

Village of Crestline, Ohio

Specifications for:

WASTEWATER TREATMENT PLANT IMPROVEMENTS PHASE I

April 2014

PREPARED BY:

GGJ, INC.
35585 CURTIS BLVD., UNIT C
EASTLAKE, OHIO 44095
PHONE: (440) 953-1567
FAX: (440) 953-0580

PREPARED FOR:

VILLAGE OF CRESTLINE, OHIO
100 NORTH SELTZER STREET
CRESTLINE, OH 43452
PHONE: (419) 683-3800
FAX: (419) 683-4205

SPECIFICATION REVIEW:

Reviewed by: _____
Project Manager

Reviewed by: _____
Specification Engineer

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Village of Crestline
WASTEWATER TREATMENT PLANT IMPROVEMENTS – PHASE I

CITY OFFICIALS

ADMINISTRATION

David Sharrock, Mayor

Marc Milliron, Village Administrator

Gloria McDonald, Treasurer

Harry Welsh, Law Director

Annette Johnston, Clerk of Council

COUNCIL

Clayton Herold

Mike Blaising

Kevin Taylor

Aaron Buckner

Ryan Mahek

Stacey Wampler

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PROJECT DIRECTORY

OWNER:

Village of Crestline, Ohio
100 North Seltzer Street
Crestline, Ohio 44827
Attn: Mayor David Sharrock

Phone: 419-683-3800
Fax: 419-683-4205

ENGINEER:

GGJ, Inc.
35585 Curtis Blvd., Unit C
Eastlake, Ohio 44095
Attn: John Sabo, PE

Phone: 440-953-1567
Fax: 440-953-0580

PROJECT CERTIFICATION

I hereby certify that the Project Drawings and the Project Manual were prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Ohio.

John Sabo, P.E.

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SECTION 00020

INVITATION TO BID

Sealed proposals will be received at the Office of the Mayor, 100 North Seltzer Street, Crestline, Ohio 44827 until 11:30 a.m. o'clock A.M. Local Time on Thursday, April 17, 2014 ,or as may be amended by written Addenda, and will be opened and read immediately thereafter for the:

**VILLAGE OF CRESTLINE, OHIO
WASTEWATER TREATMENT PLANT IMPROVEMENTS – PHASE I**

PROJECT DESCRIPTION: Project includes the conversion of the existing Anaerobic Digester into an Aerobic digester and construction of a new sludge dewatering facility with pre-engineered steel building.

COMPLETION DATE: 270 CALENDAR DAYS

Contract Documents may be examined at the following locations:

ENGINEER:
GGJ, Inc.
35585 Curtis Blvd., Unit C
Eastlake, Ohio 44095
(440) 953-1567

OWNER:
Village of Crestline
100 North Seltzer Street
Crestline, Ohio 44827
(419) 683-3800

Dodge Reports
6200 Rockside Woods Blvd., Suite 310
Independence, Ohio 44131
(216) 901-1589

Plans, specifications and bidding blanks may be obtained at the above office of the ENGINEER upon payment of **ONE HUNDRED FIFTY DOLLARS (\$150.00) NON-REFUNDABLE**. Contract Documents will be mailed as soon as possible after receipt of request and payment for such documents. Checks shall be made payable to GGJ, INC.

A bid security must be submitted with the bid. The bid security shall be in the form of a Certified check, a Cashiers check, or an Irrevocable Letter of Credit for an amount equal to ten percent (10%) of the bid; OR a Bond for the FULL AMOUNT of the bid. Said bid security shall be made payable to the OWNER and is to be held as a guarantee that in the event the bid is accepted and a contract is awarded to the BIDDER, the contract will be duly executed and its performance properly secured.

The successful BIDDER will be required to furnish a Contract Performance Bond in an amount not less than one hundred percent (100%) of the total price bid for the complete work, said Bond shall be that of an approved surety company authorized to transact business in the State of Ohio and shall be underwritten by a surety that is listed on the most current Department of the Treasury Circular 570, "Surety Companies Acceptable on Federal Bonds".

BONAFIDE BIDDER REQUIREMENTS: Bid Proposals will **ONLY** be opened and/or received from Bonafide Plan Holders. Any Bid Proposal(s) received by a non-Bonafide Plan Holder, will be deemed invalid.

Questions by prospective bidders concerning this project should be directed to the ENGINEER'S ***Mr. John Sabo, P.E.***, Monday through Friday between 9:00 A.M. and 4:00 P.M. No questions will be taken during any other time.

Each bid proposal must be made upon the blanks furnished with the Contract Documents and must be delivered to Office of the Mayor, 100 North Seltzer Street, Crestline, Ohio 44827, prior to the time on the date stated above.

No bidder may withdraw a bid within 60 days after the actual date of the opening thereof.

A pre-bid meeting will be held at 10:30 A.M. on Wednesday, April 8, 2014 at the Village Hall located on 100 North Seltzer Street, Crestline, Ohio 44827. All Contractors interested in bidding should attend. A visual inspection of the project will be conducted after the meeting.

Non-Discrimination in Employment – Bidders on this work will be required to comply with the President's Executive Order No. 11246 in that employees and applicants for employment shall not discriminate against because of race, color, religion, sex or national origin. The requirements under this order are explained in the contract documents.

WAGE RATES - Each employee employed by the CONTRACTOR or any SUBCONTRACTOR and engaged in work on the project under this contract shall be paid federal prevailing wages determined by the Secretary of Labor and in accordance with the Davis Bacon Act.

The OWNER reserves the right to reject any or all bids, to waive any informalities or irregularities in the bids received, and to accept any bid which it deems most favorable.

BY ORDER OF

Village of Crestline
Mayor David Sharrock

Proof of Publication

March 26, 2014

April 2, 2014

April 9, 2014

Crestline Advocate

END OF SECTION

DIVISION 0

BIDDING AND CONTRACT REQUIREMENTS

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INSTRUCTIONS TO BIDDERS**1. PROJECT DESCRIPTION**

- 1.1 OWNER: Village of Crestline
100 North Seltzer Street
Crestline, Ohio 44827
- 1.2 DESCRIPTION: Wastewater Treatment Plant Improvements – Phase I
- 1.3 COMPLETION TIME: Substantial Completion: 240 Calendar Days
Final Completion: 30 Calendar Days after Substantial Completion
- 1.4 ENGINEER'S OPINION OF PROBABLE COST:
General Construction: \$ 1,100,000.00
- 1.5 ENGINEER: GGJ, Inc.
35585 Curtis Blvd., Unit C
Eastlake, Ohio 44095
Telephone: (440) 953-1567
Fax: (440) 953-0580
Project Contact Person: **John Sabo, P.E.**

2. PLANS, SPECIFICATIONS, & BIDDING DOCUMENT

- 2.1 **Viewing and Purchasing Contract Documents:** Copies of the Contract Documents may be examined at the office of the Mayor, Village of Crestline, 100 North Seltzer Street, Crestline, Ohio 44827 and at the office of the Engineer. The Contract Documents including Drawings, Specifications, bidding forms, and related contract materials may be obtained at the Eastlake office of the Engineer upon payment of **ONE HUNDRED FIFTY DOLLARS (\$150.00) NON-REFUNDABLE**. CONTRACT DOCUMENTS will be mailed as soon as possible after receipt of request and payment for such CONTRACT DOCUMENTS. Checks shall be made payable to GGJ, INC.
- 2.2 **Bonafide Plan Holder:** is one who purchases plans and specifications for a specific project and is acknowledged by either the owner and/or his deemed representative.
- (2.3) **Pre-Bid Meeting:** There will be a Pre-Bid meeting at Village Hall, 100 North Seltzer Street, Crestline, Ohio on, Tuesday, April 29, 2014 to view the site and to answer potential bidders' questions.
- 2.3 **Questions during Bidding:** All questions regarding the meaning or intent of the Contract Documents shall be directed to the Engineer's Contact Person noted above. Subsequent interpretations and clarifications considered necessary by the Engineer will be issued by Addenda. Questions received less than seven (7) days prior to the scheduled date for opening bids may not be answered. Only questions and clarifications made by formal written addenda will be binding. Oral and other interpretations or clarifications, when given, will be without legal effect. The Contract Work shall be performed in accordance with the Contract Documents as prepared by the Engineer.
- 2.4 **Issuance of Contract Document Sets:** Upon award of the Contract, the Owner will furnish two (2) executed copies of the Drawings, Specifications and related Contract Materials; and if requested, will furnish one (1) set of reproducible project Drawings, at no cost to the Contractor. Additional sets of Contract Documents may be purchased from the ENGINEER for the price set forth above and in the Invitation to Bid.
- 2.5 **Addendum:** Addenda may be issued by the Engineer or Owner to notify that the Contract Documents have been amended. The Bidder is required to acknowledge receipt of Addenda in the Bidding Documents or they may be subject to disqualification. Addenda will be mailed or otherwise delivered to all parties recorded by Engineer as having received the Bidding Documents.

- 2.6 **Other Project Related Information:** The following information is available for inspection at the Owner's offices and at the Engineer's Offices:

2.6.1 N/A

3. SUBMISSION OF BID PROPOSALS

- 3.1 Sealed Bid Proposals will be received by the Owner at the designated place until the date and time specified in the Invitation to Bid, as may be amended, at which time they will be publicly opened and read.
- 3.2 All submitted Bid Proposals shall be sealed in individual envelopes and addressed as follows:
- Village of Crestline
100 North Seltzer Street
Crestline, Ohio 44827
- 3.3 Each "sealed" envelope containing a Bid Proposal must bear on the outside, the Bidder's name, address, and the name of the project for which the Bid Proposal is submitted. If forwarded by mail, the sealed envelope containing the Bid Proposal must be enclosed in another (mailing) envelope addressed to the Owner at the above address.
- 3.4 Any Bid Proposal received after the time and date stated, will not be considered.
- 3.5 Bids must be made on the Bid Proposal forms (or photocopies thereof) furnished in the Contract Documents.
- 3.5.1 All prices bid must be entered in figures only on the Bid Schedule form provided. If the bid item embraces labor and material, the Bid Proposal shall separately state the Unit Price for Material and the Unit Price for Labor.
- 3.5.2 Enter each Bid Item's Total Unit Price as the sum of the Unit Prices entered for Material and for Labor, if the Item embraces both OR as a lump sum amount, if the item is a Lump Sum Item.
- 3.5.3 Enter each Item's Total Price as the product of its Estimated Quantity and the Item's Total Unit Price. In the event of a conflict, the Estimated Quantities and the Total Unit Price listed on the form shall govern over the Unit Prices for Material and Labor, and the Total Price listed.
- 3.6 Each Bidder must bid on all Items and Alternates contained on the Bid Schedule form. Any Bid that does not conform to this requirement may be considered informal and may be rejected.
- 3.7 Each Bidder is required to disclose in his Bid, the full names and addresses, and the place of business of all people, other than the named Bidder, that have a legal or ownership interest in the Bid Proposal. If the Bidder is a corporation, only the names of its president and secretary need to be provided. If no other person has an interest, the Bidder shall state that fact.
- 3.8 The prices recorded in the Bid Schedule must be in ink and be complete when submitted.
- 3.8.1 Any corrections to the Bid Proposal made prior to submission must be initialed by the person signing the Bid Proposal.
- 3.8.2 Submit one copy of the Bid Proposal documents.
- 3.9 Bid Proposals submitted by Corporations must be executed in the corporate name by its President, Vice-President, or other Officer accompanied by evidence of authority to sign the proposal. The corporate seal must be affixed and attested to by the Secretary.
- 3.10 Bid Proposals submitted by partnerships must be executed in the partnership name and be signed by a partner, whose title must appear along with the signature.
- 3.11 All names must be typed or printed below the signature.
- 3.12 The Bid Proposal shall contain an acknowledgment the Bidder has received all of the issued Addenda;

otherwise the Bid may be disqualified.

- 3.13 The Owner reserves the right to hold the Bid Proposals for a period of sixty (60) days after opening and to award Contracts at any time during that period.
 - 3.13.1 No Bidder may withdraw a Bid within 60 days after the actual date of the opening thereof.
 - 3.13.2 Should there be reasons why the Contract cannot be awarded within the specified period; the time may be extended by mutual agreement between the Owner and the Bidder.
 - 3.13.3 Each Bid Proposal must be accompanied by a bid guarantee instrument payable to the Owner in the form of one of the following:
 - 3.13.3.1 A Bid Bond for the full amount of the Bid, including alternatives, with a corporate Surety approved by the Owner. Use Bid Guaranty and Contract Bond (Bid Bond) form included in the bidding documents for projects located in the State of Ohio. For projects located in other states, provide Bid Bond. If bid is accepted, Bidder will be required to provide Performance Bond(s) assuring required Payments, Maintenance, and Guarantees. Should a Bid be rejected, the Bond will be promptly returned to the Bidder. Bid Bonds provided for this work shall be underwritten by a surety that is listed on the most current Department of the Treasury Circular 570, "Surety Companies Acceptable on Federal Bond". Include the names and addresses of the Bid Bond Agent and the Surety Company.
 - 3.13.3.2 A certified check equal to 10 percent of the Bid.
 - 3.13.3.3 A cashier's check equal to 10 percent of the Bid.
 - 3.13.3.4 An irrevocable letter of credit equal to 10 percent of the Bid.
- 3.14 The successful Bidder will be required to furnish a Contract Performance Bond for the full amount bid for the complete work, including all selected alternatives. This bond shall be that of an approved Surety company authorized to transact business in the State of Ohio and shall be underwritten by a Surety that is listed on the most current Department of the Treasury Circular 570, "Surety Companies Acceptable on Federal Bonds".
- 3.15 Within ten (10) days after opening the Bids, the Bids will be compared and the OWNER will return the Bid guaranties of all Bidders except for the three lowest Bidders.
- 3.16 When the agreement is executed and delivered, or the period for holding the Bids has expired and no time extension has been mutually agreed upon, the Bid guarantees of the remaining Bidders will be returned.
- 3.17 Any Bid may be withdrawn prior to the scheduled time for the opening of Bids or authorized postponement thereof.
 - 3.17.1 If a Bidder wishes to withdraw his Bid Proposal, he shall state his desire in writing to the Owner BEFORE the time fixed for the opening, and when Bidder's Proposal is reached it will be set aside and returned.
- 3.18 Materials to be incorporated in this work may be purchased by the Contractor free of Ohio State or County Sales Tax.
- 3.19 The successful Bidder must comply with the minimum wage rates for laborers and mechanics as determined by the State of Ohio prevailing wages.

4. EXAMINATION OF CONTRACT DOCUMENTS & SITE

- 4.1 In submitting a Bid, Bidder warrants that he has investigated and is acquainted with the conditions to be encountered for performing the work including the character, quality, quantities of work to be performed, the materials to be furnished, the prevailing hourly wage rates for the area in which the project is located, and the requirements of the Contract Documents. It is mutually agreed that the submission of a Bid shall be considered prima facie evidence that Bidder has made such examination and is satisfied as to all the conditions that will affect the work.

- 4.1.1 Bidders shall satisfy themselves of the accuracy of the estimated quantities in the Bid Schedule by making an examination of the site and a review of the Contract Documents, including all issued Addenda.
- 4.2 Before submitting a Bid, each Bidder must (a) examine the Bid Proposal thoroughly, (b) visit the site to familiarize himself with local conditions that may in any manner affect cost, progress or performance of the work, (c) familiarize himself with Federal, State and local laws, ordinances, rules and regulations that may in any manner affect cost, progress or performance of the work; and (d) study and carefully correlate Bidder's observations with the Contract Documents.
 - 4.2.1 All applicable laws, ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the Project shall apply to the Contract throughout.
 - 4.2.2 The Contract Documents contain the provisions required for the construction of the Project.
- 4.3 Reference is made to the Supplementary Conditions and to paragraph 2.6 above for the identification of those reports of investigations and tests of subsurface and latent physical conditions at the site or otherwise affecting cost, progress or performance of the work that have been relied upon by the Engineer in preparing the Drawings and Specifications. Owner will make copies of such reports available to any Bidder requesting them. These reports are not guaranteed as to accuracy or completeness; nor are they part of the Contract Documents. Before submitting his Bid, each Bidder shall, at his expense, make such additional investigations and tests as the Bidder may deem necessary to determine his Bid for performance of the work in accordance with the time, price and other terms and conditions of the Contract Documents.
- 4.4 Upon request, the Owner will provide each Bidder access to the site to conduct such investigations and tests as each Bidder deem necessary for submission of his Bid.
- 4.5 The lands upon which the work is to be performed, rights-of-way for access to the site, and other lands designated for use by Bidder in performing the work, are identified in the Contract Documents.
- 4.6 The submission of a Bid will constitute an incontrovertible representation by the Bidder that he has complied with every requirement of this Section and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the work.
- 4.7 Information obtained from an officer, agent, or employee of the Owner or any other person shall not affect the risks or obligations assumed by the Bidder or relieve him from fulfilling any of the conditions of the Contract.

5. CONTRACTOR'S QUALIFICATION AND EQUIPMENT

- 5.1 Bidder shall provide evidence of sufficient previous experience on work of a similar nature to assure the Owner of his capability to perform the work.
- 5.2 Bidder shall complete the appropriate parts of the Bid Proposal relating to work experience and equipment available for use.
- 5.3 Bidder shall provide pertinent information to the Owner relative to any pending suits or outstanding liens. If no information is provided by the Bidder, the Owner shall assume that no such suits or liens exist.
- 5.4 Bidder shall provide information on all incomplete contracts including the Owner's name, Contract Amount, and Status.

6. ESTIMATED QUANTITIES

- 6.1 The unit price quantities listed in the Bid Schedule are approximate and are to be used for comparing Bids and in no way binds the Owner to using the quantities, or any part thereof, in the execution of the work.
- 6.2 Except for lump sum items, payments will be made to the Contractor for the actual quantities of work performed or materials furnished in accordance with the Contract Documents, and it is understood that the scheduled quantities of work to be done and materials to be furnished may be increased or decreased without invalidating the unit prices bid.

- 6.3 The Owner reserves the right to increase or decrease the quantities or omit altogether any items that in the judgment of the Owner may be deemed advisable after the award of the Contract.
- 6.4 The successful Bidder will be required to furnish the Owner a complete breakdown of the lump sum Items, to the satisfaction of the Engineer within five (5) days after the Notice of Award is provided, and before signing the Construction Contract.
- 6.5 Payments for lump sum Items will be based on an estimated percentage of the Item's completeness, as determined by the Engineer.

7. SUBCONTRACTORS

- 7.1 The Bidder shall state on the appropriate Contract form the names of all Subcontractors that he proposes to utilize and the work they will be assigned. All work of Bidder not assigned to a Subcontractor shall be understood by the Owner to be performed by the Bidder.
- 7.2 Each Bidder shall perform with his own organization not less than FIFTY PERCENT (50%) of the total Contract price.
- 7.3 The Owner reserves the right to approve or disapprove all Subcontractors proposed by the Bidder. If the Owner, after due investigation, rejects the use of a proposed Subcontractor, the apparent successful Bidder may either submit an acceptable substitution without increase in Bid price or decline substitution and withdraw his Bid Proposal without sacrificing his Bid security. Any listed Subcontractor that Owner does not make written objection to before awarding the Contract, shall be deemed acceptable to the Owner.
- 7.4 Requests by the Bidder to change Subcontractors after the award shall be subject to the Owner's approval and shall not change the Contract Bid prices.
- 7.5 No Bidder shall be required to employ any Subcontractor, person, or organization against which he has reasonable objection.

8. NON-COLLUSION AFFIDAVIT

- 8.1 Each Bid Proposal must be accompanied by a completed Non-Collusion Affidavit provided within the Bid Proposal.
- 8.2 Where there is reason to believe collusion or combination among Bidders exists, the Owner reserves the right to reject the Bid Proposal of those concerned.

9. INSURANCE

- 9.1 Verification of Workers' Compensation, General Liability, Automobile Liability, and Property insurances consistent with the provisions of the Contract Documents must be submitted to the Owner prior to an Award of Contract. The required Certificates of Insurance shall show that the Owner, Engineer, Engineer's Consultants, and other people identified in the Contract Documents shall be specifically named as additional insured on all policies covering work under this Contract.
- 9.2 All insurance shall be endorsed so that it cannot be canceled until thirty (30) days after Insurer's written notice to Owner of such proposed action.

10. CONTRACT

- 10.1 Before entering into the Contract, the Owner will require the Bidder to provide a Contract Performance Bond and a Payment Bond, each for 100 percent of the Contract Price, with a corporate surety approved by the Owner, to assure the faithful performance of the Contract. All bonds must be underwritten by a surety company authorized to transact business in the State where the work is located and upon which service of process can be made, conditioned on the faithful performance of the work in accordance with the Contract Documents. Such security or bond also shall indemnify the Owner against damages suffered as a result of the Bidder's failure to perform the Contract in accordance with the Contract Documents, and guaranteeing the related construction and performance of the improvements for a period not less than one (1) year from the date of final acceptance by the Owner, and guaranteeing the payment of all lawful claims of Subcontractors, equipment and material providers, and for labor performed in carrying forward or

completing the Contract.

- 10.2 All bonds shall be in the form required by the Department of Housing and Urban Development and the State of Ohio.
- 10.3 All bonds shall be underwritten by a surety that is listed on the most current Department of the Treasury Circular 570, "Surety Companies Acceptable on Federal Bonds."

11. AWARD OF CONTRACT

- 11.1 The Owner reserves the right to reject any and all Bids, to waive any informalities or irregularities in the Bids received, and to accept any Bid it deems most favorable.
- 11.2 All extensions and totals of unit prices and quantities submitted as part of the Bid shall be considered informal until verified by the Owner.
- 11.3 In evaluating Bids, the Owner may consider the qualifications and experience of the Bidders, whether or not the Bids comply with the prescribed requirements, and alternates and unit prices if requested in the Bid Forms.
- 11.4 Owner may consider the qualifications and experience of Subcontractors and other people and organizations (including those who are to furnish the principal items, material, or equipment) proposed for portions of the work. Operation costs, maintenance considerations, performance data and guarantees of materials and equipment may also be considered by the Owner.
- 11.5 Owner may conduct such investigations as it deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications, and financial ability of the Bidders, proposed Subcontractors, and other persons and organizations to perform the work in accordance with the Contract Documents to Owner's satisfaction and within the prescribed time. Bidder shall furnish all information and data for this purpose as the Owner may request.
- 11.6 The Owner reserves the right to reject any Bid if the evidence submitted by, or investigation of the Bidder fails to satisfy the Owner that Bidder is sufficiently qualified to carry out the obligations of the Contract and to satisfactorily complete the work identified therein.
- 11.7 If a Contract is awarded, it will be awarded to the lowest and best Bidder whose evaluation by the Owner indicated to Owner that the award will be in the best interests of the project.
- 11.8 If a Contract is awarded, Owner will give the successful Bidder a Notice of Award within sixty (60) days after the day of the Bid opening.
 - 11.8.1 Copies of Notice of Award will be sent to both the Bid Bond Agent and Surety Company.
- 11.9 A conditional or qualified Bid will not be accepted.
- 11.10 Prior to awarding the Contract, the Bidder must submit certification from the Secretary of State that Bidder is authorized to do business in the State of Ohio. Also prior to award, the Bidder must submit a Power of Attorney to the Secretary of State designating it as an agent for the purpose of accepting the service of summons in any action brought under the Ohio Revised Code and the contract and bond are submitted to the Attorney General for their certified approval.

