overall system dimensions shall not exceed 36”W x 26”D X 60”H.

2.4 SLUDGE FEED PUMP

A. MANUFACTURER

1. Manufacturer: Seepex, Netzsch, or equal.

2. The screw press, all other components mounted on the dewatering skid, and the conveyor shall be supplied by one manufacturer and delivered as a complete dewatering system.

B. DESCRIPTION

1. Pump shall be heavy duty, positive displacement, progressing cavity type. The pump shall be cradle mounted to permit the suction port to be rotated to any angle perpendicular to the centerline of the pump. Suction and discharge connections shall be 125 pound flat faced ANSI cast iron flanged.

C. HOUSING

1. Suction and discharge housings are to have smooth flow characteristics and be manufactured from GG25 cast iron. The housings shall be drilled and tapped NPT connections that can be used for the installation of pressure gauges/switches or for a drain.

D. ROTOR & DRIVE TRAIN

1. The rotor shall be driven by means of a heavy duty drive train. The pump rotor shall be machined of AISI 4150 alloy steel, hardened to a Rockwell "C" value of 57 to 60 and covered with a heavy layer of hard chrome plate at least 0.010-in thick for abrasion resistance.

2. The rotor shall be joined to the drive shaft by a carbon steel connecting rod and oil-lubricated sealed pin type or crown gear type universal joints of chrome alloy tool steel of adequate design to transmit the required thrust and torque while allowing the rotor to move through is eccentric path. The joint seals shall be clamped at both outside and inside diameters and recessed within heavy walled steel tubing to prevent damage by rags or other objects.

3. To maximize universal joint and seal life, the connecting rod operating angle shall not exceed 1¼ degrees off center. The drive shaft shall be solid. If hollow drive shaft is used, then a fiber deflector shall be installed to prevent the solids from entering the hollow shaft.

E. STATOR

1. The rotor shall rotate relative to a one-piece, medium-high Buna "N" rubber stator of approximate 65(±5) Durometer hardness (Shore A) securely bonded to its steel tube housing. The stator shall be chamfered on the ends to increase the chamber filling efficiency. The stator shall have integral moulded gaskets to prevent the pumped material from contacting the bonding of the tube.

F. SHAFT SEAL

1. The stuffing box shall be equipped with a single acting mechanical seal as manufactured by Burgmann or equal. The Seal is to be of the rubber bellows design and be able to operate independently of the direction of rotation and. The mechanical seal is to be so situated in the suction housing to ensure the best possible flushing of the seal by the product. Additionally the mechanical seal housing is to have a flushing connection. The metal parts are to be stainless steel and the seal faces are to be silicon carbide.

G. DRIVE & BASEPLATE

1. The motors shall be horizontal, totally enclosed fan cooled and of the horsepower and speed as required by the specified conditions. The motor shall be c-faced to a gear reducer in an arrangement as shown on the drawings. The pump and motor shall be mounted in-line on a structural steel baseplate.

2. Provide inverter rated, severe duty motor, 1.15 SF, NEMA Premium Efficiency, cast iron frame with manufacturer’s standard, corrosion resistant, epoxy finish.

3. Minimum sludge feed pump motor requirements of 3 HP, (208V/3 phase).

H. SURFACE PREPARATION & COATINGS

1. All surfaces shall be prepared and shop painted with the manufacturer’s standard system.

I. ACCESSORIES

1. To prevent damage through dry running the pump stator is to be provided with thermal dry running protection, including the control module for installation in the local control panel of the dewatering skid.

2.5 LOCAL CONTROL PANEL

A. Screw press manufacturer shall provide the dewatering control panel, PLC and field instrumentation for the dewatering system, as described and shown on the Contract Documents.

B. The PLC will be programmed by the screw press manufacturer. PLC shall be Allen Bradley CompactLogix 1769-L24ER, or approved equal (BABA Compliant) Screw press manufacturer is responsible to direct all programming changes required to meet the system performance standards.

C. The HMI will be programmed by the screw press manufacturer. HMI shall be Maple Systems 9.7-inch, HMI5097DXL, or approved equal, color touchscreen or larger. Screw press manufacturer shall provide all programming and screens required for display, setpoints, alarms and parameter ranges.

D. The local control panel shall include a minimum of the following:

1. NEMA 4X Stainless Steel Enclosure.

2. Variable Frequency Drive, AB Powerflex 525, for the Screw Press Motor.

3. Variable Frequency Drive, AB Powerflex 525, for the Sludge Feed Pump.

4. Variable Frequency Drive, AB Powerflex 525, for the Flocculation Tank.

5. Variable Frequency Drive, AB Powerflex 525, for the Incline Conveyor.

6. 3% Impedance Line Reactor for each VFD.