12. EXECUTION OF CONTRACT

- 12.1 Accompanying the written Notice of Award will be three (3) unsigned sets of Contract Documents not including the Drawings. Within fourteen (14) calendar days from the date of receipt of the Notice of Award, the successful Bidder shall sign and deliver to the Owner the Contract Document sets along with a performance Bond, a payment Bond, and insurance verifications.
 - 12.1.1 The Notice of Award will be accompanied by the necessary Contract and Bond forms.
- 12.2 Within fourteen (14) days of receipt of the successful Bidder's signed Contracts, the Owner will sign the Contracts and return two (2) fully executed Contracts.

- 12.3 The date of the Owner's signature shall be the effective Contract date. The Contract completion time does not start until the issuance date of the Notice to Proceed.

13. BID SECURITY

- 13.1 In the event that the successful Bidder fails, on his part, to execute the Contracts within the specified time, the Owner may consider the Bidder in default and award the Contract to the next lowest Bidder. The Bidder and/or Surety failing to enter into a contract are liable to the Owner for the lesser amount of:
- 13.1.1 The difference between his Bid and the next lowest Bid, or
- 13.1.2 A sum not to exceed ten percent (10%) of the Bid.
- 13.2 If the Owner chooses to re-bid the work, the Bidder failing to enter into a contract and/or his Surety shall pay the lesser amount of:
- 13.2.1 A sum not more than ten percent (10%) of the Bid, or
- 13.2.2 The cost incurred in the process of re-bidding, including labor, printing costs, advertising, and mailings to prospective Bidder.
- 13.3 In the event that the second lowest Bidder is awarded the Contract and fails to execute the Contract within ten (10) days, the Owner may then award to the third lowest bidder.
- 13.3.1 Same as the 13.2.1 above.
- 13.3.2 Same as the 13.2.2 above.
- 13.4 When more than one Bidder fails to execute a Contract and the Owner re-advertises for Bids, each Bidder that failed to enter into a Contract shall equally share in the re-bidding costs.

14. LIQUIDATED DAMAGES

- 14.1 Provisions for liquidated damages, if any are set forth in the Bid Proposal and the Contract.

15. DELINQUENT PERSONAL PROPERTY STATEMENT

- 15.1 Included with the Contract Documents is a delinquent Personal Property Statement to be filled out by the successful Bidder after the award of the Contract.
- 15.2 The Statement shall be sent to both the COUNTY AUDITOR and the COUNTY TREASURER. A signed copy shall remain in the Contract Documents as well.

16. SALES TAX

- 16.1 The Owner is Ohio sales tax exempt and will provide a certification of sales tax exemption. Bidder shall verify utilization of the certification with legal counsel and the State of Ohio.

END OF SECTION

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Village of Crestline
WASTEWATER TREATMENT PLANT IMPROVEMENTS – PHASE 1

BASIS OF PAYMENT

GENERAL: Payment for the work Items shall be at the total unit or lump sum price Bid for each unit of work completed and accepted in accordance with the Contract Documents.

The latest "State of Ohio, Department of Transportation, Construction and Material Specifications" manual shall govern the material and procedures used in this project, if not otherwise specified in the project Specifications or noted on the Drawings.

PRICES TO INCLUDE: For each Bid Item, the total unit price or lump sum price Bid shall be considered full compensation for the completed and accepted work, and shall include all labor, materials, tools, equipment and transportation needed to perform the work in accordance with the Contract Documents so as to provide a complete and properly functional system. The General Contractor shall be responsible for reviewing the contents and conditions of all Contract Documents as they may relate to the work under this Contract and comply with the requirement thereof.

ITEM 1 – BONDS AND INSURANCE

A. Payment:

1. The lump sum amount stated in the Bid Schedule for bonds and insurance shall include all bonds and insurance required to be in force at the commencement of the work. Successful bidder will be required to provide receipts verifying the actual costs of this item when known.
2. Subsequent expenses for bonds and insurance as may be necessary throughout the contract period for changes to the contract or for other occurrences, shall not be a part of this item.
3. Fees for bonds and insurance due to changes in the work shall be respectively a part of the cost of that work.

ITEM 2 – MOBILIZATION

A. Work included: As described in Section 00800 Supplementary Conditions SC-22 and other work incidental to this Item.

B. Payment: Lump Sum price with payments as specified in Section 00800 Supplementary Conditions SC-22.

ITEM 3 – SUBSURFACE SOIL INVESTIGATION

A. Measurement: Shall be on the lump sum basis for the total amount of work to be performed under this item.

B. Payment: The lump sum stipulated to be paid for the Subsurface Soil Investigation shall include all borings and field work, testing, and complete report in accordance with the current Ohio Building Code. Geotechnical investigations shall be conducted in accordance with Section 1803.2 (OBC) and reported in accordance with Section 1803.6 (OBC). Where geotechnical investigations involve in-situ testing, laboratory testing or engineering calculations, such investigations shall be conducted by a State of Ohio registered design professional. Soil classification shall be based on observation and any necessary tests of the materials disclosed by borings, test pits or other subsurface exploration made in appropriate locations. The scope of the geotechnical investigation including the number and types of borings or soundings, the equipment used to drill or sample, the in-situ testing equipment and the laboratory testing program shall be determined by a State of Ohio registered design professional.

ITEM 4 – STEEL BUILDING FOUNDATION (TYPE 1 – TYPE4)

- A. Measurement: Shall be on the lump sum basis for the total amount of work to be performed under this item.
- B. Payment: The lump sum stipulated to be paid for the Steel Building Foundation Design (Type 1 – Type 4) shall include a final stamped design to be done in conjunction with the subsurface soil investigation as well as account for all designed loads and reactions supplied within the Metal building final design. All column/foundation locations are to remain consistent with the drawings. Relocation of said column/foundations may be accepted if it does not impact the proposed processing equipment or cause a redesign of bathroom and hallway. Various types of foundations will be accepted as long as the registered design engineer accounts for and or utilizes the other proposed improvements within the final design. These improvements include but are not limited to the concrete floor, masonry foundation wall, and existing basement walls. Foundation design shall also be performed in accordance with the current State of Ohio Building Code and by a State of Ohio registered design professional.

ITEM 5 – SLUDGE DEWATERING BUILDING

- A. Measurement: Shall be on the lump sum basis for the total amount of work to be performed under this item.
- B. Payment: The lump sum stipulated to be paid for the balance of the Sludge Dewatering Building improvements not otherwise bid, shall be full compensation for all actual demolition, removal and disposal of all equipment and structures, and all items as shown or described on the drawings. This price shall also include as full compensation all structural and architectural improvements, proposed concrete, masonry, all proposed process equipment, utility connections, valves, piping, gates, plumbing, electrical improvements, HVAC, all WWTP site work, and all appurtenances to complete the work shown on the drawings and specified in the contract documents for a complete and ready-for-use installation.

ITEM 6 – DIGESTER TANK DEMO & IMPROVEMENTS

- A. Measurement: Shall be on the lump sum basis for the total amount of work to be performed under this item.
- B. Payment: The lump sum stipulated to be paid for the balance of the Digester Tank Demolition and Improvements, shall be full compensation for all actual demolition, removal and disposal of all equipment and structures, and all items as shown or described on the drawings. This price shall also include as full compensation all proposed process equipment, utility connections, valves, piping, wall penetrations, positive displacement blowers and aeration system, electrical improvements, and all appurtenances to complete the work shown on the drawings and specified in the contract documents for a complete and ready-for-use installation.

ALT-1 – SLUDGE DRYING BED REPAIRS

- A. Measurement: Shall be on the lump sum basis for the total amount of work to be performed under this item.
- B. Payment: The lump sum stipulated to be paid for the balance of the Sludge Drying Bed Improvements, shall be full compensation for all actual demolition, removal and disposal of all equipment and structures, and all items as shown or described on the drawings. This price shall also include as full compensation all proposed process equipment, utility connections, valves, piping, concrete, and all appurtenances to complete the work shown on the drawings and specified in the contract documents for a complete and ready-for-use installation.

PROPOSAL TO THE VILLAGE OF CRESTLINE, OHIO
WASTEWATER TREATMENT PLANT IMPROVEMENTS – PHASE 1

TO: MAYOR DAVID SHARROCK
VILLAGE OF CRESTLINE
100 NORTH SELTZER STREET
CRESTLINE, OHIO 44827

Gentlemen:

Proposal of _____ (hereinafter called "BIDDER"), organized and existing under the laws of the State of Ohio doing business as _____. * To the VILLAGE OF CRESTLINE (hereinafter called "Owner").

In compliance with your Advertisement for Bids, BIDDER hereby proposes to perform all WORK for the construction of the WASTEWATER TREATMENT PLANT IMPROVEMENTS – PHASE 1 in strict accordance with the CONTRACT DOCUMENTS, within the time set forth therein, and at the prices stated below.

By submitting this BID, the BIDDER, or in the case of a joint BID, each party thereto, certifies as to its own organization, that this BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this BID with any other BIDDER or with any competitor.

The undersigned have full knowledge of the project site, Drawings, and the conditions of the proposal. The undersigned also, hereby agrees to furnish all the services, labor, materials and equipment necessary to complete these projects according to the Drawings and Specifications and to accept as full compensation the lump sum or unit prices stated in the Bid Schedule for the work and for use when calculating the price of a deduction or an increase in quantities.

BIDDER hereby agrees to commence WORK under this Contract on or before a date to be specified in the NOTICE TO PROCEED and to fully complete the PROJECT within the period stipulated in the INSTRUCTIONS TO BIDDERS. BIDDER further agrees to pay as liquidated damages and that the CITY may retain from monies that are, or which may become due. The amount of such liquidated damages shall be as stipulated in the CONTRACT AGREEMENT FORM (Section 00500 herein).

* Insert "a corporation", "a partnership", or "an individual" as applicable.

The Bidder hereby acknowledges receipt of the following addenda:

<u>ADDENDUM NO.</u>	<u>DATE</u>
<hr/>	<hr/>
<hr/>	<hr/>
<hr/>	<hr/>

We further agree that the Owner may reject any or all bids.

SUBMITTED BY:

Firm, Corporation or Individual

Address

Telephone Number

Contractor License Number

Signature:

 Date:

NOTE: Evidence of authority to sign and the corporate seal must be affixed and attested by the Secretary.

COMPLETION DATE: 270 Calendar Days commencing on the date as shown on Notice to Proceed for Final Completion.

PROPOSAL TO THE VILLAGE OF CRESTLINE, OHIO
WASTEWATER TREATMENT Plant IMPROVEMENTS – PHASE 1

BASE BID SCHEDULE

Bid Item	Item Description	Est. Qty.	Unit	Unit Price Material	Unit Price Labor	Total Unit Price	Total Price
SANITARY							
1	BONDS AND INSURANCE	1	Lump				\$
2	MOBILIZATION	1	Lump				\$
3	SUBSURFACE SOIL INVESTIGATION	1	Lump				\$
4	STEEL BUILDING FOUNDATION (TYPE 1 – TYPE4)	1	Lump				\$
5	SLUDGE DEWATERING BUILDING	1	Lump				\$
6	DIGESTER TANK DEMO & IMPROVEMENTS	1	Lump				\$
TOTAL BASE BID							\$

TOTAL BASE BID AMOUNT OF PROJECT (IN FIGURES)

TOTAL BASE BID AMOUNT OF PROJECT (IN WORDS)

ALTERNATE BID SCHEDULE

Bid Item	Item Description	Est. Qty.	Unit	Unit Price Material	Unit Price Labor	Total Unit Price	Total Price
ALT-1	SLUDGE DRYING BED REPAIRS	1	Lump				\$
TOTAL							\$

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SECTION 00410

BIDDER'S QUALIFICATIONS

BIDDER'S GENERAL INFORMATION

The Bidder shall furnish and notarize the following information. Additional sheets shall be attached as required. Failure to complete will cause the Bid to be non-responsive and may cause its rejection. No award will be made until all of the Bidder's General Information is provided to the Owner.

1. BIDDER/CONTRACTOR'S name and street address:

Names of Responsible Management Officer or Responsible Management Employee

2. BIDDER'S telephone number: (_____) _____

3. Name of person who inspected the site of the proposed Work for the Bidder:

Name: _____ Date of inspection: _____

4. Identify Surety Company and Agent who will provide the required Bonds on this Contract:

Name of Surety:

Address

Surety Company Agent:

Telephone Numbers: Agent: (_____) _____ Surety: (_____) _____

5. When was Bidder Company Organized?

6. How many years has Bidder been engaged in the construction business under the present firm or trade name?

7. List current contracts under construction by the Bidder, showing amount of each contract and completion date.

<u>CONTRACT/PROJECT</u>	<u>AMOUNT</u>	<u>COMPLETION DATE</u>
-------------------------	---------------	------------------------

1. _____	_____	_____
----------	-------	-------

2. _____	_____	_____
----------	-------	-------

3. _____	_____	_____
----------	-------	-------

8. Briefly describe the general character of work normally performed by the Bidder.

- _____
- _____
9. Has Bidder ever failed to complete any contract awarded to you? If so, describe, list contract, amount, date and why: _____
- _____
10. Has Bidder ever defaulted on a contract? If so, list contract, amount, date and reason: _____
- _____
11. Attach to this BID the resume of the person who will be designated as General Construction Superintendent or on-site Construction Manager for the Bidder.
12. Attach to the BID a financial statement, references, and other information sufficiently comprehensive to permit an appraisal of the Bidder's current financial condition.
13. The undersigned hereby authorizes and requests any person, firm, or corporation to furnish any information requested by the Local Public Agency in verification of the recitals comprising this statement of Bidder's Qualifications.

Dated at _____ this _____ day of _____, 20_____.

Bidder: _____ By _____ Title: _____

State of _____ County of _____

being duly sworn deposes and says that he is _____ of _____ and that the answers to the foregoing questions and all statements therein contained are true and correct.

Subscribed and sworn to before me this _____ day of _____, 20_____.

Notary Public

My commission expires: _____ 20_____.

LIST OF SUBCONTRACTORS

The BIDDER is required to list in the spaces provided below, the SUBCONTRACTORS who will perform work under this BID in excess of 1% of the Contractor's Total Bid Price. The BIDDER shall also list the other required information for each SUBCONTRACTOR (Name, Address, Phone No., License Number, Work To Be Performed, MBE/WBE Business Owned Company, total amount of work to be performed in dollars and percent of total contract amount). Failure to comply with this requirement will render the BID as non-responsive and may cause its rejection.

The total cost of the work performed by SUBCONTRACTORS must not be more than fifty percent (50% of the total contract amount).

1. Work to be performed _____
Subcontractor, Address, Phone Number _____

License Number _____ MBE/WBE (Yes or No) _____
Total Dollar Amount _____ Percent of Total Contract _____
2. Work to be performed _____
Subcontractor, Address, Phone Number _____

License Number _____ MBE/WBE (Yes or No) _____
Total Dollar Amount _____ Percent of Total Contract _____
3. Work to be performed _____
Subcontractor, Address, Phone Number _____

License Number _____ MBE/WBE (Yes or No) _____
Total Dollar Amount _____ Percent of Total Contract _____
4. Work to be performed _____
Subcontractor, Address, Phone Number _____

License Number _____ MBE/WBE (Yes or No) _____
Total Dollar Amount _____ Percent of Total Contract _____
5. Work to be performed _____
Subcontractor, Address, Phone Number _____

License Number _____ MBE/WBE (Yes or No) _____
Total Dollar Amount _____ Percent of Total Contract _____
6. Work to be performed _____
Subcontractor, Address, Phone Number _____

License Number _____ MBE/WBE (Yes or No) _____
Total Dollar Amount _____ Percent of Total Contract _____

(Add additional sheets, if necessary.)

EXPERIENCE RECORD

The BIDDER shall furnish the following information on a minimum of three (3) completed projects, of recent date, involving work of similar type and complexity to this Project that the BIDDER successfully completed. List below all information to enable the OWNER to judge the experience and capability of the BIDDER to perform this Project work.

1. Project Name _____
Contract Price _____
Date Completed _____
Owner: _____ Engineer: _____
Name _____ Name _____
Address _____ Address _____

Phone No. _____ Phone No. _____
Contact _____ Contact _____
2. Project Name _____
Contract Price _____
Date Completed _____
Owner: _____ Engineer: _____
Name _____ Name _____
Address _____ Address _____

Phone No. _____ Phone No. _____
Contact _____ Contact _____
3. Project Name _____
Contract Price _____
Date Completed _____
Owner: _____ Engineer: _____
Name _____ Name _____
Address _____ Address _____

Phone No. _____ Phone No. _____
Contact _____ Contact _____
4. Project Name _____
Contract Price _____
Date Completed _____
Owner: _____ Engineer: _____
Name _____ Name _____
Address _____ Address _____

Phone No. _____ Phone No. _____
Contact _____ Contact _____

(Add additional sheets, if necessary.)

RECORD OF BIDDER'S EQUIPMENT

The BIDDER shall indicate below construction equipment he has available for Work under this CONTRACT. Information should include age of equipment, description, and existing physical conditions. Also list any equipment you intend to purchase or rent for use on the proposed work. If the BIDDER has previously prepared a description of their construction equipment with the information below, it may be attached to this sheet.

<u>EQUIPMENT DESCRIPTION</u>	<u>AGE</u>	<u>CONDITION</u>
1. _____		
2. _____		
3. _____		
4. _____		
5. _____		
6. _____		
7. _____		
8. _____		
9. _____		
10. _____		
11. _____		
12. _____		
13. _____		
14. _____		
15. _____		
16. _____		
17. _____		
18. _____		
19. _____		
20. _____		
21. _____		
22. _____		
23. _____		
24. _____		
25. _____		

(Add additional sheets, if necessary.)

END OF SECTION

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SECTION 00420

BID BOND

KNOW ALL PERSONS BY THESE PRESENTS, that we, the undersigned,

_____, as PRINCIPAL, and _____
[Bidder]

_____, as surety (ies), are hereby held and firmly bound unto

Village of Crestline _____, as OBLIGEE in the penal sum of the dollar amount of the BID
[Owner]

submitted by the PRINCIPAL to the OBLIGEE on the _____ day of _____, 20____ to undertake
the project known as Wastewater Treatment Plant Improvements – Phase 1 _____.

The penal sum referred to herein shall be the dollar amount of the PRINCIPAL'S BID to the OBLIGEE, incorporating any additive or deductive alternate proposals made by the PRINCIPAL on the date referred to above to the OBLIGEE that are accepted by the OBLIGEE. In no case shall the penal sum exceed _____ dollars. (If this blank is not filled in, the penal sum will be the full amount of the PRINCIPAL'S BID, including all accepted alternates.) Alternatively, if the blank is filled in, the dollar amount stated must not be less than the full amount of the BID including all accepted alternates, in dollars and cents. **(A percentage is not acceptable)** For the payment of the penal sum well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by any extension of time within which the OBLIGEE may accept the PRINCIPAL'S BID; and said Surety does hereby waive notice of any such extension.

Signed this _____ day of _____, 20_____.

Surety

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that whereas the above named PRINCIPAL has submitted a BID for the above referenced project;

Now, therefore, if the OBLIGEE accepts the BID of the PRINCIPAL and the PRINCIPAL fails to enter into a proper CONTRACT in accordance with the CONTRACT DOCUMENTS; and in the event the PRINCIPAL pays to the OBLIGEE the difference, not to exceed ten percent of the penalty hereof between the amount stated in the BID, and such larger amount for which the OBLIGEE may in good faith CONTRACT with the next lowest BIDDER to perform the work covered by the BID; or in the event the OBLIGEE does not award the CONTRACT to the next lowest BIDDER and resubmits the project for BIDDING, the PRINCIPAL pays to the OBLIGEE the difference not to exceed ten percent of the penalty hereof between the amount stated in the BID, or the costs, in connection with the resubmission, of printing new CONTRACT DOCUMENTS, required advertising, and printing and mailing notices to prospective BIDDERS, whichever is less, then this obligation shall be null and void, otherwise to remain in full force and effect. If the OBLIGEE accepts the BID of the PRINCIPAL, and the PRINCIPAL, within ten days after the awarding of the contract, enters into a proper contract in accordance with the CONTRACT DOCUMENTS, which said CONTRACT is made a part of this BOND the same as though set forth herein;

If PRINCIPAL shall well and faithfully do and perform the things agreed to be done and performed according to the terms of said contract; and shall pay all lawful claims of SUBCONTRACTORS, MATERIAL SUPPLIERS, AND LABORERS, for labor performed and materials furnished in the carrying forward, performing, or completing of said contract; we agreeing and assenting that this undertaking shall be for the benefit of any MATERIAL SUPPLIER OR LABORER having a just claim, as well as for the OBLIGEE herein; then this obligation shall be void; otherwise the same shall remain in full force and effect; it being expressly understood and agreed that the liability of the surety for any and all claims hereunder shall in no event exceed the penal amount of this obligation as herein stated.

The said surety hereby stipulates and agrees that no modifications, omissions, or additions, in or to the terms of the CONTRACT or in or to the Drawings or Specifications therefore shall in any way affect the obligations of said surety on its BOND.

IN WITNESS WHEREOF, the PRINCIPAL and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

SIGNED and SEALED this _____ day of _____, 20_____

Principal

by: _____

title: _____

Surety

by: _____
Attorney-in-Fact

NOTES: Attorney-in-Fact must attach certified and dated copy of this Power of Attorney.

Name and address of both Agent and Surety Company for the issued Bond must accompany bond.

Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and must not exceed the underwriting limitation. Surety companies and their agents or attorneys-in-fact must be authorized to transact business in the state where the PROJECT is located and shall furnish proof of such authorization in the BID.

END OF SECTION

SECTION 00430

CERTIFICATION OF NON-SEGREGATED FACILITIES

The undersigned BIDDER _____, certifies that they do not maintain or provide for their employees any segregated facilities at any of the BIDDERS establishments, and that they do not permit employees to perform their services at any location, under their control, where segregated facilities are maintained. The BIDDER certifies further that they will not maintain or provide for their employees any segregated facilities at any of the BIDDERS establishments, and that they will not permit their employees to perform their services at any location under their control where segregated facilities are maintained. The BIDDER agrees that a breach of this certification will be a violation of the Equal Opportunity clause in any contract resulting from acceptance of this bid. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are, in fact, segregated on the basis of race, color, religion, or national origin, because of habit, local custom, or otherwise. The BIDDER agrees that (except where the BIDDER has obtained identical certification from proposed subcontractors for specific time periods) they will obtain identical certifications from proposed subcontractors prior to the award of subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause, and that the BIDDER will retain such certifications in their files.

Note: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

Date _____, 20____

(Signature of Bidder's Representative)

(Printed Name of Representative)

(Title of Bidder's Representative)

END OF SECTION

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SECTION 00440

CERTIFICATION OF NON-COLLUSION AFFIDAVIT

The undersigned BIDDER, _____, certifies that the foregoing Bid Proposal Form is not made in the interest of or on behalf of any undisclosed person, partnership, company, association, organization, or corporation; that such bid proposal form is genuine and not collusive or sham; that said bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, nor that anyone shall refrain from bidding; that said bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of said bidder or of any other bidder, nor to fix any overhead, profit, or cost element of such bid price, nor of that of any other bidder, nor to secure any advantage against the Village of Crestline awarding the contract or anyone interested in the proposed contract; that said bidder has not directly or indirectly submitted his bid price or any breakdown thereof, nor the contents thereof, nor divulged information or data relative thereto, nor paid and will not pay a fee in connection therewith to a corporation, partnership, company, association, organization, bid depository, nor to any member or agent thereof, nor to any other individual except to such person or persons as have a partnership or other financial interest with said bidder in his general business.

Date _____, 20____

Signature of Bidder's Representative

Printed Name of Representative

Title of Bidder's Representative

Contract/Bid No. _____

State of _____ :

:S.S

County of _____ :

I state that I am _____ of _____ and that I am authorized
(Title)

to make this affidavit on behalf of my firm, and its owners, directors, and officers. I am the person responsible in my firm for the price(s) and the amount of this bid.

I state that:

1. The price(s) and amount of this BID have been arrived at independently and without consultation, communication or agreement with any other contractor, bidder or potential bidder.
2. Neither the price(s) nor the amount of this BID, and neither the approximate price(s) nor approximate amount of this BID, have been disclosed to any other firm or person who is a bidder or potential bidder, and they will not be disclosed before the bid opening.
3. No attempt has been made or will be made to induce any firm or person to refrain from bidding on this contract, or to submit a bid higher than his bid, or to submit any intentionally high or noncompetitive bid or other form of complementary bid.
4. The BID of my firm is made in good faith and not pursuant to any agreement or discussion with, or inducement from, any firm or person to submit a complementary or other noncompetitive bid.
5. _____, its affiliates, subsidiaries, officers, directors and employees are not
(Name of Firm)
currently under investigation by any governmental agency and have not in the last four years been convicted or found liable for any act prohibited by State or Federal law in any jurisdiction, involving conspiracy or collusion with respect to bidding on any public contract, except as follows:

I state that _____ understands and acknowledges that the above representations are
(Name of firm)
material and important, and will be relied on by _____ in awarding the
(Name of Public Entity)
contract(s) for which this BID is submitted. I understand, and my firm understands, that any misstatement in this affidavit is and shall be treated as fraudulent concealment for _____ of
(Name of Public Entity)
the true facts relating to the true facts to the submission of bids for this contract.

Name and Company Position

SWORN TO AND SUBSCRIBED BEFORE ME THIS

_____ DAY OF _____, 20 ____.

Notary Public

My Commission Expires

INSTRUCTIONS FOR NON-COLLUSION AFFIDAVIT

1. This Non-Collusion Affidavit is material to any contract awarded pursuant to this bid. According to the Ohio Revised Code, governmental agencies may require Non-Collusion Affidavits to be submitted together with bids.
2. This Non-Collusion Affidavit must be executed by the member, officer or employee of the bidder who makes the final decision on prices and the amount quoted in the bids.
3. Bid rigging and other efforts to restrain competition, and the making of false sworn statements in connection with the submission of bids are unlawful and may be subject to criminal prosecution. The person who signs the Affidavit should examine it carefully before signing and assure himself or herself that each statement is true and accurate, making diligent inquiry, as necessary, of all other persons employed by or associated with the bidder with responsibilities for the preparation, approval or submission of the bid.
4. In the case of a bid submitted by a joint venture, each party to the venture must be identified in the bid documents, and an Affidavit must be submitted separately on behalf of each party.
5. The term "complimentary bid" as used in the Affidavit has the meaning commonly associated with that term in the bidding process, and includes the knowing submission of bids higher than the bid of another firm, any intentionally high or noncompetitive bid, and any other form of bid submitted for the purpose of giving a false appearance of competition.
6. Failure to file an Affidavit in compliance with these instructions will result in disqualification of the bid.

END OF SECTION

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SECTION 00450

CORPORATE RESOLUTION

I, _____, Secretary of _____,
[NAME] [COMPANY]
a _____, hereby certifies that the following is a true and
[CORPORATION, PARTNERSHIP, OR SOLE PROPRIETORSHIP]
correct copy of a resolution duly adopted by the Board of Directors of _____,
[COMPANY]
on _____, 20_____, to wit:
[DATE]

"Resolved, that _____ of this Company,
[NAME]
namely, _____ is hereby
[COMPANY]
authorized and directed to enter into any and all contracts, bid guaranty and
performance bonds with _____ for the
[MUNICIPALITY]
purpose of furnishing labor and materials as to _____ WWTP Imp. – Ph. I _____ at
[PROJECT]
such price and upon such terms and conditions, including any amendments or
modifications thereto, as said _____ in his
[NAME]
sole discretion shall deem best, and that said actions shall be binding upon the
Corporation.

Resolved, further, that said _____
[NAME]
is hereby authorized and directed to execute and deliver unto said Village of
Crestline other instruments which in his
[OWNER]
discretion he shall deem necessary to carry out the foregoing resolution."

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the seal of said Corporation at _____
_____, this _____ day of _____, 20_____, and I further
[ADDRESS] [MONTH]
certify that said resolution is still in full force and effect.

SECRETARY

SEAL

END OF SECTION

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***** FOR INSTRUCTIONAL USE ONLY *****

READ BEFORE COMPLETING YOUR DMA FORM

Forms not conforming to the specifications listed below or not submitted to the appropriate agency or office will not be processed.

- To complete this form, you will need a copy of the Terrorist Exclusion List for reference. The Terrorist Exclusion List can be found on the Ohio Homeland Security Web site at the following address:

<http://www.homelandsecurity.ohio.gov/dma.asp>

- Be sure you have the correct DMA form. If you are applying for a state issued license, permit, certification or registration, the "State Issued License" DMA form must be completed (HLS 0036). If you are applying for employment with a government entity, the "Public Employment" DMA form must be completed (HLS 0037). If you are obtaining a contract to conduct business with or receive funding from a government entity, the "Government Business and Funding Contracts" DMA form must be completed (HLS 0038). The Pre-certification form (HLS 0035) should only be completed if you are specifically instructed to do so by the agency or office requesting the form.
- Your DMA form is to be submitted to the issuing agency or entity. "Issuing agency or entity" means the government agency or office that has requested the form from you or the government agency or office to which you are applying for a license, employment or a business contract. For example, if you are seeking a business contract with the Ohio Department of Commerce's Division of Financial Institutions, then the form needs to be submitted to the Department of Commerce's Division of Financial Institutions. Do NOT send the form to the Ohio Department of Public Safety UNLESS you are seeking a license from or employment or business contract with one of its eight divisions listed below.

<ul style="list-style-type: none"> <u>Department of Public Safety Divisions:</u> 	
Administration	Ohio Homeland Security*
Ohio Bureau of Motor Vehicles	Ohio Investigative Unit
Ohio Emergency Management Agency	Ohio Criminal Justice Services
Ohio Emergency Medical Services	Ohio State Highway Patrol
- * DO **NOT** SEND THE FORM TO OHIO HOMELAND SECURITY UNLESS OTHERWISE DIRECTED. FORMS SENT TO THE WRONG AGENCY OR ENTITY WILL NOT BE PROCESSED.

***** FOR INSTRUCTIONAL USE ONLY *****



Ohio Department of Public Safety
DIVISION OF HOMELAND SECURITY
<http://www.homelandsecurity.ohio.gov>

PUBLIC EMPLOYMENT

In accordance with section 2909.34 of the Ohio Revised Code

DECLARATION REGARDING MATERIAL ASSISTANCE/NO ASSISTANCE TO A TERRORIST ORGANIZATION

This form serves as a declaration of the provision of material assistance to a terrorist organization or organization that supports terrorism as identified by the U.S. Department of State Terrorist Exclusion List (see the Ohio Homeland Security Division Web site for the Terrorist Exclusion List).

Any answer of "yes" to any question, or the failure to answer "no" to any question on this declaration shall serve as a disclosure that material assistance to an organization identified on the U.S. Department of State Terrorist Exclusion List has been provided. Failure to disclose the provision of material assistance to such an organization or knowingly making false statements regarding material assistance to such an organization is a felony of the fifth degree.

For the purposes of this declaration, "material support or resources" means currency, payment instruments, other financial securities, funds, transfer of funds, and financial services that are in excess of one hundred dollars, as well as communications, lodging, training, safe houses, false documentation or identification, communications equipment, facilities, weapons, lethal substances, explosives, personnel, transportation, and other physical assets, except medicine or religious materials.

LAST NAME		FIRST NAME		MIDDLE INITIAL
HOME ADDRESS				
CITY	STATE	ZIP	COUNTY	
HOME PHONE ()		WORK PHONE ()		

DECLARATION

In accordance with section 2909.32 (A)(2)(b) of the Ohio Revised Code

For each question, indicate either "yes," or "no" in the space provided. Responses must be truthful to the best of your knowledge.

1. Are you a member of an organization on the U.S. Department of State Terrorist Exclusion List? ☐ Yes ☐ No
2. Have you used any position of prominence you have with any country to persuade others to support an organization on the U.S. Department of State Terrorist Exclusion List? ☐ Yes ☐ No
3. Have you knowingly solicited funds or other things of value for an organization on the U.S. Department of State Terrorist Exclusion List? ☐ Yes ☐ No
4. Have you solicited any individual for membership in an organization on the U.S. Department of State Terrorist Exclusion List? ☐ Yes ☐ No
5. Have you committed an act that you know, or reasonably should have known, affords "material support or resources" to an organization on the U.S. Department of State Terrorist Exclusion List? ☐ Yes ☐ No
6. Have you hired or compensated a person you knew to be a member of an organization on the U.S. Department of State Terrorist Exclusion List, or a person you knew to be engaged in planning, assisting, or carrying out an act of terrorism? ☐ Yes ☐ No

In the event of a denial of licensure due to a positive indication that material assistance has been provided to a terrorist organization, or an organization that supports terrorism as identified by the U.S. Department of State Terrorist Exclusion List, a review of the denial may be requested. The request must be sent to the Ohio Department of Public Safety's Division of Homeland Security. The request forms and instructions for filing can be found on the Ohio Homeland Security Division Web site.

CERTIFICATION

I hereby certify that the answers I have made to all of the questions on this declaration are true to the best of my knowledge. I understand that if this declaration is not completed in its entirety, it will not be processed and I will be automatically disqualified. I understand that I am responsible for the correctness of this declaration. I understand that failure to disclose the provision of material assistance to an organization identified on the U.S. Department of State Terrorist Exclusion List, or knowingly making false statements regarding material assistance to such an organization is a felony of the fifth degree. I understand that any answer of "yes" to any question, or the failure to answer "no" to any question on this declaration shall serve as a disclosure that material assistance to an organization identified on the U.S. Department of State Terrorist Exclusion List has been provided by myself or my organization. If I am signing this on behalf of a company, business or organization, I hereby acknowledge that I have the authority to make this certification on behalf of the company, business or organization referenced above.

X

APPLICANT SIGNATURE

DATE

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***** FOR INSTRUCTIONAL USE ONLY *****

READ BEFORE COMPLETING YOUR DMA FORM

Forms not conforming to the specifications listed below or not submitted to the appropriate agency or office will not be processed.

- To complete this form, you will need a copy of the Terrorist Exclusion List for reference. The Terrorist Exclusion List can be found on the Ohio Homeland Security Web site at the following address:

<http://www.homelandsecurity.ohio.gov/dma/dma.asp>

- Be sure you have the correct DMA form. If you are applying for a state issued license, permit, certification or registration, the "State Issued License" DMA form must be completed (HLS 0036). If you are applying for employment with a government entity, the "Public Employment" DMA form must be completed (HLS 0037). If you are obtaining a contract to conduct business with or receive funding from a government entity, the "Government Business and Funding Contracts" DMA form must be completed (HLS 0038).
- Your DMA form is to be submitted to the issuing agency or entity. "Issuing agency or entity" means the government agency or office that has requested the form from you or the government agency or office to which you are applying for a license, employment or a business contract. For example, if you are seeking a business contract with the Ohio Department of Commerce's Division of Financial Institutions, then the form needs to be submitted to the Department of Commerce's Division of Financial Institutions. Do NOT send the form to the Ohio Department of Public Safety UNLESS you are seeking a license from or employment or business contract with one of its eight divisions listed below.
- Department of Public Safety Divisions:

Administration	Ohio Homeland Security*
Ohio Bureau of Motor Vehicles	Ohio Investigative Unit
Ohio Emergency Management Agency	Ohio Criminal Justice Services
Ohio Emergency Medical Services	Ohio State Highway Patrol
- * DO **NOT** SEND THE FORM TO OHIO HOMELAND SECURITY UNLESS OTHERWISE DIRECTED. FORMS SENT TO THE WRONG AGENCY OR ENTITY WILL NOT BE PROCESSED.

***** FOR INSTRUCTIONAL USE ONLY *****



OHIO DEPARTMENT OF PUBLIC SAFETY
DIVISION OF HOMELAND SECURITY

GOVERNMENT BUSINESS AND FUNDING CONTRACTS

In accordance with section 2909.33 of the Ohio Revised Code

DECLARATION REGARDING MATERIAL ASSISTANCE/NONASSISTANCE TO A TERRORIST ORGANIZATION

This form serves as a declaration by an applicant for a government contract or funding of material assistance/nonassistance to an organization on the U.S. Department of State Terrorist Exclusion List ("TEL"). Please see the Ohio Homeland Security Division Web site for a copy of the TEL.

Any answer of "yes" to any question, or the failure to answer "no" to any question on this declaration shall serve as a disclosure that material assistance to an organization identified on the U.S. Department of State Terrorist Exclusion List has been provided. Failure to disclose the provision of material assistance to such an organization or knowingly making false statements regarding material assistance to such an organization is a felony of the fifth degree.

For the purposes of this declaration, "material support or resources" means currency, payment instruments, other financial securities, funds, transfer of funds, financial services, communications, lodging, training, safe houses, false documentation or identification, communications equipment, facilities, weapons, lethal substances, explosives, personnel, transportation, and other physical assets, except medicine or religious materials.

COMPLETE THIS SECTION ONLY IF YOU ARE AN INDEPENDENT CONTRACTOR

LAST NAME		FIRST NAME		MI
HOME ADDRESS				
CITY	STATE	ZIP	COUNTY	
HOME PHONE		WORK PHONE		

COMPLETE THIS SECTION ONLY IF YOU ARE A COMPANY, BUSINESS OR ORGANIZATION

BUSINESS/ORGANIZATION NAME			PHONE
BUSINESS ADDRESS			
CITY	STATE	ZIP	COUNTY
BUSINESS/ORGANIZATION REPRESENTATIVE NAME			TITLE

DECLARATION

In accordance with section 2909.32 (A)(2)(b) of the Ohio Revised Code

For each question, indicate either "yes," or "no" in the space provided. Responses must be truthful to the best of your knowledge.

- Are you a member of an organization on the U.S. Department of State Terrorist Exclusion List? ☐ Yes ☐ No
- Have you used any position of prominence you have with any country to persuade others to support an organization on the U.S. Department of State Terrorist Exclusion List? ☐ Yes ☐ No
- Have you knowingly solicited funds or other things of value for an organization on the U.S. Department of State Terrorist Exclusion List? ☐ Yes ☐ No
- Have you solicited any individual for membership in an organization on the U.S. Department of State Terrorist Exclusion List? ☐ Yes ☐ No
- Have you committed an act that you know, or reasonably should have known, affords "material support or resources" to an organization on the U.S. Department of State Terrorist Exclusion List? ☐ Yes ☐ No
- Have you hired or compensated a person you knew to be a member of an organization on the U.S. Department of State Terrorist Exclusion List, or a person you knew to be engaged in planning, assisting, or carrying out an act of terrorism? ☐ Yes ☐ No

If an applicant is prohibited from receiving a government contract or funding due to a positive indication on this form, the applicant may request the Ohio Department of Public Safety to review the prohibition. Please see the Ohio Homeland Security Web site for information on how to file a request for review.

CERTIFICATION

I hereby certify that the answers I have made to all of the questions on this declaration are true to the best of my knowledge. I understand that if this declaration is not completed in its entirety, it will not be processed and I will be automatically disqualified. I understand that I am responsible for the correctness of this declaration. I understand that failure to disclose the provision of material assistance to an organization identified on the U.S. Department of State Terrorist Exclusion List, or knowingly making false statements regarding material assistance to such an organization is a felony of the fifth degree. I understand that any answer of "yes" to any question, or the failure to answer "no" to any question on this declaration shall serve as a disclosure that material assistance to an organization identified on the U.S. Department of State Terrorist Exclusion List has been provided by myself or my organization. If I am signing this on behalf of a company, business or organization, I hereby acknowledge that I have the authority to make this certification on behalf of the company, business or organization referenced above on of this declaration.

APPLICANT SIGNATURE X	DATE
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CONTRACTOR EQUAL EMPLOYMENT OPPORTUNITY CERTIFICATION

During the performance of this contract, the undersigned agrees as follows:

1. The undersigned will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The undersigned will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion or national origin. Such action shall include, but not be limited to the following: 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. The undersigned agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this equal opportunity (federally assisted construction) clause.
2. The undersigned will, in all solicitations or advertisements for employees placed by or on behalf of the undersigned, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex or national origin.
3. The undersigned will send to each labor union or representative of workers, with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representative of the undersigned's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
4. The undersigned will comply with all provisions of Executive Order No. 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.
5. The undersigned will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records and accounts by the administering agency of the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
6. In the event of the undersigned's non-compliance with the equal opportunity (federally assisted construction) clause of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole in part, and the undersigned may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, or by rule, regulations, or order of the Secretary of Labor, or as provided by law.
7. The undersigned will include this equal opportunity (federally assisted construction) clause in every subcontract or purchase order unless exempted by the rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order No. 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The undersigned will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for non-compliance: Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor, as a result of such direction by the administering agency the undersigned may request the United States to enter into such litigation to protect the interest of the United States.

(Signature)

(Date)

(Name and Title of Signer, Please type)

(Firm name)

Note: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

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BASIS AND METHOD OF AWARD

1. Owner reserves the right to reject any and all Bids, to waive any and all informalities and to negotiate contract terms with the successful Bidder, and the right to disregard all nonconforming, nonresponsive or conditional bids. Discrepancies between words and figures will be resolved in favor of words. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.
2. In evaluating Bids, Owners shall consider the qualifications of the Bidder, whether or not the Bids comply with the prescribed requirements and alternates and unit prices if requested in the Bid forms. The Owner intends to accept alternates (if any are accepted) in the order in which they are listed in the Bid Form but Owner may accept them in any order or combination.
3. Owner may consider the qualifications and experience of Subcontractors and other persons and organizations (including those who are to furnish the principal items of material or equipment) proposed for those portions of the Work as to which the identity of Subcontractors and other persons and organizations must be submitted as provided in the Supplementary Conditions. Operating costs, maintenance considerations, performance data and guarantees of materials and equipment may also be considered by Owner.
4. Owner may conduct investigations he deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications and financial ability of the Bidders, proposed Subcontractors, and other persons and organizations to do the Work in accordance with the Contract Documents to Owner's satisfaction within the prescribed time.
5. Owner reserves the right to reject the bid of any Bidder who does not pass investigations or evaluations to Owner's satisfaction. Owner may reject any Proposal where the unit price or individual lump sum prices are unbalanced and/or unfavorable to the Owner's interest.
6. Owner will not make any award or permit any award (subgrant or contract) at any tier to any party which is debarred or suspended or is otherwise excluded from or ineligible for participation in Federal assistance programs under Executive Order 12549, "Debarment and Suspension". Each Contractor and supplier (over \$25,000) shall complete Form 5700-49.
7. If Contract is awarded, it will be awarded to the lowest responsive responsible Bidder whose evaluation by Owner indicates to Owner that the award will be in the best interest of the Project.
8. If the Contract is awarded, Owner will give the Successful Bidder a "Notice of Award" within the time stated in the advertisement after the day of the Bid opening.
9. When Owner gives a "Notice of Award" to the Successful Bidder, it will be accompanied by at least three unsigned counterparts of the Agreement and three copies of all other Contract Documents. Within ten days thereafter, Contractor shall sign and deliver at least three counterparts of the Agreement to Owner with three copies of all other Contract Documents attached. Within fifteen days thereafter, Owner will deliver one copy of all fully signed counterparts to the Contractor.

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SECTION 00467

CONTINUOUS TREATMENT PROVISIONS

1. Federal regulations prohibit bypassing of any sewage during construction operations. The Contractor will be responsible for providing any required temporary pumping facilities piping, etc., necessary to complete the project without any plant by-passing and continuous treatment must be provided at the same level during construction as existed prior to construction.
2. Unless otherwise previously or subsequently specified, the Contractor shall procure and pay for all permits, licenses, and approvals necessary for the execution of his Contract.
3. The Contractor shall comply with all laws, ordinances, rules, orders, and regulations relating to the performance of the work required to complete his Contract.

END OF SECTION

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REQUIREMENT FOR UTILIZATION OF SMALL BUSINESSES IN RURAL

AREAS (SBRA)

This procurement is subject to the EPA policy of encouraging the participation of small businesses in rural areas. It is EPA policy that recipients of EPA financial assistance awards utilize the services of small businesses in rural area (SBRA's), to the maximum extent practicable. The objective is to assure that such small business entities are afforded the maximum practicable opportunity to participate as subcontractors, suppliers and otherwise in EPA-awarded financial assistance programs. This policy applies to all contracts and subcontracts for supplies, construction, and services under EPA grants or cooperative agreements. Small purchases are also subject to this policy.

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Certification Regarding Debarment, Suspension, and Other Responsibility Matters

The prospective participant certifies to the best of its knowledge and belief that it and its principals:

- (a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
- (b) Have not within a three 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 statements, or receiving stolen property;
- (c) Are not presently indicted for or otherwise criminally or civilly charged by a government entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (b) of this certification;
- (d) Have not within a three year period preceding this application / proposal had one or more public transactions (Federal, State, or local) terminated for cause or default; and
- (e) Will not utilize a subcontractor or supplier who is unable to certify (a) through (d) above.

I understand that a false statement on this certification may be grounds for rejection of this proposal or termination of the award. In addition, under 18 USC Sec. 1001, a false statement may result in a fine of up to \$10,000 or imprisonment for up to 5 years, or both.

Type Name & Title of Authorized Representative

Signature of Authorized Representative

☐

I am unable to certify to the above statements. My explanation is attached.

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VIOLATING FACILITIES:

The Contractor shall comply with all applicable standards, orders or requirements under Section 306 of the Clean air Act, 42 USC 1857 (h), Section 508 of the Clean Water Act, 33 US C 1368, Executive Order 117389, and EPA regulations, 40 CFR Part 32, which prohibits the use of facilities under non-exempt Federal contracts, grants, or loans of facilities included on the EPA List of Violating Facilities.

END OF SECTION

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SECTION 00485

LOCAL PROTEST PROCEDURE

1. A protest based upon an alleged violation of the procurement requirements may be filed against the OWNER's procurement action by a party with an adversely affected direct financial interest. The protest shall be filed with the Owner's chief administrative Officer. The OWNER shall determine the protest and may request additional information or a hearing in order to resolve the protest.
2. A protest shall be filed as early as possible during the procurement process, but must be received by the OWNER no later than one week after the basis of the protest is known or should have been known, whichever is earlier. If the protest is mailed, the protester bears the risk of non-delivery within the required time period.
3. A protest must clearly present the procurement requirement being protested, the facts which support the protest, and any other information necessary to support the protest.

END OF SECTION

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DISADVANTAGED BUSINESS ENTERPRISES (DBE) UTILIZATION

(Required WPCLF/WSRLA Contract Provision)

USEPA has a program to encourage the participation of disadvantaged businesses in the construction activities funded by the Clean Water and Drinking Water SRF's. "DBE" is an all inclusive term that includes Minority Business Enterprises (MBE), Women Business Enterprises (WBE), Small Business Enterprises (SBE), Small Business in Rural Areas (SBRA), HUBZone Small Business, Labor Surplus Area Firms (LSAF), and other entities defined as socially and/or economically disadvantaged. While the WPCLF and WSRLA strongly encourage participation by all disadvantaged groups, specific participation goals are negotiated with USEPA only for Minority Business Enterprises and Women's Business Enterprises.