7. 208V/120V Transformer for 120V/1ph & 24VDC power supply for Polymer Makedown System and Instrumentation listed in paragraph 2.6.

8. Surge Protector, 208VAC 3-Phase Delta; 47 to 63 Hz.

9. Surge Arrestor, Pluggable type, 150VAC/DC, Square D.

10. Ethernet Switch, 8-port.

11. Mushroom Head, Red, Process Stop Push Button.

12. NEMA 4X Air Conditioner, 200 BTU, Through-Mount, EIC Solutions.

E. The local control panel shall include customer connections and programming for the following:

1. Pump #1 Run Status (Screw Press Grinder Station)

2. Pump #1 Seal Fail (Screw Press Grinder Station)

3. Pump #1 Overtemp (Screw Press Grinder Station)
4. Pump #1 Overload (Screw Press Grinder Station)
5. Pump #2 Run Status (Screw Press Grinder Station)
6. Pump #2 Seal Fail (Screw Press Grinder Station)
7. Pump #2 Overtemp (Screw Press Grinder Station)
8. Pump #2 Overload (Screw Press Grinder Station)
9. Wet well high-level float (Screw Press Grinder Station)
10. Wet well low-level float (Screw Press Grinder Station)
11. Wet well level (Screw Press Grinder Station) (analog)
12. Digester #1 Level (analog)
    a. Pump off at low water level of 840.00 FT and alert to main SCADA controls.
13. Digester #2 Level (analog)
    a. Pump off at low water level of 840.00 FT and alert to main SCADA controls.
14. These will include ten (10) dry contact digital inputs and three (3) – 4-20mA signals.

2.6 INSTRUMENTATION

A. HEADBOX LEVEL TRANSMITTER

1. Screw press manufacturer shall provide a pressure sensing type level indicating transmitter as follows:
2. MANUFACTURER
    a. Manufacturer: IMF Efector PI2307 or approved equal

B. HI-LEVEL SWITCH

1. MANUFACTURER
    a. Manufacturer: Warrick or approved equal
2. MATERIAL
    a. 303 Stainless Steel electrodes, ¼” diameter.

b. Junction Box & Electrode Mounting Assembly: stainless steel.

3. STANDARD RELAY

a. 10 A resistive at up to 120 VAC, 8-pin socket to be installed in screw press local control panel.

C. SOLENOID VALVES

1. MANUFACTURER

a. Manufacturer: ASCO Red Hat or equal

2. DESCRIPTION

a. Slow Closing Solenoid Valves

b. Pilot operated, normally closed.

c. Brass Body, NMR disc, PTFE & MBR Seals, 305SS Core Tube, 430FSS Core & Plugnut, 302SS Springs, & copper shading coil.

d. 120V/1ph, 6.1 watts, Class F Coil Insulation.

e. 125 psi max differential pressure.

f. 150 deg. F maximum fluid temperature

D. Provide a Fiber to Ethernet managed switch for PLC Ethernet I/P network. Refer to Construction Drawings.

2.7 SKID

A. The skid shall be 16-feet long by 8-feet wide and shall be comprised of 5052 bright aluminum 3/16” tread plate fastened on structural 6061-T6 aluminum 6” channel. Stainless steel is also an acceptable skid material option.

B. All other aluminum sheets, plates, bars, angles and structural shapes shall be grade 6061-T6 or 3003.

C. The entire skid shall be capable of being lifted, moved and set using the four lifting points.

D. All equipment integral to the skid shall be secured with stainless steel anchor bolts and nuts mounted through drilled holes in flat bar welded to the aluminum structure.

E. All electrical and power conduit shall be routed below the aluminum trade plate within the dimensions of the skid. Conduit shall be liquid-tight flexible nonmetallic type.

F. Piping between the sludge feed pump and flocculation tank shall be schedule 80 PVC. Piping from the polymer systems to the sludge feed line and/or flocculation tanks shall be flexible hose type.

G. An aluminum access ladder for view the top of the floc tank shall be included and mounted on the skid.

2.8 SHAFTLESS SCREW CONVEYOR

A. Manufacturer

1. Manufacturer: FKC Co., Ltd. or approved equal

B. Description

1. The shaftless screw conveyor is to be loose and separate from the skid. Contractor shall provide one (1) inclined screw conveyor. The inclined conveyor shall be of a shaftless design and be 6” nominal diameter.

2. The Conveyor System shall accept dewatered sludge cake from the screw press and through an inlet hopper and convey the dewatered sludge cake to the outlet.