Goals

As a condition of receiving capitalization grants from U.S. EPA for the Water Pollution Control Loan Fund (WPCLF) and the Water Supply Revolving Loan Account (WSRLA), the Ohio EPA negotiates "fair share" Disadvantaged Business Enterprises (DBE) objectives with U.S. EPA. The current negotiated goals for construction related activities are 3.0% of all contracts to MBE's and 3.7% of all contracts to WBE's.

DBE Certification

Under the DBE program, qualified DBE's are those that have been certified as an MBE or WBE. Certifications can be obtained from a federal agency such as the Small Business Administration or the Department of Transportation or by an approved State agency. The Unified Certification Program (UCP) administered by the Ohio Department of Transportation (ODOT) can provide the necessary DBE certifications. Information on the UCP can be found at www.ohioucp.org as well as the ODOT website www.dot.state.oh.us/divisions/equalopportunity/pages/dbe.aspx. Applications for certification by EPA can be found on EPA's Small Business Programs website at www.epa.gov/osbp under the Disadvantaged Business Enterprise Program link. Any questions regarding EPA's certification process should be directed to Kimberly Patrick of EPA at 202-566-2605.

DBE Qualifications

To qualify for MBE certification, businesses must be 51 percent owned and controlled by a U.S. citizen and Ohio resident belonging to an African-American, Native American, Hispanic, or Oriental ethnic group. In addition, the business must be in operation for at least one year prior to submitting an application. For DBE status, a business must be at least 51 percent owned by a socially and economically disadvantaged person who participates in the daily operations of the business. This person must be a woman or of African-American, Hispanic, Native American, Asian-Pacific or Asian Subcontinent ethnicity.

Program Requirements

To comply with DBE program requirements the WPCLF/WSRLA loan recipient must do the following:

1. Create and maintain a bidder's list (see description below)

2. Include contract conditions applicable to the DBE program in all procurement contracts entered into by the Borrower for all WPCLF and WSRLA projects. These conditions are listed below.
3. Follow, document, and maintain documentation of good faith efforts on the part of prime contractors to ensure that Disadvantaged Business Enterprises (DBEs) have the opportunity to participate in the project.
4. Review the Form 1A and 1B submittals provided by bidders on the project for completeness and obtain any additional information necessary to verify the certification status of all proposed subcontractors.
5. Obtain documentation of the good faith efforts of the prime contractor if the prime contractor does not meet the MBE or WBE goal.
6. Obtain a written confirmation from any prime contractor states that they will not meet the MBE and WBE goals because they will not be entering into any agreements for goods or services with any company, firm, joint venture, or individual.
7. Submit the following to the Ohio EPA/DEFA as part of the bid package upon which the WPCLF/WSRLA loan amount is determined:
 - Form 1A from each subcontractor
 - Form 1B from each prime contractor
 - a copy of the Good Faith Efforts documentation from any prime contractors that will not meet the MBE and WBE goals,
 - if any of the prime contractors will not meet the MBE and WBE goals because they will not be entering into any agreements for goods or services with any company, firm, joint venture, or individual, a copy of the written confirmation from that prime contractor
8. Report MBE/WBE accomplishments on Form 5700-52A semi-annually (within 15 days after each April 30th and October 30th).

NOTE: It is up to the WPCLF/WSRLA loan recipient whether or not to require completion and submission of Forms 1A and 1B from all bidders with the bid proposal or to accept completion and submission from the successful bidder(s) only at some time after bids are received. Regardless of whether the forms are completed and submitted with the bids or at some later time once the successful bidders are identified, completed forms are to be submitted to Ohio EPA with the bid package.

To comply with DBE program requirements all prime contractors must do the following:

1. Follow, document, and maintain documentation of their good faith efforts.
2. Complete and submit **Form 1B DBE Subcontractor Utilization Summary** as part of the bid proposal package to the loan recipient.
3. Have its Disadvantaged Business Enterprise subcontractors complete **Form 1A Individual DBE Subcontractor Proposed Performance Form** and submit those as part of the bid proposal package to the loan recipient.
4. Provide **Form 2 DBE Subcontractor Actual Participation Form** to all of its Disadvantaged Business Enterprise subcontractors for completion at the end of the work.
5. During construction, provide the data necessary so that the loan recipient can report MBE/WBE accomplishments on Form 5700-52A semi-annually (within 15 days after each April 30th and October 30th).

Bidders List

The Borrower must create, maintain, and use a bidders list for purposes of soliciting both MBE/WBEs and non-MBE/WBEs during procurement of construction, equipment, supplies, and services. This list shall include:

1. Entity's name with point of contact;
2. Entity's mailing address, telephone number, and e-mail address;
3. The procurement on which the entity bid or quoted, and when; and
4. Entity's status as an MBE/WBE or non-MBE/WBE.

Borrowers that receive less than \$250,000 or less in any one fiscal year can be exempt from maintaining a Bidders List.

The Bidders List shall be maintained until the project period has expired and the Borrower is no longer receiving EPA funding. The Bidders List must include all firms that bid on the prime contracts, or bid or gave a quote on subcontracts, including both MBE/WBEs and non-MBE/WBEs.

Required Contract Conditions

The DBE Specification language and instructions to the bidders and Forms 1A, 1B and 2 must be included in the contract documents and referenced in the Instructions to Bidders, informing bidders that the forms must be completed and submitted with their bid for all WPCLF and WSRLA projects:

1. The prime contractor must pay its subcontractor for satisfactory performance no more than 30 days from the prime contractor's receipt of payment from the owner.
2. The prime contractor must notify the owner in writing prior to the termination of any Disadvantage Business Enterprise subcontractor for convenience by the prime contractor.
3. If a Disadvantage Business Enterprise contractor fails to complete work under the subcontract for any reason, the prime contractor must employ the six Good Faith Efforts (listed below) if soliciting a replacement contractor.
4. The prime contractor must employ the six Good Faith Efforts even if the prime contractor has achieved its fair share objectives.
5. An owner must ensure that each procurement contract it awards contains the following terms and conditions:

The contractor shall not discriminate on the basis of race, color, national origin or sex in the performance of this contract. The contractor shall carry out applicable requirements of 40 CFR Part 33 in the award and administration of contracts awarded under EPA financial assistance agreements. Failure by the contractor to carry out these requirements is a material breach of this contract which may result in the termination of this contract or other legally available remedies.

Good Faith Efforts

Borrowers and their prime contractors must follow, document, and maintain documentation of their good faith efforts as listed below to ensure that Disadvantaged Business Enterprises (DBEs) have the opportunity to participate in the project by increasing DBE awareness of procurement efforts and outreach.

1. Ensure DBEs are made aware of contracting opportunities to the fullest extent practicable through outreach and recruitment activities; including DBEs on solicitation lists and soliciting them whenever they are potential sources.
2. Make information on forthcoming opportunities available to DBEs and arrange time frames for contracts and establish delivery schedules, where the requirements permit, in a way that encourages and facilitates participation by DBEs in the competitive process. This includes, whenever possible, posting solicitation for bids or proposals for a minimum of 30 calendar days before the bid or proposal closing date.
3. Consider in the contracting process whether firms competing for large contracts could be subcontracted with DBEs. This will include dividing total requirements when economically feasible into smaller tasks or quantities to permit participation by DBEs in the competitive process.
4. Encourage contracting with a consortium of DBEs when a contract is too large for one of these firms to handle individually.
5. Use the services and assistance of the Small Business Administration and the Minority Business Development Agency of the U.S. Department of Commerce.
6. If the prime contractor awards subcontracts, require the prime contractor to take the steps in numbers 1 through 5 above.

DBE Forms

Form 1A – Each prime contractor must have its DBE subcontractors complete **Form 1A Individual DBE Subcontractor Proposed Performance Form**. This form gives the DBE subcontractor the opportunity to report the scope and cost of the subcontract it and should be forwarded to the Prime Contractor along with the DBE's quote. Each subcontractor completes one Form 1A. The Borrower must submit all Form 1A forms to the Ohio EPA/DEFA as part of the bid package upon which the WPCLF/WSRLA loan amount is determined.

Form 1B – Each prime contractor must complete and submit **Form 1B DBE Subcontractor Utilization Summary** as part of the prime contractor's bid proposal package to the Borrower. This form summarizes the Prime Contractor's intended use of identified DBE(s) and the estimated dollar amount of each subcontract. Only one Form 1B form is required from each Prime Contractor. The Borrower must submit this form to the Ohio EPA/DEFA as part of the bid package upon which the WPCLF/WSRLA loan amount is determined.

Form 2 - The prime contractor must provide **Form 2 DBE Subcontractor Actual Participation Form** to all of its Disadvantaged Business Enterprise subcontractors.

This form gives the DBE subcontractor the opportunity to describe the work the DBE received from the Prime Contractor, how much the DBE was paid and any other concerns the DBE might have. Disadvantaged Business Enterprise subcontractors must send completed Form 2 directly to the Region 5 DBE Coordinator:

Adrianne M. Callahan, Region 5 MBE/WBE Coordinator
USEPA, Acquisition and Assistance Branch
77 West Jackson Boulevard (MC-10J)
Chicago, IL 60604

This form is completed after the work by the subcontractor is done, and is NOT submitted with the bid package to Ohio EPA.

Reporting During Construction

The purpose of MBE/WBE reporting is to monitor the grant recipient's accomplishments in utilizing MBEs and WBEs; and adherence to the good faith efforts (i.e., outreach to MBEs, WBEs, and other DBEs); and progress in achieving MBE and WBE Goals. During the progress of the construction project, the loan recipient must complete & submit Form 5700-52A semi-annually (within 15 days after each April 30th and October 30th). If there were no MBEs or WBEs utilized, or no procurement expenditures of any kind were made during the reporting period, a "negative report" is still required.

Reports are to be sent to:

Becky Hegyi
Ohio EPA – DEFA
P.O. Box 1049
Columbus, OH 43216-1049
E-mail address: defamail@epa.state.oh.us
Fax: (614)644-3687

FORM 1A
Disadvantaged Business Enterprise Program
Individual DBE Subcontractor Proposed Performance Form

NAME OF SUBCONTRACTOR ¹	PROJECT NAME	
ADDRESS	CONTRACT NO.	
TELEPHONE NO.	EMAIL ADDRESS	
PRIME CONTRACTOR NAME		
CONTRACT ITEM NO.	ITEM OF WORK OR DESCRIPTION OF SERVICES BID TO PRIME	PRICE OF WORK SUBMITTED TO PRIME CONTRACTOR
Currently certified as an MBE or WBE under EPA's DBE Program? _____ MBE _____ WBE _____ Neither		
<div style="display: flex; justify-content: space-between; margin-top: 100px;"> <div style="width: 45%; text-align: center;"> _____ Prime Contractor Signature </div> <div style="width: 45%; text-align: center;"> _____ Title/Date </div> </div>		
<div style="display: flex; justify-content: space-between; margin-top: 100px;"> <div style="width: 45%; text-align: center;"> _____ Subcontractor Signature </div> <div style="width: 45%; text-align: center;"> _____ Title/Date </div> </div>		

1 Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an EPA award of financial assistance.

This form is to be submitted as part of the prime contractor's proposal package.

FORM 1B
Disadvantaged Business Enterprise Program
DBE Subcontractor Utilization Summary

BID/PROPOSAL NO.	PROJECT NAME
NAME OF PRIME BIDDER/PROPOSER	E-MAIL ADDRESS
ADDRESS	
TELEPHONE NO.	FAX NO.

The following subcontractors will be used on this project:			
COMPANY NAME, ADDRESS, PHONE NUMBER, AND E-MAIL ADDRESS	TYPE OF WORK TO BE PERFORMED	ESTIMATED DOLLAR AMOUNT	CURRENTLY CERTIFIED AS AN MBE OR WBE? (specify which)
<p>I certify under penalty of perjury that the forgoing statements are true and correct. In the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302(c).</p> <div style="display: flex; justify-content: space-between; margin-top: 20px;"><div style="width: 45%;"><p>_____ Signature of Prime Contractor</p><p>_____ Print Name</p></div><div style="width: 45%;"><p>_____ Date</p><p>_____ Title</p></div></div>			

1 Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an EPA award of financial assistance.

This form is to be submitted as part of the prime contractor's proposal package.

FORM 2
Disadvantaged Business Enterprise Program
DBE Subcontractor Actual Participation Form

NAME OF SUBCONTRACTOR ¹	PROJECT NAME
ADDRESS	CONTRACT NO.
TELEPHONE NO.	EMAIL ADDRESS
PRIME CONTRACTOR NAME	

Please use the space below to report any concerns regarding the above EPA-funded project (e.g., reason for termination by prime contractor, late payment, etc.).

CONTRACT ITEM NO.	ITEM OF WORK OR DESCRIPTION OF SERVICES RECEIVED FROM THE PRIME CONTRACTOR	ACTUAL AMOUNT SUBCONTRACTOR WAS PAID BY PRIME CONTRACTOR
<div style="display: flex; justify-content: space-between;"><div style="width: 45%; border-top: 1px solid black; margin-top: 10px;">Subcontractor Signature</div><div style="width: 45%; border-top: 1px solid black; margin-top: 10px;">Title/Date</div></div>		

¹ Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an EPA award of financial assistance.

This form is to be completed and submitted after the work has been completed. Submit completed forms to
Adrianne M. Callahan, Region 5 MBE/WBE Coordinator
USEPA, Acquisition and Assistance Branch
77 West Jackson Boulevard (MC-10J)
Chicago, IL 60604

**U.S. ENVIRONMENTAL PROTECTION AGENCY
MBE/WBE UTILIZATION UNDER FEDERAL GRANTS, COOPERATIVE
AGREEMENTS, AND INTERAGENCY AGREEMENTS**

PART 1. (Reports are required even if no procurements are made during the reporting period.)

1A. FEDERAL FISCAL YEAR 20_____		1B. REPORTING PERIOD (Check ALL appropriate boxes) <input type="checkbox"/> 1 st (Oct-Dec) <input type="checkbox"/> 2 nd (Jan-Mar) <input type="checkbox"/> 3 rd (Apr-Jun) <input type="checkbox"/> 4 th (Jul-Sep) <input type="checkbox"/> Annual <input type="checkbox"/> Check if this is the last report for the project (Project completed).																				
1C. REVISION OF A PRIOR REPORT? Y or N Year: _____ Quarter: _____		BRIEFLY DESCRIBE THE REVISIONS YOU ARE MAKING:																				
2A. EPA FINANCIAL ASSISTANCE OFFICE ADDRESS (ATTN: DBE Coordinator)		3A. RECIPIENT NAME AND ADDRESS																				
2B. EPA DBE COORDINATOR Name: E-mail:	2C. PHONE: Fax:	3B. RECIPIENT REPORTING CONTACT: Name: E-mail:	3C. PHONE: Fax:																			
4A. FINANCIAL ASSISTANCE AGREEMENT ID NUMBER (SRF State Recipients, refer to Instructions for Completion of blocks 4A, 5A and 5C.)		4B. FEDERAL FINANCIAL ASSISTANCE PROGRAM TITLE or CFDA NUMBER:																				
5A. TOTAL ASSISTANCE AGREEMENT AMOUNT (SRF State Recipients, refer to Instructions for Completion of blocks 4A, 5A and 5C.) EPA Share: \$ _____ Recipient Share: \$ _____		5B. If NO procurement and NO accomplishments were made this reporting period, check and skip to Block No. 7. (Procurements are all expenditures through contract, order, purchase, lease or barter of supplies, equipment, construction, or services needed to complete Federal assistance programs. <u>Accomplishments</u> , in this context, are procurements made with MBEs and/or WBEs. <div style="text-align: center;"><input type="checkbox"/></div>																				
5C. Total Procurement and MBE/WBE Accomplishments This Reporting Period (Only include amount not reported in any prior reporting period) Were sub-awards issued under this assistance agreement? Yes___ No___ Were contracts issued under this assistance agreement? Yes___ No___ Total Procurement Amount \$ _____ (Include total dollar values awarded by recipient, sub-recipients and SRF loan recipients.) Actual MBE/WBE Procurement Accomplished: (Include total dollar values awarded by recipient, sub-recipients, SRF loan recipients and Prime Contractors.) <table style="width: 100%; margin-top: 10px;"> <thead> <tr> <th></th> <th style="text-align: center;"><u>Construction</u></th> <th style="text-align: center;"><u>Equipment</u></th> <th style="text-align: center;"><u>Services</u></th> <th style="text-align: center;"><u>Supplies</u></th> <th style="text-align: center;"><u>Total</u></th> </tr> </thead> <tbody> <tr> <td>\$MBE:</td> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>\$WBE:</td> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> </tbody> </table>						<u>Construction</u>	<u>Equipment</u>	<u>Services</u>	<u>Supplies</u>	<u>Total</u>	\$MBE:	_____	_____	_____	_____	_____	\$WBE:	_____	_____	_____	_____	_____
	<u>Construction</u>	<u>Equipment</u>	<u>Services</u>	<u>Supplies</u>	<u>Total</u>																	
\$MBE:	_____	_____	_____	_____	_____																	
\$WBE:	_____	_____	_____	_____	_____																	
6. COMMENTS: (If no MBE/WBE procurements were accomplished during the reporting period, please explain what steps you are taking to achieve the MBE/WBE Program requirements specified in the terms and conditions of the Assistance Agreement.) 																						
7. NAME OF RECIPIENT'S AUTHORIZED REPRESENTATIVE		TITLE																				
8. SIGNATURE OF RECIPIENT'S AUTHORIZED REPRESENTATIVE		DATE																				

FORM 5700-52A

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Part 2 - MBE/WBE PROCUREMENTS MADE DURING REPORTING PERIOD
Ohio EPA Financial Assistance Agreement Number: _____

1. Procurement Made By (check one)			2. Business Enterprise Type (indicate percentage if both)		3. \$ Value of Procurement	4. Date of Award	5. Type of Product or Services (Enter Code)	6. Name/Address/Phone Number of MBE/WBE Contractor or Vendor
Recipient	Sub- Recipient and/or SRF Loan Recipient	Prime	Minority	Women				

Type of product or service codes:

1 = Construction

2 = Supplies

3 = Services

4 = Equipment

Note: Refer to Terms and conditions of your Assistance Agreement to determine the frequency of reporting. Recipients are required to submit MBE/WBE reports to EPA beginning with the Federal fiscal year quarter the recipients receive the award, continuing until the project is completed.

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FORM 5700-52A Instructions:

A. General Instructions:

MBE/WBE utilization is based on Executive Orders 11625, 12138, 12432, P.L. 102-389 and EPA Regulations Part 30 and 31. Form 5700-52A must be completed by recipients of Federal grants, cooperative agreements, or other Federal financial assistance which involve procurement of supplies, equipment, construction or services to accomplish Federal assistance programs.

Recipients are required to report 30 days after the end of each federal fiscal quarter or annually, per the terms and conditions of the financial assistance agreement. Submission dates are January 30, April 30, July 30, and October 30. The submission date for annual reports is October 30. MBE/WBE program requirements, including reporting, are material terms and conditions of the financial assistance agreement.

B. Definitions:

Procurement is the acquisition through contract, order, purchase, lease or barter of supplies, equipment, construction or services needed to accomplish Federal assistance programs.

A *contract* is a written agreement between an EPA recipient and another party (also considered "prime contracts") and any lower tier agreement (also considered "subcontracts") for equipment, services, supplies, or construction necessary to complete the project. This definition excludes written agreements with another public agency. This definition includes personal and professional services, agreements with consultants, and purchase orders.

A *minority business enterprise* (MBE) is a business concern that is (1) at least 51 percent owned by one or more minority individuals, or, in the case of a publicly owned business, at least 51 percent of the stock is owned by one or more minority individuals; and (2) whose daily business operations are managed and directed by one or more of the minority owners.

U.S. citizenship is required. Recipients shall presume that minority individuals include Black Americans, Hispanic Americans, Native Americans, Asian Pacific Americans, or other groups whose members are found to be disadvantaged by the Small Business Act or by the Secretary of Commerce under section 5 of Executive order 11625. The reporting contact at EPA can provide additional information.

A *woman business enterprise* (WBE) is a business concern that is, (1) at least 51 percent owned by one

or more women, or, in the case of a publicly owned business, at least 51 percent of the stock is owned by one or more women and (2) whose daily business operations are managed and directed by one or more of the women owners.

Business firms which are 51 percent owned by minorities or women, but are in fact managed and operated by non-minority individuals do not qualify for meeting MBE/WBE procurement goals. U.S. Citizenship is required.

The following affirmative steps for utilizing MBEs and WBEs must be documented. Such documentation is subject to EPA review upon request:

1. Include of MBEs/WBEs on solicitation lists.
2. Assure that MBEs/WBEs are solicited once they are identified.
3. Divide total requirements into smaller tasks to permit maximum MBE/WBE participation, where feasible.
4. Establish delivery schedules which will encourage MBE/WBE participation, where feasible.
5. Encourage use of the services of the U.S. Department of Commerce's Minority Business Development Agency (MBDA) and the U.S. Small Business Administration to identify MBEs/WBEs.
6. Require that each party to a subgrant, subagreement, or contract award take the affirmative steps outlined here.

C. Instructions for Part 1:

1a. Specify Federal fiscal year this report covers. The Federal fiscal year runs from October 1st through September 30th (**e.g. November 29, 2005 falls within Federal fiscal year 2006**)

1b. Check applicable reporting box, quarterly or annually. Also indicate if this is the last report for the project.

1c. Indicate if this is a revision to a previous year or quarter, and provide a brief description of the revision you are making.

2a-c. Please refer to your financial assistance agreement for the mailing address of the EPA financial assistance office for your agreement.

The "EPA DBE Reporting Contact" is the DBE Coordinator for the EPA Region from which your financial assistance agreement was originated. For a list of DBE Coordinators please refer to the EPA OSDBU website at www.epa.gov/osdbu. Click on "Regional Contacts" for the name of your coordinator.

3a-c. Identify the agency, state authority, university or other organization which is the recipient of the Federal financial assistance and the person to contact concerning this report.

4a. Provide the Assistance Agreement or Interagency Agreement number assigned by EPA. A separate report must be submitted for each Assistance Agreement or Interagency Agreement.

***For SRF recipients:** In box 4a list numbers for ALL open Assistance Agreements. SRF recipients will report activity for all Agreements on one form.

4b. Refer back to Assistance Agreement document for this information.

5a. Provide the total amount of the Assistance Agreement which includes Federal funds plus recipient matching funds and funds from other sources.

***For SRF recipients only:** SRF recipients will not enter an amount in 5a. Please leave 5a blank.

5b. Self-explanatory.

5c. State whether or not sub-awards and/or subcontracts have been issued under the assistance agreement by indicating "yes" or "no".

Provide the total dollar amount of all contracts/procurements awarded this reporting period by the recipient and all sub-recipients, and SRF loan recipients. For example: Actual dollars for procurement from the procuring office; actual contracts let from the contracts office; actual goods, services, supplies, etc., from other sources including the central purchasing/ procurement centers).

Where requested, also provide the total dollar amount of all MBE/WBE procurement awarded during this reporting period by the recipient, sub-recipients, SRF loan recipients, and prime contractors in the categories of construction, equipment, services and supplies. These amounts include the Federal, State and local shares in the procurement awards.

***For SRF recipients only:** In 5c please enter the total procurement amount for the quarter under all of your SRF Assistance Agreements. The figure reported in this section is **not** directly tied to an individual Assistance Agreement identification number. **(SRF state recipients report state procurements in this section)**

6. If there were no MBE/WBE accomplishments this reporting period, please briefly explain what steps you are taking in furtherance of the MBE/WBE requirements specified in the terms and conditions of the Assistance Agreement.

7. Name and title of official administrator or designated reporting official.

8. Signature and month, day year report submitted.

D. Instructions for Part 2:

For each MBE/WBE procurement made under this assistance agreement during the reporting period, provide the following information:

1. Check whether this procurement was made by the recipient, sub-recipient/SRF loan recipient, or the prime contractor.

2. Check either the MBE or WBE column. If a firm is both an MBE and WBE, the recipient may choose to count the entire procurement towards EITHER its MBE or WBE accomplishments. The recipient may also divide the total amount of the procurement (using any ratio it so chooses) and count those divided amounts toward its MBE and WBE accomplishments. If the recipient chooses to divide the procurement amount and count portions toward its MBE and WBE accomplishments, please state the appropriate amounts under the MBE and WBE columns on the form. **The combined MBE and WBE amounts for that MBE/WBE contractor must not exceed the "Value of the Procurement" reported in column #3**

3. Dollar value of procurement.

4. Date of award, shown as month, day, year. Date of award is defined as the date the contract or procurement was awarded, **not** the date the contractor received payment under the awarded contract or procurement, unless payment occurred on the date of award. **(Where direct purchasing is the procurement method, the date of award is the date the purchase was made)**

5. Using codes at the bottom of the form, identify type of product or service acquired through this procurement (eg., enter 1 if construction, 2 if supplies, etc).

6. Name, address, and telephone number of MBE/WBE firm.

**This data is requested to comply with provisions mandated by: statute or regulations (40 CFR Part 30 and 31); OMB Circulars; or added by EPA to ensure sound and effective assistance management. Accurate, complete data are required to obtain funding, while no pledge of confidentiality is provided.

The public reporting and recording burden for this collection of information is estimated to average 1 hour per response annually. Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclosure or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and

verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, OPPE Regulatory Information Division, U.S. Environmental Protection Agency (2136), 1200 Pennsylvania Avenue, NW, Washington, D.C. 20460. Include the OMB Control number in any correspondence. Do not send the completed form to this address.

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CONTRACT AGREEMENT FORMCONTRACT AGREEMENT FORM FOR:
VILLAGE OF CRESTLINE, OHIO**WWTP IMPROVEMENTS – PHASE I**

THIS AGREEMENT is dated the ____ day of _____, 20____.

BY AND BETWEEN _____, hereinafter called CONTRACTOR and the Village of Crestline, Ohio, hereinafter called the OWNER.

OWNER and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

1. SCOPE OF WORK

The CONTRACTOR shall furnish all labor, materials, supplies, equipment and other facilities and things necessary or proper or incidental to complete performances of the work under this Contract for the OWNER as required by and in strict accordance with the applicable Contract Documents entitled, WWTP IMPROVEMENTS – PHASE I for Crestline, Ohio, and shall complete everything required by the Contract and Contract Documents.

2. ENGINEER

This project has been designed by GGJ, INC., 35585 Curtis Blvd., Unit C, Eastlake, Ohio 44095, who is hereinafter called ENGINEER and who will assume all duties and responsibilities and will have the rights and authority assigned to ENGINEER in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

3. CONTRACT TIME

3.1 The Work will be substantially completed within 240 calendar days after the date when the contract Time commences to run as provided in Paragraph 2.3 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 14.13 of the General Conditions within 30 calendar days after substantial completion.

3.1.1 Commencement of the demolition of existing facilities shall not commence without written authorization of the Engineer.

3.2 OWNER and CONTRACTOR recognize that time is of the essence of this Agreement and that OWNER will suffer financial loss if the Work is not complete within the time specified in Paragraph 3.1 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. They 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 complete on time. Accordingly, instead of requiring any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) CONTRACTOR shall pay OWNER Seven Hundred Fifty Dollars (\$750.00) for each day that expires after the time specified in Paragraph 3.1 for Substantial Completion until the Work is substantially complete. After Substantial Completion if CONTRACTOR shall neglect, refuse or fail to complete the remaining work within the Contract Time or any proper extension thereof granted by OWNER, CONTRACTOR shall pay OWNER One-Thousand Dollars (\$1,000.00) for each day that expires after the time specified in paragraph 3.1 for completion and readiness for final payment.

4. CONTRACT PRICE

4.1 OWNER shall pay CONTRACTOR for performance of the Work in accordance with the Contract Documents, in current funds, the sum of _____

_____ Dollars \$ _____ (The amount shall be shown in both words and figures; in the case of discrepancy, the amount shown in words will govern.) in accordance with Article 14 of the General Conditions.

- 4.2 The following percentages shall be used to calculate CONTRACTOR'S Fee (overhead and profit) for changes in the value of work per Article 11.6 of the General Conditions as modified by the Supplementary Conditions.

4.2.1 Labor and Material (paragraph 11.6.1.1) 6.5 percent

4.2.2 Subcontractors (paragraph 11.6.1.2) 5 percent

5. PAYMENT PROCEDURES

CONTRACTOR shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by ENGINEER as provided in the General Conditions.

- 5.1 Progress Payments - OWNER shall make progress payments on account of the Contract Price on the basis of CONTRACTOR'S Applications for Payment as recommended by ENGINEER, once each month during construction as provided below. All progress payments will be on the basis of the progress of the Work measured by the Schedule of Values provided for in Paragraph 14.1 of the General Conditions.

5.1.1 Until the Work is 50% complete, progress payments will be in an amount equal to 92% of the work completed and 90% of materials and equipment not incorporated in the Work but delivered and suitably stored, less in each case the aggregate of payments previously made.

5.1.2 When the work is 50% complete, progress payments will be in the amount equal to 100% of all Work satisfactorily completed to date (excluding retainage held for work described in 5.1.1) will be made to the CONTRACTOR.

5.1.3 Upon substantial Completion, OWNER shall pay an amount sufficient to increase total payments to CONTRACTOR to 100% of the contract price, less only 1-1/2 times such amount as is required to complete any then remaining, uncompleted, minor items, which amount shall be certified by the ENGINEER.

- 5.2 Final Payment - Upon final completion and acceptance of the Work in accordance with Paragraph 14.13 of the General Conditions, OWNER shall pay the remainder of the Contract Price as recommended by ENGINEER.

6. INTEREST

All monies not paid when due hereunder shall bear interest at the maximum rate allowed by law in Ohio for public contracts.

7. CONTRACTOR'S REPRESENTATIONS

In order to induce OWNER to enter into this Agreement, CONTRACTOR makes the following representations:

7.1 CONTRACTOR has familiarized himself with the nature and extent of the Contract Documents, Work, locality and with all local conditions and federal, state and local laws, ordinances, rules and regulations that in any manner may affect cost, progress or performance of the Work.

7.2 CONTRACTOR has studied carefully all reports of investigations and tests of subsurface and latent physical conditions at the site or otherwise affecting cost, progress or performance of the Work which were relied upon by ENGINEER in the preparation of the Drawings and Specifications and which have been identified in the Supplementary Conditions.

7.3 CONTRACTOR has made or caused to be made examinations, investigations and tests and studies of such reports and related data in those referred to in Paragraph 7.2 as he deems necessary for the

performance of the Work at the Contract Price, within the Contract Time and in accordance with the other items and conditions of the Contract Documents; and no additional examinations, investigations, tests, reports or similar data are or will be required by CONTRACTOR for such purpose.

- 7.4 CONTRACTOR has correlated the results of all such observations, examination, investigations, tests, reports and data with the terms and conditions of the Contract Documents.
- 7.5 CONTRACTOR has given ENGINEER written notice of all conflicts, errors or discrepancies that he has discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to CONTRACTOR.

8. CONTRACT DOCUMENTS

The Contract Documents which comprise the entire agreement between OWNER and CONTRACTOR are attached to this Agreement, and made a part hereof and consists of the following:

- 8.1 This Agreement identified as Section 00500.
- 8.2 Contract Bonds, identified as Section 00610.
- 8.3 Workmen's Compensation Certification, identified as Section 00630.
- 8.4 Certificate of Owner's Fiscal Officer, identified as Section 00635.
- 8.5 Certificate of Owner's Legal Counsel, identified as Section 00640.
- 8.6 Notice of Commencement, identified as Section 00645.
- 8.7 Notice of Award, identified as Section 00680.
- 8.8 Notice to Proceed, identified as Section 00681.
- 8.9 Standard General Conditions of the Construction Contract, identified as Section 00700.
- 8.10 Supplementary Conditions, identified as Section 00800.
- 8.11 Evidence of insurance.
- 8.12 Specifications bearing the title Project Manual, including specifications for construction of: WASTEWATER TREATMENT PLANT IMPROVEMENTS – PHASE I FOR CRESTLINE, OHIO.
- 8.13 Drawings consisting of a Cover Sheet and Drawings numbered inclusive with each sheet bearing the general title as outlined in the Drawings Index of the Project Manual.
- 8.14 Addenda numbers _____ to _____ inclusive.
- 8.15 CONTRACTOR'S Bid, identified as Sections 00300, 00410, 00420, 00430, 00440, and 00450.
- 8.16 Documentation submitted by CONTRACTOR prior to Notice of Award.
- 8.17 Any Modification, including Change Orders, duly delivered after execution of Agreement.

There are no Contract Documents other than those listed above in this Article 8. The Contract Documents may only be altered, amended or repealed by a Modification (as defined in Section 1 of the General Conditions).

9. MISCELLANEOUS

- 9.1 Terms used in this Agreement which are defined in Article 1 of the General Conditions shall have the meanings indicated in the General Conditions.

9.2 No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and specifically but without limitation, monies that may become due and monies that are 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.

9.3 OWNER and CONTRACTOR each binds himself, his partners, successors, assigns and legal representatives to the other party hereto, his partners, successors, assigns and legal representatives in respect to all covenants, agreements and obligations contained in the Contract Documents.

IN WITNESS WHEREOF, the parties hereto have signed this Agreement in triplicate. One counterpart each has been delivered to OWNER, CONTRACTOR and ENGINEER. All portions of the Contract Documents have been signed or identified by OWNER and CONTRACTOR or by ENGINEER on their behalf.

This Agreement will be effective on _____, 20____

_____(SEAL)
(Owner's Representative)

_____(SEAL)
(Contractor's Representative)

David Sharrock, Mayor
(Printed Name of Representative)

(Printed Name of Representative)

Witness _____

Address for giving notices to OWNER

Address for giving notices to CONTRACTOR

Village of Crestline

100 North Seltzer Street

Crestline, Ohio 44827

END OF SECTION

SECTION 00610

BID GUARANTY AND CONTRACT BOND

KNOW ALL PEOPLE BY THESE PRESENTS, that we, the undersigned

(Name and Address of Principal)

as Principal, and

(Name and Address of Surety)

as Surety, are hereby held and firmly bound unto

Village of Crestline, 100 North Seltzer Street, Crestline, Ohio 44827

(Name and Address of Obligee/Owner)

hereinafter called the Obligee, in the penal sum of the dollar amount of the bid submitted by the Principal to the

Obligee on _____

to undertake the project known as: WWTP Improvements – Phase 1

The penal sum referred to herein shall be the dollar amount of the Principal's bid to the Obligee, incorporating any additive or deductive alternate proposals made by the Principal on the date referred to above to the Obligee, which are accepted by the Obligee. In no case shall the penal sum exceed the amount of

_____ (\$_____).

(IF THE ABOVE LINES ARE LEFT BLANK, THE PENAL SUM WILL BE THE FULL AMOUNT OF THE PRINCIPAL'S BID, INCLUDING ALTERNATES. ALTERNATIVELY, IF COMPLETED, THE AMOUNT STATED MUST NOT BE LESS THAN THE FULL AMOUNT OF THE BID, INCLUDING ALTERNATES, IN DOLLARS AND CENTS. A PERCENTAGE IS NOT ACCEPTABLE.) For the payment of the penal sum well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that whereas the above named Principal has submitted a bid on the above referred to project;

NOW THEREFORE, if the Obligee accepts the bid of the Principal and the Principal fails to enter into a proper contract in accordance with the bid, plans, details, specifications, and bills of material; and in the event the Principal pays to the Obligee the difference not to exceed ten percent (10%) of the penalty hereof between the amount specified in the bid and such larger amount for which the Obligee may in good faith contract with the next lowest bidder to perform the work covered by the bid; or in the event the Obligee does not award the contract to the next lowest bidder and resubmits the project for bidding, the Principal will pay the Obligee the difference not to exceed ten percent (10%) of the penalty hereof between the amount specified in the bid, or the costs, in connection with the resubmission, of printing new contract documents, required advertising and printing and mailing contract documents, required advertising and printing and mailing notices to prospective bidders, whichever is less, then this obligation shall be void, otherwise to remain in full force and effect. If the Obligee accepts the bid of the Principal and the Principal within ten (10) days after the awarding of the contract, enters into a proper contract in accordance with the bid, plans, details, specifications, and bills of material which said contract is made a part of this bond the same as though set forth herein, and IF THE SAID Principal shall well and faithfully perform each and every condition of such contract; and indemnify the Obligee against all damage suffered by failure to perform such contract according to the provisions thereof and in accordance with the plans, details, specifications, and bills of material therefore; and shall pay all lawful claims of subcontractors, material suppliers, and laborers, for labor performed and materials furnished in the carrying forward performing, or completing of said contract; we agreeing and assenting that this undertaking shall be for the benefit of any material supplier or laborer having a just claim, as well as for the Obligee herein; then this obligation shall be void; otherwise the same shall remain in full force and effect; it being expressly understood

and agreed that the liability of the Surety for any and all claims hereunder shall in no event exceed the penal amount of this obligation as herein stated.

THE SAID Surety hereby stipulates and agrees that no modification, omissions or additions, in or to the terms of said contract or in or to the plans and specifications therefore shall in any way affect the obligations of said Surety on this bond, and it does hereby waive notice of any such modifications, omissions or additions to the terms of the contract or to the work or to the specifications.

SIGNED AND SEALED this ____ day of _____, 20____.

_____	_____
	Principal
_____	By: _____
Witness	Title
_____	_____
	Surety
_____	By: _____
Witness	
_____	_____
	Attorney-In-Fact
_____	_____
	Surety Agents Address:
_____	_____

END OF SECTION

SECTION 00620

PAYMENT BOND

Know all men by these presents, that we, _____, as PRINCIPAL, and _____, as sureties are held and firmly bound unto the **Village of Crestline**, its certain attorney, successors, or assigns (hereinafter called the OBLIGEE) in the sum of _____ Dollars (\$ _____) lawful money of the United State, for the payment of which sum will and truly to be made, we bind ourselves, our heirs, personal representatives, successors, and assigns, jointly and severally firmly by these presents:

WHEREAS, said PRINCIPAL has entered into a certain contract with said OBLIGEE, dated _____ 20 __, hereinafter called the Contract) for **Wastewater Treatment Plant Improvements – Phase 1** which contract and the specifications for said Work shall be deemed a part thereof as fully as if set out herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH that if said PRINCIPAL and all subcontractors to whom any portion of the work provided for in said contract is sublet and all assignees of said PRINCIPAL and of such subcontractors shall promptly make payment for all material furnished, labor supplied or performed, rental for equipment employed, and services rendered by public utilities in or in connection with the prosecution of the work, whether or not the said material, labor, equipment, or services enter into and become component parts of the work or improvement contemplated in said contract, of in any amendment or extension of or addition to said Contract, then the above obligation shall be void; otherwise to remain in full force and effect, PROVIDED, however, that this bond is subject to the following conditions and limitations:

- (a) All persons who have performed labor, rendered services or furnished materials or machinery, shall have a direct right of action against the PRINCIPAL and surety on this bond, which right of action shall be asserted in proceedings instituted in the State in which labor was performed, services rendered or materials furnished under said contract in more than one state, then in any such state). Insofar as permitted by laws of such state, such right of action shall be asserted in a proceeding instituted in the name of the OBLIGEE to the right and benefit of the person instituting such action and any or all other persons having claims hereunder, and any other person having a claim hereunder shall have the right to be made a party to such proceedings (but not later than 2 years after the complete performance of said Contract and final settlement thereof) and to have such claim adjudicated in such action and judgment rendered thereon.
- (b) The surety shall not be liable hereunder for any damages or compensation recoverable under any workmen's compensation or employer's liability statute.
- (c) In no event shall the surety be liable for a greater sum than the penalty of this bond, or subject to any suit, action or proceeding thereon that is instituted later than 2 years after the complete performance of said Contract and final settlement thereof.
- (d) As used herein: The term "person" refers to any individual, firm or corporation who have furnished materials or machinery or public utility services to be used on or incorporated in the work or the prosecution thereof provided for in said Contract or in any amendment or extension of or addition to said Contract, and/or to any person engaged in the prosecution of the work provided for in said Contract of in any amendment or extension of or addition to said Contract who is an agent, servant or employee of the PRINCIPAL or of any subcontractor, or of any assignee of said PRINCIPAL, or any subcontractor, or any assignee of said principal or of said subcontractor, and such labor or mechanic, but shall not include office employees not regularly stationed at the site of the work.

The said surety, for value received, hereby stipulates and agrees that no charge, extension of time, alteration or addition to the terms of the Contract, or to the work to be performed thereunder or the Specifications accompanying the same, shall in any way affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time alteration or addition to the terms of the Contract or to the work or to the Specifications.

SIGNED, SEALED AND DELIVERED IN _____ ORIGINAL COUNTERPARTS THIS _____ day of _____, 20 ____.

(Individual Principals sign here)

BY: _____

TITLE: _____ (SEAL)

BY: _____

TITLE: _____ (SEAL)

Attest:

By: _____

Title: _____

Attest:

By: _____

Title: _____

BY: _____

TITLE: _____ (SEAL)

(Corporate Principal sign here)

BY: _____

TITLE: _____ (SEAL)

(Surety Sign Here)

BY: _____

TITLE: _____ (SEAL)

The rate of premium charges is \$ _____ per thousand.

The total amount of the premium charged \$ _____.

(The above must be filled in by the Corporate Surety.)

NOTE: Date of Bond must not be prior to date of NOTICE OF AWARD. If CONTRACTOR is Partnership, all partners should execute Bond.

Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 70 as amended) and be authorized to transact business in the State where the Project is located.

END OF SECTION

SECTION 00630

WORKERS' COMPENSATION CERTIFICATION

The undersigned CONTRACTOR, _____, being duly sworn according to law deposes and accepts the provisions of Workers Compensation for the State of Ohio, with its supplements and amendments, and provides insured liability thereunder in accordance with the terms of said Act with

(Name of Insurance Company, with Policy Number)

Date _____, 20 ____

(Signature of Contractor's Representative)

(Printed Name of Representative)

(Title of Contractor's Representative)

END OF SECTION

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SECTION 00635

CERTIFICATE OF FISCAL OFFICER

I, **Marc Milliron**, duly appointed and acting Auditor of the Village of Crestline, do hereby certify that a copy of the foregoing CONTRACT has been received by me from the Auditor of the Village of Crestline and that I hereby certify that the amount of _____ Dollars (\$) required to meet the payment of this CONTRACT has been lawfully appropriated or authorized or directed for such purpose of complying with the terms and conditions of the foregoing CONTRACT, and is on deposit or in the process of collection to the credit of the appropriate fund and the same is free from any previous encumbrances.

WITNESS MY HAND this _____ day of _____, 20____, at _____.
(Day) (Month) (Year)

(Signature of Acting Auditor)

Marc Milliron
(Printed Name)

END OF SECTION

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SECTION 00640

CERTIFICATE OF LEGAL COUNSEL

On this _____ day of _____, 20_____, I, **Harry Welsh, Law Director**
(Month) (Year)

of the **Village of Crestline** do hereby approve the foregoing CONTRACT with

_____ as to form.
(Contractor)

(Law Director)

Harry Welsh
(Printed Name of Legal Counsel)

END OF SECTION

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OWNER'S NOTICE OF COMMENCEMENT

State of Ohio,)
County of Crawford) ss.

1. Affiant is the Mayor of the Village of Crestline.
 Title "Public Authority"

Crestline, Ohio 44827

The following is a list of all principal contractors, their addresses, and their trades working on this public improvement:

NAME	ADDRESS	TRADE
------	---------	-------

PRINCIPAL CONTRACTOR	NAME OF SURETY	ADDRESS OF SURETY
-------------------------	----------------	-------------------

6. For the purpose of serving an affidavit pursuant to Revised Code §1311.26, service may be made upon the

following representative of the Public Authority: David Sharrock Mayor at
Name Title
Village of Crestline, 100 North Seltzer Street, Crestline, Ohio 44827
Address

FURTHER AFFIANT SAYETH NAUGHT.

Signature

SWORN TO BEFORE ME and subscribed in my presence this _____ day of _____, 20__.

Notary Public

[SEAL]

SECTION 00650

ONE-YEAR GUARANTEE

Contractor shall guarantee all work, labor, materials, and equipment provided for a period of one year from the date that final payment is due. The following shall be completed as part of the project closeout process.

Project: WWTP Improvements – Phase I

Owner: Village of Crestline

Contractor: _____

Contractor Address: _____

Project Manager: _____

Phone Number: _____

Contract Start _____

Contract Completion Date: _____

One-Year Guarantee
Start Date: _____ (Date of Contract Completion Certificate)

One-Year Guarantee
Completion Date: _____

The undersigned hereby guarantees all material and labor for work performed for a period of one (1) year from the date of the final completion certificate by the Owner, Village of Crestline or its representative and acceptance of the property owner(s). All available manufacturers' warranties and suppliers' guarantees covering materials and equipment, under subject contract are attached. This guarantee shall include all labor, equipment, materials, or other items required to correct defects or deficiencies in the work provided. The contractor will not, however, guarantee any damage caused by improper use, extremely heavy wear, vandalism, or "Acts of God" such as high winds, extremely heavy snow storms, ice storms or flooding if the specifications or design criteria was exceeded.

The undersigned hereby certifies that all work required under this contract has been performed in accordance with terms thereof. The undersigned further certifies that all payments due for materials, supplies, equipment; and all payments due to sub-contractors, laborers or mechanics for subject work, have been made or will be made within fifteen (15) days of receipt of requested final payment.

Upon receipt of final payment, the undersigned does hereby release the property owner(s) and the Owner, Village of Crestline from any and all claims which may arise under or by virtue of this contract.

Contractor (Company Name)

Signature and Title of Officer, Partner or Individual

Date

Witness

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SECTION 00655

DELINQUENT PERSONAL PROPERTY STATEMENT

Name of Bidder: _____

Address: _____

Having been awarded a contract by Village of Crestline, Ohio, hereby affirms under oath, pursuant to the Ohio Revised Code Section 5719.042 (see Section 00610-2) that at the time this bid was submitted, my company (was) (was not) charged with delinquent personal property taxes on the general tax list of personal property for Crawford County, Ohio. If such charge for delinquent personal property tax exists on the general tax list of personal property of Crawford County, Ohio the amount of such due and unpaid delinquent taxes, including due and unpaid penalties and interest shall be set forth below.

A copy of this statement shall be transmitted by the Bidder to the county treasurer within thirty days of the date it is submitted. A copy of this statement shall also be incorporated into the contract made between the

Village of Crestline and _____
(Name of Owner) (Name of Bidder)

and no payment with respect to any contract shall be made unless such a statement has been so incorporated as a part thereof.