3. The screw conveyor shall be fully assembled and tested prior to shipping. The screw conveyor shall be shipped fully assembled, no field screw welding allowed.

4. The conveyor operation shall not cause excessive noise or vibration under loading conditions. The conveyor, including drive units, shall be designed such that noise levels in normal operation will not exceed 80 dBA at 3 feet from the equipment.

5. PERFORMACE REQUIREMENTS

a. The screw conveyors shall be capable of continuous transport of dewatered sludge at the following operating conditions:

1) Sludge volumetric min. transport rate.: 10 cu. ft./hour at 30 RPM

2) The conveyor shall be sized to convey the sludge at less than 60 percent of the conveyor’s rated capacity or 30 percent through filling. The conveyor drive unit shall be designed for 100 percent of conveyor rated capacity

b. 6” Diameter and 20-feet in length

c. Maximum incline of 26 degrees.

d. Screw conveyor will be able to be used in a through-wall application.

e. The Conveyor System shall meet service at 50% of the conveyor’s trough filling capacity. Each conveyor drive unit and spiral shall be designed for 100% of the conveyor’s trough filling capacity, and the starting of the

conveyor based on a fully loaded condition. Design units for continuous operations.

6. MATERIALS

   a. Steel plate & shapes: 304 SS

   b. Spiral: Cold formed spring steel, minimum thickness of 0.75-inch x 2.5-inch wide, 8620, 220 min BHN

   c. Wear Liners: ½ inch thick ultra-high molecular weight (UHMW) PE 48" maximum length.

   d. Bolt, Nuts, Washers: 304 SS, nuts and bolts shall be coated with anti-seize compound.

   e. Cover: 10-gauge 304 SS bolted with gaskets in 5-foot removable sections.

7. SPIRAL

   a. The spiral for the shaftless conveyors shall be designed to convey material without a center shaft, and with the stability to prevent distortion and jumping in the trough. Shaftless sections shall be formed to diameter and pitch in one operation. Shaftless sections shall be made from 0.75" thick x 2.5" wide, 8620 bar. Cut plate or sectional flights shall not be used. Minimum flight hardness 220 BHN.

   b. The spiral shall have double bevel full penetration welds at splice connections. The spiral shall be aligned to assure true alignment when assembled and shall be coupled to the end shaft by a welded connection.

   c. The spiral shall be concentric to within 1/16 inch over its entire length and shall be capable of withstanding a torque of at least 3,500 ft. lbs. without failure.

8. TROUGH

   a. The trough shall conform to the dimensional standards of CEMA 300 and enclosure classification IIE and shall be fabricated from minimum 10 GA 304 SS stainless steel sheet. The trough shall be U shaped, formed flange, and shall be equipped with one (1) filling and one (1) discharge chutes for transferring material from screw presses to the designated discharge point, as shown on the Drawings.

   b. The trough shall be furnished complete with a replaceable wear liner manufactured of ultrahigh molecular weight polyethylene PE, 48" long max sections for easy removal. Trough shall have a 304 stainless steel side hold

down bolted in place to prevent the screw from lifting in trough and bending the screw.

9. INLET/OUTLET CHUTES

a. The inlet and outlet chutes shall be fabricated from minimum 12 GA 304 SS stainless steel sheet. The inlet chute shall be supplied with a flange and 304 SS hardware to match the screw press discharge flange. The outlet chute shall be supplied with a flange and 304 SS hardware to match the inlet chute.

10. SUPPORT FRAMES

a. The conveyors shall be furnished complete support frames necessary to carry all loading. Frame bracing may not extend any further than the extent of the frame legs. with galvanized carbon steel intermediate support legs suitable for anchoring to the concrete base as shown on the contract drawings. The supports shall be shop fabricated from galvanized structural steel shapes and plates, with welding conforming to the standards of the American Welding Society.

b. Bolts, nuts and washers for conveyor supports shall be 304 stainless steel. Bolts, nuts and washers in contact with sludge together with those connecting the inlet and outlet chutes shall be 304 stainless steel. Nuts and bolts shall be coated with anti-seize compound.

c. The supports shall be designed to avoid interference with other equipment, equipment supports, or walking access around the conveyor. The supports shall be designed to prevent excessive vibration of the conveyor unit under every loading conditions.

11. GEAR REDUCER

a. The gear reducer shall be direct-coupled to the conveyor drive shaft.

b. Gear reducers shall be commercially built, AGMA Class II, single or double reduction, helical gear units with high capacity roller bearings. Bearings shall be designed for the thrust loads from the spiral flights and shall have an AFBNA B 10 life of 100,000 hours. The reducers shall be standard air-cooled units with no auxiliary cooling required. Lubrication shall be by splash as a minimum.

c. The applied torque of the drive unit and gear reducer shall be adequate to start the spiral conveyor when fully loaded.

12. DRIVE SHAFTS CONVEYOR SYSTEM

a. The drive shafts shall be heat-treated alloy steel AISI 4150. The shaft shall be accurately ground and fitted with key seats, as required.

13. BEARINGS

    a. Bearings shall have a B-10 life rating of 100,000 hours and conform to AFBMA standards.

14. COVERS

    a. A protection cover fabricated of minimum 10-guage 304 stainless steel shall be provided for the exposed length of the conveyor, as shown on the Drawings. The cover shall be bolted. The cover shall be sectioned to allow removal in 5-foot (maximum) pieces and shall be attached with stainless steel fasteners.

15. MOTOR REQUIREMENTS

    a. The spiral conveyors shall be driven by an electric motor directly connected to a gear reducer. The gear reducer shall be shaft mounted with a trough end adapter. The drive system shall be designed for starting the conveyor full loaded. OSHA-approved drive guards shall be provided to protect against moving parts.

    b. The motors shall be squirrel-cage TEFC electric induction motor complying meeting NEMA MG 1 and other applicable NEMA, ANSI and CISD, IEEE standards. Motor shall be constructed with Class B or F insulated winding, cast iron frame and cast iron end bells, with minimum B 30,000 anti-friction bearings. The motor shall be rated at 5 HP, 208 volts, 3 phase, 60 Hertz, continuous duty at 40 degrees C ambient temperature with a 1.15 service factor. The connecting load shall not exceed the motor nameplate horsepower rating under design operating conditions.

    c. Motor shall be listed and labeled by a recognized electrical testing laboratory for the application.

16. FABRICATION AND TESTING

    a. The conveyors shall be fabricated and assembled and tested prior to shipment. The system shall be broken down as required and shipped as an assembled unit in maximum permissible sizes where possible. Fabrication shall include shop drilling and reaming of field-assembled connections and fabrication of support frames. Exposed surfaces shall have a smooth finish and sharp edges and corners shall be ground off and removed.

17. SPARE OR REPLACEMENT PARTS

    a. Furnish a set of special tools required for removing worn parts, carrying out routine maintenance, and for making machine adjustments. Special tools are defined as those tools, which because of their limited use of purpose-made

design are not normally readily available, but which are necessary for maintaining the equipment.

b. Furnish gauges, indicators and lubricating devices necessary for the proper operation o the equipment, whether or not such accessories are specified.

18. WARRANTY

a. The contractor shall submit manufacturer's warranties for equipment to be furnished in accordance with this section.

b. Warranty shall extend for 12 months after start-up or 18 months after delivery, whichever comes first.

c. Warranty shall include parts, labor, and coatings for repairing or replacing equipment that fails during the warranty period. Defects occurring within the warranty period shall be repaired or replaced by the manufacturer at no cost to the Owner.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions and approved submittals.

B. The Contractor shall provide all hardware and accessories required for installation.

C. Manufacturer's Field Services

1. Include the following:

a. Inspection and Functional/Operational Testing: One trip with 3 days service.

b. Performance Testing/Training: One trip with 2 days service.

2. Additional trips resulting from failed tests shall be the sole responsibility of the manufacturer.

3. The Conveyor System

a. The contractor shall install the conveyors as shown in the drawings and as recommended by the manufacturer. Install the screw conveyors in a workmanlike manner, taking possible precautions to ensure proper alignment of shafts, gears, and other parts of the equipment.

b. The Contractor shall make electrical and process connections to the system prior to the arrival of the manufacturer's representative.

c. The Conveyor System is a subsystem of the Solids Dewatering System. Contractor responsibilities include assembly of components, connections between components, power supply, interconnecting wiring, instrumentation and controls, supports and miscellaneous hardware not specifically stated herein to ensure the exceptional overall system performance with seamless transition from one component to the next.

3.2 EQUIPMENT STARTUP AND TESTING

A. Perform start-up and functional testing for entire dewatering system, with all units operating in AUTO mode. The Contractor shall complete all electrical/instrumentation and loop testing prior to functional performance testing

B. Provide Major Certificate of Proper Installation.

C. Operational Test:

1. Functional/operational tests may be performed in the same trip.

D. Guaranteed Performance Testing:

1. Include the minimum number of trips and duration of service as previously indicated.

2. Include demonstration that dewatering system meets minimum specified performance requirements of this specification.

3. Manufacturer’s representative shall supervise all performance testing and be solely responsible for operating the dewatering and ancillary equipment (e.g., sludge and polymer feed systems). The Owner shall furnish personnel to assist in operating the equipment and take samples. Manufacturer shall provide certified test reports.