Delinquent Personal Property Tax: \$ _____

Penalties: \$ _____

Interest: \$ _____

Bidder: _____

By: _____

Title: _____

Subscribed in my presence, and sworn to me this _____ day of _____, 20 ____.

Notary Public

SEAL

Ohio Revised Code Section 5791.042

5791.042 Successful bidders on contract with a taxing district to disclose any delinquent personal property taxes.

After the award by a taxing district of any contract let by competitive bid and prior to that time the contract is entered into, the person making a bid shall submit to the district's fiscal officer a statement affirmed under oath that the person with whom the contract is to be made was not charged at the time the bid was submitted with any delinquent personal property taxes on the general tax list of personal property of any county in which the taxing district has territory or that such person was charged with delinquent personal property taxes on any such tax list, in which case the statement shall also set for the amount of such due and unpaid delinquent taxes and any due and unpaid penalties and interest thereon. If the statement indicates that the taxpayer was charged with any such taxes, a copy of the statement shall be transmitted by the fiscal officer to the county treasurer within thirty days of the date it is submitted.

A copy of the statement shall also be incorporated into the contract, and no payment shall be made with respect to any contract to which this section applies unless such statement has been so incorporated as a part thereof.

HISTORY: 1982 H 379, eff. 9-21-82

CROSS REFERENCES

See Baldwin's Ohio School Law, Text 105.07

END OF SECTION

SECTION 00660

ESCROW AGREEMENT

Section 153.13 of the Ohio Revised Code states that for contracts of \$15,000 or greater, all funds retained pursuant to Sections 153.12 and 153.14 of the Revised Code for faithful performance of the work shall be deposited in the Escrow Account designated in Section 153.63 of the Revised Code. After the contract is 50% complete, no further funds can be retained.⁽¹⁾

PER 1980 CASE NOTES AND OA6 IN SECTION 153.13 OF ⁽¹⁾ A CHARTER MUNICIPALITY, IN EXERCISE OF LOCAL SELF GOVERNMENT MAY ENACT RETAINAGE PROVISIONS FOR A CONTRACT FOR IMPROVEMENTS TO MUNICIPAL PROPERTY WHICH DIFFER FROM THE RETAINAGE PROVISIONS DESCRIBED IN O.R.C. 153.23.

We are proposing to hold the retained amount of your contract and invest it with other City funds in order to take advantage of maximum yields. Upon notice from the Department of Public Service, the retainage with interest from the date of escrow will be released to you. We are in no way guaranteeing any minimum interest earnings; however the City's earnings rates have been competitive.

Project: WWTP Improvements – Phase I

Current Earnings Rate: _____

Amount of Retainage Held: _____

Date of Escrow: _____

I accept the proposed escrow agreement for retainage held.

Signature _____

Title _____

END OF SECTION

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SECTION 00680

NOTICE OF AWARD

EFFECTIVE DATE _____ 20____

TO: _____
[BIDDER]

ADDRESS: _____

PROJECT: WWTP Improvements – Phase I

CONTRACT FOR: Village of Crestline

You are hereby notified that your Bid dated _____ for the above Contract has been considered. You are the apparent successful bidder and have been awarded a contract for the above named project.

The Bid Price of your contract is \$ _____

Six (6) copies of each of the proposed Contract Documents accompany this Notice of Award. Three sets of the Drawings will be delivered separately or otherwise made available to you immediately.

You must comply with the following conditions precedent within 14 days of the Effective Date of this Notice of Award.

1. You must deliver to the Owner six (6) fully executed counterparts of the Agreement, including all the Contract Documents.
2. You must deliver with the executed Agreement, the Payment and Performance Bonds and the Insurance Certificate as specified in the Instructions to Bidders, The General Conditions (Article 5), and the Supplementary Conditions.

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

Within 10 days after you comply with the foregoing conditions, the Owner will return to you one fully signed counterpart of the Agreement with the Contract Documents attached.

OWNER: Village of Crestline

By: _____

Title: _____

Copy to Engineer by Certified Mail

_____ Return Receipt Requested

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged by _____,
(Bidder)

this ____ day of _____, 20 ____.

By: _____

Title _____

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SECTION 00681

NOTICE TO PROCEED

EFFECTIVE DATE _____ 20 _____

To: _____

Address: _____

Project Title: WWTP Improvements – Phase I

Owner's Project No. _____

Contract for: Village of Crestline, Ohio

You are hereby notified that the Contract Time under the above Contract will commence to run on the Effective Date of this Notice to Proceed. By that date, you are to start performing your obligations under the Contract Documents, in accordance with the provisions in Section 3.1 of the Contract Agreement.

The Time or Date of Final Completion is _____ on _____, 20 _____, which is _____ calendar days after the Effective Date of this Notice to Proceed.

Section 3.2 of the Contract Agreement provides for an assessment of liquidated damages for each calendar day after the above-established contract completion date that the Work remains incomplete.

Before starting any Work at the site, Paragraph 2.5 of the General Conditions provides that the Contractor must study the Contract Documents and verify figures and field dimensions, and must report any observed errors or discrepancies.

Also, before starting any Work at the site, Contractor must:

1. Submit to the Engineer the Proposed Schedule called for in Section 01300 Submittals.

VILLAGE OF CRESTLINE

By: _____

Title: _____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED is hereby acknowledged by

_____, this the _____ day of _____, 20_____
(month) (year)

Bidder _____

By _____

Title _____

Copy to Engineer (Use Certified Mail, Return Receipt Requested)

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CONTRACTOR'S PAY REQUEST

OWNER:	APPLICATION NO.: _____ WORK COMPLETED TO: _____ JOB NUMBER: _____
CONTRACTOR:	ENGINEER: GGJ., INC. 35585 Curtis Boulevard, Unit C Eastlake, Ohio 44836
PROJECT: _____	

1 ORIGINAL CONTRACT PRICE	_____
2 APPROVED CHANGE ORDERS	_____
3 CURRENT CONTRACT PRICE (Line 1 + 2)	_____
4 CONTRACT COMPLETED TO DATE	_____
5 CHANGE ORDER COMPLETED TO DATE	_____
6 STORED MATERIAL	_____
7 TOTAL COMPLETED TO DATE (Line 4 + 5 +6)	_____
8 RETAINAGE	
a. 8% of completed work	_____
b. 10% of stored work	_____
Total Retainage (Line 8a + 8b)	_____
9 TOTAL EARNED LESS RETAINAGE (Line 7 less Line 8 total)	_____
10 LESS PREVIOUS PAYMENTS (Line 9 from prior certificate)	_____
11 CURRENT PAYMENT DUE	_____

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner		
Total approved this Month		
TOTALS		
NET CHANGES by Change Order		

CONTRACTOR: CONTRACTOR'S CERTIFICATE: I hereby certify that the above materials and services have been furnished and performed in accordance with the conditions of the contract for the above work, and that payment has not been received and therefore is due and to be paid on said contract BY: _____ DATE: _____	
ENGINEER: GGJ., INC. ENGINEER'S CERTIFICATE FOR PAYMENT: In accordance with the Contract Documents based on on-site observations and the data comprising the above application, the Engineer certifies to the Owner that to the best of the Engineer's knowledge, Information and belief, the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED. BY: _____ DATE: _____	
OWNER: BY: _____ DATE: _____	

APPLICATION FOR PAYMENT UNIT PRICE BREAKDOWN

Cut Off Date:
Pay Request No.:

	Description of Work	Units	Bid Quantity	Unit Price	Total Bid Price	Total Completed Quantity	Total Completed Price	Previous Completed Quantity	Previous Completed Price	Current Inv. Completed Quantity	Current Inv. Completed Price	Percent Complete
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
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17												
18												
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22												
23												
24												
25												
26												
27												
28												

TOTALS:

State of Ohio
WATER POLLUTION CONTROL LOAN FUND

CONTRACT CHANGE ORDER

RECIPIENT _____	CHANGE ORDER NBR _____
WPCLF LOAN NUMBER _____	CONTRACT _____
OWDA PROJECT NBR _____	DATE _____

Description of Change: _____

RECOMMENDED BY: _____	DATE: _____
(Engineer)	
APPROVED BY: _____	DATE: _____
(Recipient)	
ACCEPTED BY: _____	DATE: _____
(Contractor)	

(Company)	

<table border="0" style="width: 100%;"><tr><td style="width: 80%;">Original Contract Amt _____</td><td style="width: 20%;"></td></tr><tr><td>Previous Changes (+ / -) _____</td><td></td></tr><tr><td>This Change (+ / -) _____</td><td></td></tr><tr><td>Adjusted Contract Amt _____</td><td></td></tr></table>	Original Contract Amt _____		Previous Changes (+ / -) _____		This Change (+ / -) _____		Adjusted Contract Amt _____		<div style="text-align: center;">OWDA APPROVAL The above proposal is hereby accepted and I recommend that it be approved and made a part of the contract covered by OWDA Project Number _____</div> <div style="text-align: center; border-top: 1px solid black; margin-top: 10px;">_____ Chief Engineer</div> <div style="text-align: center; border-top: 1px solid black; margin-top: 10px;">_____ Date</div> <div style="text-align: center; border-top: 1px solid black; margin-top: 10px;">_____ Executive Director</div> <div style="text-align: center; border-top: 1px solid black; margin-top: 10px;">_____ Date</div>
Original Contract Amt _____									
Previous Changes (+ / -) _____									
This Change (+ / -) _____									
Adjusted Contract Amt _____									
<div style="text-align: center;">OHIO EPA ACCEPTANCE</div> <table border="0" style="width: 100%;"><tr><td style="width: 80%;">Ohio EPA ACCEPTANCE _____</td><td style="width: 20%;"></td></tr><tr><td>DATE _____</td><td></td></tr></table>	Ohio EPA ACCEPTANCE _____		DATE _____						
Ohio EPA ACCEPTANCE _____									
DATE _____									

INSTRUCTIONS:

All Change Orders for this work, regardless of costs and whether Water Pollution Control Loan Fund funding will be used to finance the changes, must be submitted to Ohio EPA for review.

Changes Requiring Prior Approval

Any change which substantially modifies the Project Facilities as specified in the Ohio EPA approved Facilities Plan and Final Permit to Install (when applicable) or alters the direct or indirect impact of the Project Facilities upon the environment must be incorporated into a Change Order. One copy of the Change Order is to be submitted to Ohio EPA – DEFA for review and confirmation of the acceptability of the change. "Prior to execution" means before the change order is signed by the Owner.

Ohio EPA – DEFA will review the Change Order and inform the Owner of the technical, environmental and operational acceptability of the change, and give the Owner permission to proceed with the proposed work.

All Other Changes

Change orders not requiring prior approval as described above must be submitted to the Ohio EPA – DEFA within one (1) month of the time at which they are approved by the Owner.

Change Order Approval Process

After the change order is executed, a minimum of three copies are to be sent to Ohio EPA - DEFA for final review. All three copies must have original signatures. Only one copy of the supporting documentation for the change is to be submitted.

After the Change Order is accepted and WPCLF eligible costs determined, Ohio EPA will issue a letter informing the Owner and authorizing OWDA to disburse funds from Project Contingency for the work. Ohio EPA - DEFA will retain one copy of the Change Order plus the supporting documentation and send the remaining two copies to the Ohio Water Development Authority (OWDA) for processing.

OWDA will retain one copy of the Change Order and send the remaining copies, signed by both Ohio EPA - DEFA and OWDA, back to the Owner.

Payments for Change Order Work

The Owner is precluded from submitting to the OWDA payment requests for Eligible Project Costs associated with the change orders until such time as the Ohio EPA – DEFA's approval of the change orders has been obtained.

All Change Orders, including Prior Approval requests, should be sent to:

Ohio EPA - Division of Environmental and Financial Assistance
Engineering Section
P.O. Box 1049
Columbus, Ohio 43216-1049
(614) 644-2828
www.epa.state.oh.us/defa/

CERTIFICATE OF SUBSTANTIAL COMPLETION

PROJECT WWTP Improvements – Phase I

DATE OF ISSUANCE _____

OWNER Village of Crestline

OWNER'S CONTRACT NO. _____

CONTRACTOR _____ ENGINEER GGJ, Inc.

This Certificate of Substantial Completion applies to all Work under the Contract Documents or to the following specified parts thereof:

TO _____
Village of Crestline
OWNER

AND TO _____
CONTRACTOR

The Work to which this Certificate applies has been inspected by authorized representatives of OWNER, CONTRACTOR and ENGINEER, and that Work is hereby declared to be substantially complete in accordance with the Contract Documents on

DATE OF SUBSTANTIAL COMPLETION

A tentative list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include an item in it does not alter the responsibility of CONTRACTOR to complete all the Work in accordance with the Contract Documents. The items in the tentative list shall be completed or corrected by CONTRACTOR within _____ days of the above date of Substantial Completion.

EJCDC No. 1910-8-D (1990 Edition)

Prepared by the engineers Joint Contract Documents Committee and endorsed by the Associated General Contractors of America.

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PARTIAL WAIVER OF LIEN

To All Whom It May Concern:

WHEREAS, the undersigned has been employed by (A) _____

to furnish labor and materials for (B) _____

under a contract (C) _____

for the improvement of the premises described as (D) _____

in the _____ (City-Village) of _____

County of _____, State of _____

of which _____

_____ is the Owner.

NOW, THEREFORE, this _____ day of _____, 20 _____.

for and in consideration of the sum of (E) _____

Dollars paid simultaneously herewith, the receipt whereof is hereby acknowledged by the undersigned, the undersigned does hereby waive and release to the extent only of the aforesaid amount, any lien rights to, or claim of lien with respect to and on said above-described premises, and the improvements thereon, and on the monies or other considerations due or to become due from the owner, by virtue of said contract, on account of labor, services, materials, fixtures, apparatus or machinery furnished by the undersigned to or for the above-described premises, but only to the extent of the payment aforesaid.

(F) _____ (SEAL)
(Name of sole ownership, corporation or partnership)

**(Affix Corporate
Seal Here)**

_____ (SEAL)
(Signature of Authorized Representative)

_____ TITLE

INSTRUCTIONS FOR PARTIAL WAIVER:

- A) Name person or firm with whom you agreed to furnish either labor, or services, or materials, or both.
- B) Fill in nature and extent of work; strike the word labor or the word materials if not in your contract.
- C) If you have more than one contract on the same premises, describe the contract by number if available, date and extent of work.
- D) Furnish an accurate enough description of the improvements and location of the premises so that it can be distinguished from any other property.
- E) Amount shown should be the amount actually received on that date.
- F) If waiver is for a corporation, corporate name should be used, corporate seal affixed and title of officer signing waiver should be set forth; if waiver is for a partnership, the partnership name should be used, partner should sign and designate himself as partner.
- G) To be prepared and submitted with each estimate; preparation to be by Prime, Sub-Contractors, and Suppliers that are included in the estimate.

Construction Industry Affairs Committee of Chicago

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FINAL WAIVER OF LIEN

To All Whom It May Concern:

WHEREAS, the undersigned has been employed by (A) _____

to furnish labor and materials for (B) _____

under a contract (C) _____

for the improvement of the premises described as (D) _____

in the _____ (City-Village) of _____

County of _____, State of _____

of which _____

_____ is the Owner.

NOW, THEREFORE, this _____ day of _____, 20 ____.

for and in consideration of the sum of (E) _____ Dollars paid simultaneously herewith, the receipt whereof is hereby acknowledged by the undersigned, the undersigned does hereby waive and release any lien rights to, or claim of lien with respect to and on said above-described premises, and the improvements thereon, and on the monies or other considerations due or to become due from the owner, on account of labor, services, materials, fixtures, apparatus or machinery heretofore or which may hereafter be furnished by the undersigned to or for the above-described premises by virtue of said contract.

(F) _____ (SEAL)
(Name of sole ownership, corporation or partnership)

**(Affix Corporate
Seal Here)**

_____ (SEAL)
(Signature of Authorized Representative)

_____ TITLE

INSTRUCTIONS FOR FINAL WAIVER:

- (A) Name person or firm with whom you agreed to furnish either labor, or services, or materials, or both.
- (B) Fill in nature and extent of work; strike the word labor or the word materials if not in your contract.
- (C) If you have more than one contract on the same premises, describe the contract by number if available, date and extent of work.
- (D) Furnish an accurate enough description of the improvements and location of the premises so that it can be distinguished from any other property.
- (E) Amount shown should be the amount actually received and equal to total amount of contract as adjusted.
- (F) If waiver is for a corporation, corporate name should be used, corporate seal affixed and title of officer signing waiver should be set forth; if waiver is for a partnership, the partnership name should be used, partner should sign and designate himself as partner.

Construction Industry Affairs Committee of Chicago

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SECTION 00700

**STANDARD
GENERAL CONDITIONS
OF THE
CONSTRUCTION CONTRACT**

Prepared by
Engineers Joint Contract Documents Committee
And
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CONSTRUCTION SPECIFICATIONS INSTITUTE

This document has been approved and endorsed by

The Associated General

Contractors of America

These General Conditions have been prepared for use with the Owner-Contractor Agreements (No. 1910-A-1 or 1910-8-A-2) (1990 Editions). Their provisions are interrelated and a change in one may necessitate a change in the others. Comments concerning their usage are contained in the Commentary on Agreements for Engineering Services and Contract Documents (No. 1910-9) (1986 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (No. 1910-17) (1990 Edition). When bidding is involved, the Standard Form of Instructions to Bidders (No. 1910-12) (1990 Edition) may be used.

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GENERAL CONDITIONS

ARTICLE 1 – DEFINITIONS

Wherever used in these General Conditions or in the other Contract Documents, the following terms have the meanings indicated which are applicable to both the singular and plural thereof:

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

1.2 *Agreement*—The written contract between OWNER and CONTRACTOR covering the Work to be performed: other Contract Documents are attached to the Agreement and made a part thereof as provided therein.

1.3 *Application for Payment*—The form accepted by ENGINEER which is to be used by CONTRACTOR in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

1.4 *Asbestos*—Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

1.5 *Bid*—The offer or proposal of the bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

1.6 *Bidding Documents*—The advertisement or invitation to Bid, instructions to bidders, the Bid form, and the proposed Contract Documents (including all Addenda issued prior to receipt of Bids).

1.7 *Bidding Requirements*—The advertisement of invitation to Bid, instructions to bidders and the Bid Form.

1.8 *Bonds*—Performance and Payment bonds and other instruments of security.

1.9 *Change Order*—A document recommended by ENGINEER, 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, issued on or after the Effective Date of the Agreement.

1.10 *Contract documents*—The Agreement, Addenda (which pertain to the Contract Documents), CONTRACTOR's Bid (including documentation accompanying the Bid and any post Bid documentation submitted prior to the Notice of Award) when attached as an exhibit to the Agreement, the Notice to Proceed, the Bonds, these General Conditions, the Supplementary

Conditions, the Specifications and the Drawings as the same are more specifically identified in the Agreement, together with all Written Amendments, Change Orders, Work Change Directives, Field Orders and ENGINEER's written interpretations and clarifications issued pursuant to paragraphs 3.5, 3.6.1 and 3.6.3 on or after the Effective Date of the Agreement. Shop Drawing submittals approved pursuant to paragraphs 6.26 and 6.27 and the reports and drawings referred to in paragraphs 4.2.1.1 and 1.2.2.2 are not Contract Documents.

1.11 *Contract Price*—The moneys payable by OWNER to CONTRACTOR for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of paragraph 11.9.1 in the case of Unit Price Work).

1.12 *Contract Times*—The numbers of days or the dates stated in the Agreement: (i) to achieve Substantial Completion, and (ii) to complete the Work so that it is ready for final payment as evidenced by ENGINEER's written recommendation of final payment in accordance with paragraph 14.13.

1.13 *CONTRACTOR*—The person, firm or corporation with whom OWNER has entered into the Agreement.

1.14 *Defective*—An adjective which when notifying the word Work refers to Work that is unsatisfactory, faulty or deficient, in that it does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents, or 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 14.8 or 14.10).

1.15 *Drawings*—The drawings which show the scope, extent and character of the Work to be furnished and performed by CONTRACTOR and which have been prepared or approved by ENGINEER and are referred to in the Contract Documents. Shop drawings are not Drawings as so defined.

1.16 *Effective Date of the Agreement*—The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

1.17 *ENGINEER*—The person, firm or corporation named as such in the Agreement.

1.18 *ENGINEER's Consultant*—A person, firm or corporation having a contract with ENGINEER to furnish services as ENGINEER's independent professional associate or consultant with respect to the Project and who is identified as such in the Supplementary Condition.

1.19 *Field Order*—A written order issued by ENGINEER which orders minor changes in the Work in

accordance with paragraph 9.5 but which does not involve a change in the contract Price or the Contract Times.

1.20 *General Requirements*—Sections of Division 1 of the Specifications.

1.21 *Hazardous Waste*—The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

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

1.23 *Liens*—Liens, charges, security interests or encumbrances upon real property or personal property.

1.24 *Milestone*—A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

1.25 *Notice of Award*—The written notice by OWNER to the apparent successful bidder stating that upon compliance by the apparent successful bidder with the conditions precedent enumerated therein, within the time specified, OWNER will sign and deliver the Agreement.

1.26 *Notice to Proceed*—A written notice by OWNER to CONTRACTOR (with a copy to ENGINEER) fixing the date on which the Contract Times will commence to run and on which CONTRACTOR shall start to perform CONTRACTOR's obligations under the Contract Documents.

1.27 *OWNER*—The public body or authority, corporation, association, firm or person with whom CONTRACTOR has entered into the Agreement and for whom the Work is to be provided.

1.28 *Partial Utilization*—Use by OWNER of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Substantial Completion of all the Work.

1.29 *PCB's*—Polychlorinated biphenyls.

1.30 *Petroleum*—Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene and oil mixed with other non-Hazardous Wastes and crude oils.

1.31 *Project*—The total construction of which the Work to be provided under the Contract Documents may be the whole, or a part as indicated elsewhere in the Contract Documents.

1.32 *Radioactive Material*—Source, special nuclear, or by-product material as defined by the Atomic Energy Act of

1954 (42 USC Section 2011 et seq.) as amended from time to time.

1.33 *Resident Project Representative*—The Authorized representative of ENGINEER who may be assigned to the site or any part thereof.

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

1.35 *Shop Drawings*—All drawings, diagrams, illustrations, schedules and other data or information which are specifically prepared or assembled by or for CONTRACTOR and submitted by CONTRACTOR to illustrate some portion of the Work.

1.36 *Specifications*—Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the Work and certain administrative details applicable thereto.

1.37 *Subcontractor*—An individual, firm or corporation having a direct contract with CONTRACTOR or with any other Subcontractor for the performance of a part of the Work at the site.

1.38 *Substantial Completion*—The Work (or a specified part thereof) has progressed to the point where, in the opinion of ENGINEER as evidenced by ENGINEER's definitive certificate of Substantial Completion, it is sufficiently complete, in accordance with the Contract Documents, so that the Work (or specified part) can be utilized for the purposes for which it is intended; or if no such certificate is issued, when the Work is complete and ready for final payment as evidenced by ENGINEER's written recommendation of final payment in accordance with paragraph 14.13. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

1.39 *Supplementary Conditions*—The part of the Contract Documents which amends or supplements these General Conditions.

1.40 *Supplier*—A manufacturer, fabricator, supplier, distributor, material man or vendor have a direct contract with CONTRACTOR or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by CONTRACTOR or any Subcontractor.

1.41 *Underground Facilities*—All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments and any encasements containing such facilities which have been installed underground to furnish any of the following services or materials: electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems or water.