4. After adjustments are made to achieve the operating requirements, the dewatering system will be operated at the design conditions to demonstrate consistent performance. Samples of feed, filtrate, and cake shall be collected by Engineer's appointed representative or Owner and evaluated by the Manufacturer. The test will be deemed successful if average test results meet or exceed those specified.

5. Sample testing and analysis costs shall be the responsibility of the Owner.

6. Polymer shall be as selected by the polymer representative and supplied by the Owner for testing.

7. Data collected during each test run used to complete guaranteed performance testing shall include, as a minimum:

a. Run number.

b. Date.

c. Time.

d. Feed sludge percent total solids, %TS

e. Sludge feed rate, gpm.

f. Polymer name.

g. Polymer percent active, %.

h. Polymer feed rate (neat), gph.

i. Screw press speed, rpm.

j. Amperage draw by the screw press drive.

k. Cake percent total solids, %TS.

8. Provide calculated values for the following:

a. Solids throughput, lbs TS/hr.

9. Solids concentrations will be determined using “Standard Methods.”

10. Guaranteed Performance Test Runs:

a. Test runs shall consist of two 24 hour steady state runs performed on two separate days, one week apart. Maintain the minimum design solids throughput throughout the test runs. Inlet sludge for test runs shall be 1.0% or greater.

b. All test data and values and previously described and required to demonstrate compliance shall be recorded at the start of each run and every hour thereafter. The averaged results for each sample shall meet or exceed the minimum and guaranteed performance standards.

c. The units shall be operated in AUTO mode at all times during the Guaranteed Performance test runs.

d. Should the installed equipment fail to meet the specified minimum performance requirements, the manufacturer shall within 30 days make all necessary changes to the equipment and/or operation at no cost to the Owner. The equipment shall be retested using the same procedure indicated above. If after the second test the equipment still does not meet the minimum performance requirements and/or guaranteed performance standards, damages will be assessed and equipment replaced.

e. The screw press dewatering system shall meet every item of the performance criteria as specified prior to acceptance of the Owner.

11. MANUFACTURER shall prepare and submit a written report documenting the test data listed above.

12. Provide a computer spreadsheet compatible with Microsoft Excel (latest version) with the test data listed above.

E. Witnessing: All field testing shall be witnessed by the Owner's representative or Engineer.

F. A representative of the screw press manufacturer shall be provided for the following:

1. To inspect the equipment and installation

2. To make any field adjustments to ensure proper equipment operation

3. To furnish affidavit stating that the dewatering system has been tested and is ready for installation as specified.

4. To inspect start-up

G. Manufacturer shall inspect system before initial start-up and certify that system has been correctly installed and prepared for start-up.

H. Training:

1. Provide operator training for at least 2 days on-site by factory trained representative. Operator training to include:

a. Operations and inspection training.

b. Safety instruction.

c. Preventative maintenance instruction.

d. Calibration and other pertinent services.

I. The Conveyor System

1. The conveyor manufacturer shall test general operation and perform the following inspections and tests on each conveyor before shipment from the factory:

a. A conveyor run test to verify correct rotation and mechanical integrity. The entire unit is checked for vibration.

b. A Full Load Motor Test (run dry for 5 minutes at full load) to verify electrical data measurements.

c. A final inspection of screw, trough, motor rating, and electrical connections for compliance with purchase order.

2. The conveyors shall be tested onsite under typical operating load conditions before final acceptance.

3. The Contractor shall include services of a qualified representative to perform a pre-operational checkout and start-up of the equipment. Startup shall include one (eight) 8-hour session.

4. The Contractor shall adjust the instruments and signals associated with the Conveyor System as required to affect the conveyor operation described in this specification.

5. Provide one session (session for 4 hours) of field training for the Owner’s operation staff in conjunction with or immediately following the performance testing.

6. Provide authorized representative from equipment manufacturers to instruct the Owner's personnel in the operation and maintenance and configuration of the equipment. Training shall be scheduled a minimum of 2 weeks in advance of the first session.

7. Proposed training materials shall be submitted for review, and comments shall be incorporated. Training materials shall remain with the trainees.

8. Provide ongoing technical support for Owner’s operation staff for the full warranty period, including additional field training if requested by the Owner due to operational issues.

END OF SECTION

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