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

1.43 *Work*—The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work includes and is the result of performing or furnishing labor and furnishing and incorporating materials and equipment into the construction, and performing or furnishing services and furnishing documents, all as required by the Contract Documents.

1.44 *Work Change Directive*—A written directive to CONTRACTOR, issued on or after the Effective Date of the Agreement and signed by OWNER and recommended by ENGINEER, ordering an addition, deletion or revision in the Work, or responding to differing or unforeseen physical conditions under which the Work is to be performed as provided in paragraph 4.2 or 4.3 or to emergencies under paragraph 6.23. A Work Change Directive will not change the Contract Price or the Contract times, but is evidence that the parties expect that the change directed or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times as Provided in Paragraph 10.2.

1.45 *Written Amendment*—A written amendment of the Contract Documents, signed by OWNER and CONTRACTOR on or after the Effective Date of the Agreement and normally dealing with the non-engineering or non-technical rather than strictly construction-related aspects of the Contract Documents.

ARTICLE 2—PRELIMINARY MATTER

Delivery of Bonds:

2.1 When CONTRACTOR delivers the executed Agreements to OWNER, CONTRACTOR shall also deliver to OWNER such Bonds as CONTRACTOR may be required to furnish in accordance with paragraph 5.1.

Copies of Documents:

2.2 OWNER shall furnish to CONTRACTOR up to ten copies (unless otherwise specified in the Supplementary Conditions) of the Contract Documents as are reasonable necessary for the execution of the Work. Additional copies will be furnished, upon request, at the cost of reproduction.

Commencement of Contract Times; Notice to Proceed:

2.3 The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement, 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 thirty days after the Effective Date of the Agreement. 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 Agreement, whichever date is earlier.

Starting the Work:

2.4 CONTRACTOR shall start to perform the Work on the date when the Contract Times commence to run, but no Work shall be done at the site prior to the date on which the Contract Times commence to run.

Before Starting Construction:

2.5 Before undertaking each part of the Work, CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. CONTRACTOR shall promptly report in writing to ENGINEER any conflict, error, ambiguity or discrepancy which CONTRACTOR may discover and shall obtain a written interpretation or clarification from ENGINEER before proceeding with any Work affected thereby; however, 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 knew or reasonably should have known thereof.

2.6 Within ten days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), CONTRACTOR shall submit to ENGINEER for review:

2.6.1 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 Documents.

2.6.2 A preliminary schedule of Shop Drawing and Sample submittals which will list each required submittal and the times for submit, reviewing and processing such submittal.

2.6.3 A preliminary schedule of values for all of the Work which will include quantities and prices of items aggregating the Contract Price and will subdivide the Work into component parts in sufficient detail to serve as the basis for progress payments during construction. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.7 Before any Work at the site is started, CONTRACTOR and OWNER shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which CONTRACTOR and OWNER respectively are required to purchase and maintain in accordance with paragraphs 5.4, 5.6 and 5.7.

Preconstruction Conference:

2.8 Within twenty days after the Contract Times start to run, but before any Work at the site is started, a conference attended by 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 2.6, procedures for handling Shop Drawings and other submittals, processing Applications for Payment and maintaining required records.

Initially Acceptable Schedules:

2.9 Unless otherwise provided in the Contract Documents, at least ten 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 2.6, CONTRACTOR shall have an additional ten days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to CONTRACTOR until the schedules are submitted to and acceptable to ENGINEER as provided below. The progress schedule will be acceptable to ENGINEER as providing an orderly progression of the Work to completion within any specified Milestones and the Contract Times, but such acceptance will neither impose on ENGINEER responsibility for the sequencing, scheduling or progress of the Work nor interfere with or relieve CONTRACTOR from CONTRACTOR's full responsibility therefore, CONTRACTOR's schedule of shop Drawing and Sample submissions will be acceptable to ENGINEER as providing a workable arrangement for reviewing and processing the required submittals. CONTRACTOR's schedule of values will be acceptable to ENGINEER as to form and substance.

ARTICLE 3—CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

Intent:

3.1 The Contract Documents comprise the entire agreement between OWNER and CONTRACTOR

concerning the Work. The Contract Documents are complementary; what is called for by one is as binding as if called for by all. The Contract Documents will be construed in accordance with the law of the place of the Project.

3.2 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. Any Work, materials or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be furnished and performed whether or not specifically called for. When words or phrases, which have a well-known technical or construction industry or trade meaning, are used to describe Work, materials or equipment, such words or phrases shall be interpreted in accordance with that meaning. Clarifications and interpretations of the Contract Documents shall be issued by ENGINEER as provided in paragraph 9.4.

3.3 Reference to Standards and Specifications of Technical Societies: Reporting and Resolving Discrepancies:

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

3.3.2 If, during the performance of the Work, CONTRACTOR discovers any conflict, error, ambiguity or discrepancy with the Contract Documents or between the Contract Documents and any provision of any such Law or Regulation applicable to the performance of the Work or of any such standard, specification, manual or code or of any instruction of any Supplier referred to in paragraph 6.5, CONTRACTOR shall report it to ENGINEER in writing at once, and, CONTRACTOR shall not proceed with the Work affected thereby (except in an emergency as authorized by paragraph 6.23) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in paragraph 3.5 or 3.6; provided, however, that CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any such conflict, error, ambiguity or discrepancy unless CONTRACTOR knew or reasonably should have known thereof.

3.3.3 Except as otherwise specifically stated in the Contract Documents or a may be provided by amendment or supplement thereto issued by one of the methods indicated in paragraph 3.5 or 3.6, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity or

discrepancy between the provisions of the Contract Documents and:

3.3.3.1 The provisions of any such standard, specification, manual, code or instruction (whether or not specifically incorporated by reference in the Contract Documents); or

3.3.3.2 The provisions of any such 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).

No provision of any such standard, specification manual, code or instruction shall be effective to change the duties and responsibilities of OWNER, CONTRACTOR or ENGINEER or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents, nor shall it be effective to assign to OWNER, ENGINEER or any of ENGINEER's Consultants, agents or employees any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of paragraph 9.13 or any other provision of the Contract Documents.

3.4 Whenever in the Contract Documents the terms "as ordered", "as directed", "as require", "as allowed", "as approved" or terms of like effect or import are used, or the adjectives "reasonable", "suitable", "acceptable", "proper" or "satisfactory" or adjectives of like effect or import are used to describe a requirement, direction, review or judgment of ENGINEER as to the Work, it is intended that such requirement, direction, review or judgment will be solely to evaluate, in general, the completed Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed 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 shall not be effective to assign to ENGINEER any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.13 or any other provision of the Contract Documents.

Amending and Supplementing Contract Documents:

3.5 The Contract Documents may be amended to provide for additions, deletions and revisions in the Work or to modify the terms and conditions thereof in one or more of the following ways:

3.5.1 A Formal Written Amendment.

3.5.2 A Change Order (pursuant to paragraph 10.4), or

3.5.3 A Work change Directive (pursuant to paragraph 10.1).

3.6 In addition, the requirements of the Contract Documents may be supplemented and minor variations and deviations in the Work may be authorized, in one or more of the following ways:

3.6.1 A Field Order (pursuant to paragraph 9.5).

3.6.2 ENGINEER's approval of a Shop Drawing or Sample (pursuant to paragraphs 6.26 and 6.27), or

3.6.3 ENGINEER's written interpretation or clarification (pursuant to paragraph 9.4).

Reuse of Documents:

3.7 CONTRACTOR and any subcontractor or Supplier or other person or organization performing or furnishing any of the Work under a direct or indirect contract with OWNER (i) shall not 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 ENGINEER's Consultant, and (ii) shall not reuse any of such Drawings, Specifications, other documents or copies on extensions of the Project or any other project without written consent of OWNER and ENGINEER and specific written verification or adaptation by ENGINEER.

ARTICLE 4—AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; REFERENCE POINTS

Availability of Lands:

4.1 OWNER shall furnish, as indicated in the Contract Documents, the lands upon which the Work is to be performed, rights-of-way and easements for access thereto, and such other lands which are designated for the use of CONTRACTOR. Upon reasonable written request, OWNER shall furnish CONTRACTOR with a correct statement of record legal title and legal description of the lands upon which the Work is to be performed and OWNER's interest therein as necessary for giving notice of or filing a mechanic's lien against such lands in accordance with applicable Laws and Regulations. OWNER shall identify any encumbrances of restrictions not of general application but specifically related to use of lands so furnished with which CONTRACTOR will have to comply in performing the Work. Easements for permanent structures of permanent changes in existing facilities will be obtained

and paid for by OWNER, unless otherwise provided in the Contract Documents. If CONTRACTOR and OWNER are unable to agree on entitlement to or the amount or extent of any adjustments in the Contract Price or the Contract Times as a result of any delay in OWNER's furnishing these lands, rights-of-way or easements, CONTRACTOR may make a claim therefore as provided in Articles 11 and 12. CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.2 *Subsurface and Physical Conditions:*

4.2.1 *Reports and Drawings:* Reference is made to the Supplementary Conditions for identification of:

4.2.1.1 *Subsurface Conditions:* Those reports of explorations and tests of subsurface conditions at or contiguous to the site that have been utilized by ENGINEER in preparing the Contract Documents: and

4.2.1.2 *Physical Conditions:* Those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the site (except Underground Facilities) that have been utilized by ENGINEER in preparing the Contract Documents.

4.2.2 *Limited Reliance by CONTRACTOR Authorized: Technical Data:* CONTRACTOR may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data is identified in the Supplementary Conditions, except for such reliance on such "technical data." CONTRACTOR may not rely upon or make any claim against OWNER, ENGINEER or any of ENGINEER's Consultants with respect to:

4.2.2.1 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

4.2.2.2 Other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings, or

4.2.2.3 Any CONTRACTOR interpretation of or conclusion drawn from any "technical data" or any such data, interpretations, opinions or information.

4.2.3 *Notice of Differing Subsurface or Physical Conditions:* If CONTRACTOR believes that any

subsurface or physical condition at or contiguous to the site that is uncovered or revealed either:

4.2.3.1 Is of such a nature as to establish that any "technical data" on which CONTRACTOR is entitled to rely as provided in paragraphs 4.2.1 and 4.2.2 is materially inaccurate, or

4.2.3.2 Is of such a nature as to require a change in the Contract Document, or

4.2.3.3 Differs materially from that shown or indicated in the Contract Documents, or

4.2.3.4 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 conditions affected thereby or performing any Work in connection therewith (except in an emergency as permitted by paragraph 6.23), notify OWNER and ENGINEER in writing about such condition. CONTRACTOR shall not further disturb such conditions or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

4.2.4 *ENGINEER's Review:* ENGINEER will promptly review the pertinent conditions, determine the necessity of OWNER's obtaining additional exploration or tests with respect thereto and advise OWNER in writing (with a copy to CONTRACTOR) of ENGINEER's findings and conclusions.

4.2.5 *Possible Contract Documents Change:* If ENGINEER concludes that a change in the Contract Documents is required as a result of a condition that meets one or more of the categories in paragraph 4.2.3, a Work Change Directive or a Change Order Will be issued as provided in Article 10 to reflect and document the consequences of such change.

4.2.6 *Possible Price and Times Adjustments:* An equitable adjustment in the Contract Price or in the Contract Times, or both, will be allowed to the extent that the existence of such uncovered or revealed condition causes an increase or decrease in CONTRACTOR's cost of, or time, required for performance of the Work: Subject, however, to the following:

4.2.6.1 Such condition must meet any one or more of the categories described in paragraphs 4.2.3.1 through 4.2.3.4 inclusive:

4.2.6.2 A change in the Contract Documents pursuant to paragraph 4.2.5 will not be an automatic authorization or nor a condition

precedent to entitlement to any such adjustments:

4.2.6.3 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 9.10 and 11.9: and

4.2.6.4 CONTRACTOR shall not be entitled to any adjustment in the Contract Price or times if:

4.2.6.4.1 CONTRACTOR knew of such conditions at the time CONTRACTOR made a final commitment to OWNER in respect of Contract Price and Contract times by the submission of a bid or becoming bound under a negotiated contract: or

4.2.6.4.2 The existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test or study of the site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for CONTRACTOR prior to CONTRACTOR's making such final commitment: or

4.2.6.4.3 CONTRACTOR failed to give the written notice within the time and as required by paragraph 4.2.3.

If OWNER and CONTRACTOR are unable to agree on entitlement to or as to the amount or length of any such equitable adjustment in the Contract Price or Contract Times, a claim may be made therefore as provided in Articles 11 and 12. However, OWNER, ENGINEER and ENGINEER's Consultants shall not be liable to CONTRACTOR for any claims, costs, losses or damages sustained by CONTRACTOR on or in connection with any other or anticipated project.

4.3 *Physical Conditions—Underground Facilities:*

4.3.1 *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the site is based on information and data furnished to OWNER or ENGINEER by the owners of such Underground Facilities or by others, unless it is otherwise expressly provided in the Supplementary Conditions:

4.3.1.1 OWNER and ENGINEER shall not be responsible for the accuracy or completeness of any such information or data; and

4.3.1.2 The cost of all of the following will be included in the Contract Price and

CONTRACTOR shall have full responsibility for: (i) reviewing and checking all such information and data, (ii) locating all Underground Facilities shown or indicated in the Contract Documents, (iii) coordination of the Work with the owners of such Underground Facilities during construction, and (iv) the safety and protection of all such Underground Facilities as provided in paragraph 6.20 and repairing any damage thereto resulting from the Work.

4.3.2 *Not shown or Indicated:* If an Underground Facility is uncovered or revealed at or contiguous to the site which was not shown or indicated in the Contract Documents, 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 6.23), identify the owner of such Underground Facility and give written notice to that owner and to OWNER and ENGINEER. ENGINEER will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence of the Underground Facility. If ENGINEER concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued as provided in Article 10 to reflect and document such consequences. During such time, CONTRACTOR shall be responsible for the safety and protection of such Underground Facility as provided in paragraph 6.20. CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, to the extent that they are attributable to the existence of any Underground Facility that was not shown or indicated in the Contract Documents and that CONTRACTOR did not know of and could not reasonably have been expected to be aware of or to have anticipated. If OWNER and CONTRACTOR are unable to agree on entitlement to or the amount or length of any such adjustment in Contract Price or Contract Times, CONTRACTOR may make a claim therefore as provided in Articles 11 and 12. However, OWNER, ENGINEER and ENGINEER's Consultants shall not be liable to CONTRACTOR for any claims, costs, losses or damages incurred or sustained by CONTRACTOR on or in connection with any other project or anticipated project.

Reference Points:

4.4 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 shall make no changes or relocations without the prior written approval of OWNER. CONTRACTOR shall report to ENGINEER whenever any reference point is lost or destroyed or

requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocations of such reference points by professionally qualified personnel.

4.5 Asbestos, PCBs, Petroleum, Hazardous Waste or Radioactive Material:

4.5.1 OWNER shall be responsible for any Asbestos, PCBs, Petroleum, Hazardous Waste or Radioactive Material uncovered or revealed at the site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work and which may present a substantial danger to persons or property exposed thereto in connection with the Work at the site. OWNER shall not be responsible for any such materials brought to the site by CONTRACTOR, Subcontractor, Suppliers or anyone else for whom CONTRACTOR is responsible.

4.5.2 CONTRACTOR shall immediately: (i) stop all Work in connection with such hazardous condition and in any area affected thereby (except in an emergency as required by paragraph 6.23), and (ii) notify OWNER and ENGINEER (and 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 hazardous condition or take corrective action, if any. CONTRACTOR shall not be required to resume Work in connection with such hazardous condition or in any such affected area until after OWNER has obtained any required permits related thereto and delivered to CONTRACTOR special written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (ii) specifying any special conditions under which such Work may be resumed safely. If OWNER and CONTRACTOR cannot agree as to entitlement to or the amount or extent of an adjustment, if any, in Contract Price or Contract Times as a result of such Work stoppage or such special conditions under which Work is agreed by CONTRACTOR to be resumed, either party may make a claim therefore as provided in Articles 11 and 12.

4.5.3 If after receipt of such special 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 conditions, then OWNER may order such portion of the Work that is in connection with such hazardous condition or in such affected area to be deleted from the Work. If OWNER and CONTRACTOR cannot agree as to entitlement to or the amount or extent of an adjustment, if any, in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a claim therefore as provided in Articles 11 and 12. OWNER may have such deleted portion of

the Work performed by OWNER's own forces or others in accordance with Article 7.

4.5.4 To the fullest extent permitted by Laws and Regulations, OWNER shall indemnify and hold harmless CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and the officers, directors, employees, agents, other consultants and subcontractors of each and any of them from and against all claims, costs, losses and damages arising out of or resulting from such hazardous condition, provided that: (i) 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, and (ii) nothing in this subparagraph 4.5.4 shall obligate OWNER to indemnify any person or entity from and against the consequences of that person's or entity's own negligence.

4.5.5 The provisions of paragraphs 4.2 and 4.3 are not intended to apply to Asbestos, PCBs, Petroleum, Hazardous Waste or Radioactive Material uncovered or revealed at the site.

ARTICLE 5—BONDS AND INSURANCE

Performance, Payment and Other Bonds:

5.1 CONTRACTOR shall furnish Performance and Payment Bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all CONTRACTOR's obligations under the Contract Documents. These Bonds shall remain in effect at least until one year after the date when final payment becomes due, except as provided otherwise by Laws or Regulations or by the Contract Documents. CONTRACTOR shall also furnish such other Bonds as are required by the Supplementary Conditions. All Bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff, Bureau of Government Financial Operations, U.S. Treasury Department. All Bonds signed by an agent must be accompanied by a certified copy of such agent's authority to act.

5.2 If the surety on any Bond furnished by CONTRACTOR is declared a bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of paragraph 5.1, CONTRACTOR shall within ten days thereafter substitute another Bond and surety, both of which must be acceptable to OWNER.

5.3 Licensed Sureties and Insurers; Certificates of Insurance:

5.3.1 All Bonds and insurance required by the Contract Documents to be purchased and maintained by OWNER or CONTRACTOR shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue Bonds or insurance policies for the limits and coverage's so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the supplementary Conditions.

5.3.2 CONTRACTOR shall deliver to OWNER, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by OWNER or any other additional insured) which CONTRACTOR is required to purchase and maintain in accordance with paragraph 5.4. OWNER shall deliver to CONTRACTOR, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by CONTRACTOR or any other additional insured) which OWNER is required to purchase and maintain in accordance with paragraphs 5.6 and 5.7 hereof.

CONTRACTOR's Liability Insurance:

5.4 CONTRACTOR shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and furnished and as will provide protection from claims set forth below which may arise out of or result from CONTRACTOR's performance and furnishing of the Work and CONTRACTOR's other obligations under the Contract Documents, whether it is to be performed or furnished by CONTRACTOR, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform or furnish any of the Work, or pay anyone for whose acts any of them may be liable:

5.4.1 Claims under Worker's Compensation, disability benefits and other similar employee benefit acts:

5.4.2 Claims for damages because of bodily injury, occupational sickness or disease, or death of CONTRACTOR's employees:

5.4.3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than CONTRACTOR's employees:

5.4.4 Claims for damages insured by customary personal injury liability coverage which are sustained: (i) by any person as a result of an offense directly or indirectly related to the employment of such

person by CONTRACTOR, or (ii) by any other person for any other reason:

5.4.5 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 and:

5.4.6 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 policies of insurance so required by this paragraph 5.4 to be purchased and maintained shall:

5.4.7 With respect to insurance required by paragraphs 5.4.3 through 5.4.6 inclusive, include as additional insured's (subject to any customary exclusion in respect of professional liability) OWNER, ENGINEER, ENGINEER's Consultants and any other persons or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insured's, and include coverage for the respective officers and employees of all such additional insured's:

5.4.8 Include specific coverages and be written for not less than the limits of liability provided in the Supplemental Conditions or required by Laws or regulations, whichever is greater:

5.4.9 Include completed Operations insurance:

5.4.10 Include contractual liability insurance covering CONTRACTOR's indemnity obligations under paragraphs 6.12, 6.16 and 6.31 through 6.33:

5.4.11 Contain a provision of endorsement that the coverage afforded will not be cancelled, materially changed or renewal refused until at least thirty days prior written notice has been given to OWNER and CONTRACTOR and to each other additional insured identified in the Supplemental Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the CONTRACTOR pursuant to paragraph 5.3.2 will so provide):

5.4.12 Remain in effect at least until final payment and at all times thereafter when CONTRACTOR may be correcting, removing or replacing *defective work* in accordance with paragraph 13.12 and:

5.4.13 With respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment (and CONTRACTOR shall furnish OWNER and each other additional insured identified in the Supplementary Conditions to whom a

certificate of insurance has been issued evidence satisfactory to OWNER and any such additional insured of continuation of such insurance at final payment and one year thereafter).

OWNERS's Liability Insurance:

5.5 In addition to the insurance required to be provided by CONTRACTOR under paragraph 54. OWNER, at OWNER's option, may purchase and maintain at OWNER's expense OWNER's own liability insurance as will protect OWNER against claim which may arise from operations under the Contract Documents.

Property Insurance:

5.6 Unless otherwise provided in the Supplementary Conditions, OWNER shall purchase and maintain property insurance upon the Work at the site in the amount of the full 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:

5.6.1 Include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and any other persons or entities identified in the Supplementary Conditions, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured:

5.6.2 Be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, false-work and Work in transit and shall insure against at least the following perils: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage, and such other perils as may be specifically required by the Supplementary Conditions:

5.6.3 Include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects):

5.6.4 Cover materials and equipment stored at the site or at another location that was agreed to in writing by OWNER prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by ENGINEER, and;

5.6.5 Be maintained in effect until final payment is made unless otherwise agreed to in writing by OWNER, CONTRACTOR and ENGINEER with thirty days written notice to each other additional

insured to whom a certificate of insurance has been issued.

5.7 OWNER shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and any other persons or entities identified in the Supplementary Conditions, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.

5.8 All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained by OWNER in accordance with paragraphs 5.6 and 5.7 will contain a provision or endorsement that the coverage afforded will not be cancelled or materially changed or renewal refused until at least thirty days' prior written notice has been given to OWNER and CONTRACTOR and to each other additional insured to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with paragraph 5.11.

5.9 OWNER shall not be responsible for purchasing and maintaining any property insurance to protect the interests of CONTRACTOR, Subcontractors or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount, will be borne by CONTRACTOR, Subcontractor or others suffering any such loss and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

5.10 If CONTRACTOR requests in writing that other special insurance be included in the property insurance policies provided under paragraphs 5.6 or 5.7, OWNER shall, if possible, include such insurance and the cost thereof will be charged to CONTRACTOR by appropriate Change Order or Written Amendment, prior to commencement of the Work at the site. OWNER shall in writing advise CONTRACTOR whether or not such other insurance has been procured by OWNER.

5.11 Waiver of Rights:

5.11.1 OWNER and CONTRACTOR intend that all policies purchased in accordance with paragraphs 5.6 and 5.7 will protect OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and all other persons or entities identified in the Supplementary Conditions to be listed as insured or additional insured in such policies and will provide primary coverage for all losses and damages caused by the perils covered thereby. All such policies 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 of the insured or additional insured thereunder. OWNER

and CONTRACTOR waive all rights against each other and their respective officers, directors, employees and agents for all losses and damages caused by, arising out of or resulting from any of the perils covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors, ENGINEER, ENGINEER's Consultants and all other persons or entities identified in the Supplementary Conditions to be listed as insured or additional insured 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 as trustee or otherwise payable under any policy so issued.

5.11.2 In addition, OWNER waives all rights against CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and the officers, directors, employees and agents of any of them, for:

5.11.2.1 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, arising out of or resulting from fire or other peril, whether or not insured by OWNER, and:

5.11.2.2 Loss or damage to the completed Project or part thereof caused by, arising out of or resulting from fire or other insured peril covered by any property insurance maintained on the completed Project or part thereof by OWNER during partial utilization pursuant to paragraph 14.10, after substantial completion pursuant to paragraph 14.8 or after final payment pursuant to paragraph 14.13.

Any insurance policy maintained by OWNER covering any loss, damage or consequential loss referred to in this paragraph 5.11.2 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 any of CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and the officers, directors, employees and agents of any of them.

Receipt and Application of Insurance Proceeds

5.12 Any insured loss under the policies of insurance required by paragraphs 5.6 and 5.7 will be adjusted with OWNER and made payable to OWNER as fiduciary for the insured, as their interests may appear, subject to the requirements of any applicable mortgage clause and of paragraph 5.13, OWNER shall deposit in a separate account any money so received, and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the moneys so received applied on account

thereof and the Work and the cost thereof covered by an appropriate Change Order or Written Amendment.

5.13 OWNER as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within fifteen days after the occurrence of loss to OWNER's exercise of this power. If such objection be made, OWNER as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, OWNER as fiduciary shall adjust and settle the loss with insurers and, if required in writing by any party in interest, OWNER as fiduciary shall give bond for the proper performance of such duties.

Acceptance of Bonds and Insurance: Option to Replace:

5.14 If either party (OWNER or CONTRACTOR) has any objection to the coverage afforded by or other provisions of the Bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within ten days after receipt of the certificates (or other evidence requested) required by paragraph 2.7, OWNER and CONTRACTOR shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the Bonds and insurance required or such party by the Contract Documents, 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. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent Bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

Partial Utilization—Property Insurance:

5.15 If OWNER finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work, such use or occupancy may be accomplished in accordance with paragraph 14.10; provided that no such use of occupancy shall commence before the insurers providing the property insurance have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be cancelled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6—CONTRACTOR'S RESPONSIBILITIES

Supervision and Superintendence:

6.1 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, but CONTRACTOR shall not be responsible for the negligence of others in the design or specification of a specific means, method, technique, sequence of procedure of construction which is shown or indicated in and expressly required by the Contract Documents. CONTRACTOR shall be responsible to see that the completed Work complies accurately with the Contract Documents.

6.2 CONTRACTOR shall keep on the Work at all times during its progress a competent resident superintendent, who shall not be replaced without written notice to OWNER and ENGINEER except under extraordinary circumstances. The superintendent will be CONTRACTOR's representative at the site and shall have authority to act on behalf of CONTRACTOR. All communications to the superintendent shall be as binding as if given to CONTRACTOR.

Labor, Materials and Equipment:

6.3 CONTRACTOR shall provide competent, suitably qualified personnel to survey, lay out and construct the Work as required by the Contract Documents. CONTRACTOR shall at all times maintain good discipline and order at the site. 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 indicated in the Contract Documents, all Work at the site shall be performed during regular working hours and CONTRACTOR will not permit overtime work or the performance of Work on Saturday, Sunday or any legal holiday without OWNER's written consent given after prior written notice to ENGINEER.

6.4 Unless otherwise specified in the General Requirements, CONTRACTOR shall furnish and assume full responsibility for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up and completion of the Work.

6.5 All materials and equipment shall be of good quality and new, except as otherwise provided in the

Contract Documents. All warranties and guarantees specifically called for 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 kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with instructions of the applicable Supplier, except as otherwise provided in the Contract Documents.

Progress Schedule:

6.6 CONTRACTOR shall adhere to the progress schedule established in accordance with paragraph 2.9 as it may be adjusted from time to time as provided below:

6.6.1 CONTRACTOR shall submit to ENGINEER for acceptance (to the extent indicated in paragraph 2.9) proposed adjustments in the progress schedule that will not change the Contract Times (or Milestones). Such adjustments will conform generally to the progress schedule then in effect and additionally will comply with any provisions of the General Requirements applicable thereto.

6.6.2 Proposed adjustments in the progress schedule that will change the Contract Times (or Milestones) shall be submitted in accordance with the requirements of paragraph 12.1. Such adjustments may only be made by a Change Order or Written Amendment in accordance with Article 12.

6.7 Substitutes and "Or-Equal" Items:

6.7.1 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 specification or description is intended to establish the type, function and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be accepted by ENGINEER under the following circumstances:

6.7.1.1 "Or-Equal": If in ENGINEER's sole discretion 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, it may be considered by ENGINEER as an "or-equal" item, in which case review and approval of the proposed item may, in ENGINEER's sole discretion, be accomplished without compliance with some or all of the requirements for acceptance of proposed substitute items.

6.7.1.2 *Substitute Items:* If in ENGINEER's sole discretion an item of material or equipment proposed by CONTRACTOR does not qualify as an "or-equal" item under subparagraph 6.7.1.1, it will be considered a proposed substitute item. CONTRACTOR shall submit sufficient information as provided below to allow ENGINEER to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefore. The procedure for review by the ENGINEER will include the following as supplemented in the General Requirements and as ENGINEER may decide is appropriate under the circumstances. Requests for review of proposed substitute items of material or equipment will not be accepted by ENGINEER from anyone other than CONTRACTOR. If CONTRACTOR wishes to furnish or use a substitute item of material or equipment, CONTRACTOR shall first make written application to ENGINEER for acceptance thereof, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar in substance to that specified and be suited to the same use as that specified. The application will state the extent, if any, to which the evaluation and acceptance of the proposed substitute will prejudice CONTRACTOR's achievement of Substantial Completion on time, whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents for in the provisions of any other direct contract with OWNER for work on the Project, to adapt the design to the proposed substitute and whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair and replacement service will be indicated. The application will also contain an itemized estimate of all costs or credits that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which will be considered by ENGINEER in evaluating the proposed substitute. ENGINEER may require CONTRACTOR to furnish additional data about the proposed substitute.

6.7.1.3 *CONTRACTOR's Expense:* All data to be provided by CONTRACTOR in support of any proposed "or-equal" or substitute item will be at CONTRACTOR's expense.

6.7.2 *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence of procedure of construction is shown or indicated in and expressly required by the Contract

Documents, CONTRACTOR may furnish or utilize a substitute means, method, technique, sequence or procedure of construction acceptable to ENGINEER. CONTRACTOR shall submit sufficient information to allow ENGINEER, in ENGINEER's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The procedure for review by ENGINEER will be similar to that provided in subparagraph 6.7.1.2.

6.7.3 *ENGINEER's Evaluation:* ENGINEER will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to paragraphs 6.7.1.2 and 6.7.2. ENGINEER will be the sole judge of acceptability. No "or-equal" or substitute will be ordered, installed or utilized without ENGINEER's prior written acceptance, which will be evidenced, by either a Change Order or an approved Shop Drawing. OWNER may require CONTRACTOR to furnish at CONTRACTOR's expense a special performance guarantee or other surety with respect to any "or-equal" or substitute. ENGINEER will record time required by ENGINEER and ENGINEER's Consultants in evaluating substitutes proposed or submitted by CONTRACTOR pursuant to paragraphs 6.7.1.2 and 6.7.2 and in making changes in the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) occasioned thereby. Whether or not ENGINEER accepts a substitute item so proposed or submitted by CONTRACTOR. CONTRACTOR shall reimburse OWNER for the charges of ENGINEER and ENGINEER's Consultants for evaluating each such proposed substitute item.

6.8-6.11 *Concerning Subcontractors, Suppliers and Others:*

6.8.1 CONTRACTOR shall not employ any Subcontractor, Supplier or other person or organization (including those acceptable to OWNER and ENGINEER as indicated in paragraph 6.8.2), whether initially or as a substitute, against whom OWNER or ENGINEER may have reasonable objection. CONTRACTOR shall not be required to employ any Subcontractor, Supplier or other person or organization to furnish or perform any of the Work against whom CONTRACTOR has reasonable objection.

6.8.2 If the Supplementary Conditions require the identify of certain Subcontractors, Suppliers or other persons or organizations (including those who are to furnish the principal items of materials or equipment) to be submitted to OWNER in advance of the specified date prior to the Effective Date of the Agreement for acceptance by OWNER and ENGINEER, and if CONTRACTOR has submitted a list thereof in accordance with the Supplementary Conditions, OWNER's or ENGINEER's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or

objection in the bidding documents or the Contract Documents) of any such Subcontractor, Supplier or other person or organization so identified may be revoked on the basis of reasonable objection after due investigation, in which case CONTRACTOR shall submit an acceptable substitute, the Contract Price will be adjusted by the difference in the cost occasioned by such substitution and an appropriate Change Order will be issued or Written Amendment signed. No acceptance by OWNER or ENGINEER of any such Subcontractor, Supplier or other person or organization shall constitute a waiver of any right of OWNER or ENGINEER to reject *defective Work*.

6.9.1 CONTRACTOR shall be fully responsible to OWNER and ENGINEER for all acts and omissions of the Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or Indirect contract with CONTRACTOR just as CONTRACTOR is responsible for CONTRACTOR's own acts and omissions. Nothing in the Contract Documents shall create for the benefit of any such Subcontractor, Supplier or other person or organization any contractual relationship between OWNER or ENGINEER and any such Subcontractor, Supplier or other person or organization, nor shall it create any obligation on the part of OWNER or ENGINEER to pay or to see to the payment of any moneys due any such Subcontractor, Supplier or other person or organization except as may otherwise be required by Laws and Regulations.

6.9.2 CONTRACTOR shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR. CONTRACTOR shall require all Subcontractors, Suppliers and such other persons and organizations performing or furnishing any of the Work to communicate with the ENGINEER through CONTRACTOR.

6.10 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.

6.11 All Work performed for CONTRACTOR by a Subcontractor or Supplier will be pursuant to an appropriate agreement between CONTRACTOR and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of OWNER and ENGINEER. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance provided in paragraph 5.6 or 5.7, the agreement between the CONTRACTOR and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against OWNER, CONTRACTOR, ENGINEER,

ENGINEER's Consultants and all other additional insured for all losses and damages caused by, arising out of or resulting from any of the perils covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, CONTRACTOR will obtain the same.

Patent Fees and Royalties:

6.12 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. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultants and the officers, directors, employees, agents and other consultants of each and any of them from and against all claims, costs, losses and damages arising out of or resulting from 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.

Permits:

6.13 Unless otherwise provided in the Supplementary Conditions, 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 opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement, CONTRACTOR shall pay all charges of utility owners for connections to the Work, and OWNER shall pay all charges of such utility owners for capital costs related thereto such as plant investment fees.

Laws and Regulations:

6.14.1 CONTRACTOR shall give all notices and comply with all Laws and Regulations applicable to furnishing and 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.

6.14.2 If CONTRACTOR performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, CONTRACTOR shall bear all claims, costs, losses and damages caused by, arising out of or resulting therefrom; however, it shall not be CONTRACTOR's primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve CONTRACTOR or CONTRACTOR's obligations under paragraph 3.3.2.

Taxes:

6.15 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.

Use of Premises:

6.16 CONTRACTOR shall confine construction equipment, the storage of materials and equipment and the operations of workers to the site and land and areas identified in and permitted by the Contract Documents and other land and areas permitted by Laws and Regulations, rights-of-way, permits and easements, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. CONTRACTOR shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof or of any adjacent land or areas, resulting from the performance of the Work. Should any claim be made by any such owner or occupant because of the performance of the Work, CONTRACTOR shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law. CONTRACTOR shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultant and anyone directly or indirectly employed by any of them from and against all claims, costs, losses and damages arising out of or resulting from 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 by or based upon CONTRACTOR's performance of the Work.

6.17 During the progress of the Work, CONTRACTOR shall keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the Work. At the completion of the Work CONTRACTOR shall remove all waste materials, rubbish and debris from and about the premises as well as all tools, appliances, construction equipment and machinery and surplus materials. CONTRACTOR shall leave the site clean and ready for occupancy by OWNER at Substantial Completion of the Work. CONTRACTOR shall restore to original condition all property not designated for alteration by the Contract Documents.

6.18 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 property to stresses or pressures that will endanger it.

Record Documents:

6.19 CONTRACTOR shall maintain in a safe place at the site one record copy of all Drawings, Specifications, Addenda, Written Amendments, Change Orders, Work Change Directives, Field Orders and written interpretations and clarifications (issued pursuant to paragraph 9.4) in good order and annotated to show all changes made during construction. These record documents together with all approved Samples and a counterpart of all approved shop Drawings will be available to ENGINEER for reference. Upon completion of the Work, these record documents, Samples and Shop Drawings will be delivered to ENGINEER for OWNER.

Safety and Protection:

6.20 CONTRACTOR shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

6.20.1 All persons on the Work site or who may be affected by the Work:

6.20.2 All the Work and materials and equipment to be incorporated therein, whether in storage on or off the site; and

6.20.3 Other Property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities and Underground Facilities not designated for removal, relocation or replacement in the course of construction.

CONTRACTOR shall comply with all applicable Laws and Regulations of any public body having jurisdiction for safety or persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. CONTRACTOR shall notify owners of adjacent property and of Underground Facilities and utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property. All damage, injury or loss to any property referred to in paragraph 6.20.2 or 6.20.3 caused, directly or indirectly, in whole or in part, by CONTRACTOR, any Subcontractor, Supplier or any other person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, shall be remedied by CONTRACTOR (except damage or loss attributable to the fault of Drawings

or Specifications or to the acts or omissions of OWNER or ENGINEER or ENGINEER's Consultant or anyone employed by any of them or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of CONTRACTOR or any Subcontractor, Supplier or other person or organization directly or indirectly employed by any of them). CONTRACTOR's duties and responsibilities for safety and for protection of the Work 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 14.13 that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

Safety Representative:

6.21 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.

Hazard Communication Programs:

6.22 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 and Regulations.

Emergencies:

6.23 In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, CONTRACTOR, without special instruction or authorization from OWNER or ENGINEER, 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. 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 to document the consequences of such action.

6.24 Shop Drawings and Samples:

6.24.1 CONTRACTOR shall submit Shop Drawings to ENGINEER for review and approval in accordance with the accepted schedule of Shop Drawings and Sample submittals (see paragraph 2.9). All submittals will be identified as ENGINEER may require and in the number of copies specified in the General Requirements. The 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 materials and equipment CONTRACTOR proposes to provide and to enable ENGINEER to review the information for the limited purposes required by paragraph 6.26.

6.24.2 CONTRACTOR shall also submit Samples to ENGINEER for review and approval in accordance with said accepted schedule of Shop Drawings and Sample submittals. Each Sample will be identified clearly as to material, supplier, pertinent data such as catalog numbers and the use for which intended and otherwise as ENGINEER may require to enable ENGINEER to review the submittal for the limited purposes required by paragraph 6.26. The numbers of each Sample to be submitted will be as specified in the Specifications.

6.25 Submittal Procedures:

6.25.1 Before submitting each Shop Drawing or Sample, CONTRACTOR shall have determined and verified:

6.25.1.1 All field measurements, quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar information with respect thereto.

6.25.1.2 All materials and respect to intended use, fabrication, shipping, handling, storage, assembly and installation pertaining to the performance of the Work, and

6.25.1.3 All information relative to CONTRACTOR's sole responsibilities in respect of means, methods, techniques, sequences and procedures of construction and safety precautions and programs incident thereto.

CONTRACTOR shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the Requirements of the Work and the Contract Documents.

6.25.2 Each submittal will bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR's obligations under the Contract Documents with respect to CONTRACTOR's review and approval of that submittal.

6.25.3 At the time of each submission, CONTRACTOR shall give ENGINEER specific written notice of such variations, if any, that the Shop Drawing of Sample submitted may have from the requirements of the Contract Documents, such notice to be in a written communication separate from the submittal; and, in addition, shall cause a specific notation to be made on each Shop Drawing and Sample submitted to

ENGINEER for review and approval of each such variation.

6.26 ENGINEER will review and approve Shop Drawings and Samples in accordance with the schedule of Shop Drawings and Sample submittals accepted by ENGINEER as required by paragraph 2.9. 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. ENGINEER's review and approval will not extend to means, methods, techniques, sequences of procedures of construction (except where a particular means, method, technique, sequence or procedure of construction is specifically and expressly called for by the Contract Documents) or, to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions. 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.

6.27 ENGINEER's review and approval of Shop Drawings or Samples shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents unless CONTRACTOR has in writing called ENGINEER's attention to each such variation at the time of submission as required by paragraph 6.25.3 and ENGINEER has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing of Sample approval; nor will any approval by ENGINEER relieve CONTRACTOR from responsibility for complying with the requirements of paragraph 6.25.1.

6.28 Where a Shop Drawing or Sample is required by the Contract Documents or the schedule of Shop Drawings and Sample submissions accepted by ENGINEER as required by paragraph 2.9, 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.

Continuing the Work:

6.29 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, except as permitted by paragraph 15.5 or an OWNER and CONTRACTOR may otherwise agree in writing.

6.30 CONTRACTOR's General Warranty and Guarantee:

6.30.1 CONTRACTOR warrants and guarantees to OWNER, ENGINEER and ENGINEER's Consultants that all Work will be in accordance with the Contract Documents and will not be *defective*. CONTRACTOR's warranty and guarantee hereunder excludes defects or damage caused by:

6.30.1.1 Abuse, modification or improper maintenance or operation by persons other than CONTRACTOR, Subcontractors or Suppliers; or

6.30.1.2 Normal wear and tear under normal usage.

6.30.2 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 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:

6.30.2.1 Observations by ENGINEER;

6.30.2.2 Recommendation of any progress or final payment by ENGINEER;

6.30.2.3 The issuance of a certificate of Substantial Completion or any payment by OWNER to CONTRACTOR under the Contract Documents;

6.30.2.4 Use of occupancy of the Work or any part thereof by OWNER;

6.30.2.5 Any acceptance by OWNER or any failure to do so;

6.30.2.6 Any review and approval of a shop Drawing or Sample submittal or the issuance of a notice of acceptability by ENGINEER pursuant to paragraph 14.13;

6.30.2.7 Any inspection, test or approval by others; or

6.30.2.8 Any correction or *defective* Work by OWNER.

Indemnification:

6.31 To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultants and the officers, directors, employees, agents and other consultants 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) caused by, arising out of or resulting from the performance of the Work, provided that any such claim, cost, loss or damage: (i) 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, and (ii) is caused in whole or in part by any negligent act or omission of CONTRACTOR, any Subcontractor, any Supplier, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, regardless of whether or not caused in part by any negligence or omission of a person or entity indemnified hereunder or whether liability is imposed upon such indemnified party by Laws and Regulations regardless of the negligence of any such person or entity.

6.32 In any and all claims against OWNER or ENGINEER or any of their respective consultants, agents, officers, directors or employees by any employee (or the survivor of personal representative of such employee) of CONTRACTOR, any Subcontractor, any Supplier, any person or organization directly or indirectly employed by any of them to perform or furnish any of the work, or anyone for whose acts any of them may be liable, the indemnifications obligation under paragraph 6.31 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 person or organization under workers' compensation acts, disability benefit acts or other employee benefit acts.

6.33 The indemnification obligations of CONTRACTOR under paragraph 6.31 shall not extend to the liability of ENGINEER and ENGINEER's Consultants, officers, directors, employees or agents caused by the professional negligence, errors or omissions of any of them.

Survival of Obligations:

6.34 All representations, indemnifications, warranties and guarantees made in, required by or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion and acceptance of the Work and termination or completion of the Agreement.

ARTICLE 7—OTHER WORK

Related Work at Site:

7.1 OWNER may perform other work related to the Project at the site by OWNER's own forces, or let other direct contracts therefore which shall contain General Conditions similar to these, or have other work performed by utility owners. If the fact that such other work is to be

performed was not noted in the Contract Documents, then; (i) written notice thereof will be given to CONTRACTOR prior to starting any such other work, and (ii) CONTRACTOR may make a claim therefore as provide in Articles 11 and 12 if CONTRACTOR believes that such performance will involve additional expense to CONTRACTOR or requires additional time and the parties are unable to agree as to the amount or extent thereof.

7.2 CONTRACTOR shall afford each other contractor who is a party to such a direct contract and each utility owner (and OWNER, if OWNER is performing the additional work with OWNER's employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work and shall properly connect and coordinate the Work with theirs. Unless otherwise provided in the Contract Documents, CONTRACTOR shall do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and integrate with such other work. CONTRACTOR shall not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter their work with the written consent of ENGINEER and the others whose work will be affected. The duties and responsibilities of CONTRACTOR under this paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of CONTRACTOR in said direct contracts between OWNER and such utility owners and other contractors.

7.3 If the proper execution or results of any part of CONTRACTOR's Work depends upon work performed by others under this Article 7, 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 so to report will constitute an acceptance of such other work as fit and proper for integration with CONTRACTOR's Work except for latent non-apparent defects and deficiencies in such other work.

Coordination:

7.4 If OWNER contracts with others for the performance of other work on the Project at the site, the following will be set forth in Supplementary Conditions:

7.4.1 The person, firm or corporation who will have authority and responsibility for coordination of the activities among the various prime contractors will be identified;

7.4.2 The specific matters to be covered by such authority and responsibility will be itemized; and

7.4.3 The extent of such authority and responsibilities will be provided.

Unless otherwise provided in the Supplementary Conditions, OWNER shall have sole authority and responsibility in respect of such coordination.

ARTICLE 8-OWNER'S RESPONSIBILITIES

8.1 Except as otherwise provided in these General Conditions, OWNER shall issue all communications to CONTRACTOR through ENGINEER.

8.2 In case of termination of the employment of ENGINEER, OWNER shall appoint an engineer against whom CONTRACTOR makes no reasonable objection, whose status under the Contract Documents shall be that of the former ENGINEER.

8.3 OWNER shall furnish the data required of OWNER under the Contract Documents promptly and shall make payments to CONTRACTOR promptly when they are due as provided in paragraphs 14.4 and 14.13.

8.4 OWNER's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in paragraphs 4.1 and 4.4. Paragraph 4.2 refers to OWNER's identifying and making available to CONTRACTOR copies of reports of explorations and tests of subsurface conditions at the site and drawings of physical conditions in existing structures at or contiguous to the site that have been utilized by ENGINEER in preparing the Contract Documents.

8.5 OWNER's responsibilities in respect of purchasing and maintaining liability and property insurance are set forth in paragraphs 5.5 through 5.10.

8.6 OWNER is obligated to execute Change Orders as indicated in paragraph 10.4.

8.7 OWNER's responsibility in respect of certain inspections, tests and approvals is set forth in paragraph 13.4.

8.8 In connection with OWNER's right to stop Work or suspend Work, see paragraphs 13.10 and 15.1. Paragraph 15.2 deals with OWNER's right to terminate services of CONTRACTOR under certain circumstances.

8.9 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 furnishing or performance of the Work. OWNER will not be responsible for CONTRACTOR's failure to perform or furnish the Work in accordance with the Contract Documents.

8.10 OWNER's responsibility in respect of undisclosed Asbestos, PCBs, Petroleum, Hazardous Waste or Radioactive Materials uncovered or revealed at the site is set forth in paragraph 4.5.

8.11 If and to the extent OWNER has agreed to furnish CONTRACTOR reasonable evidence that financial arrangements have been made to satisfy OWNER's obligations under the Contract Documents, OWNER's responsibility in respect thereof will be as set forth in the Supplementary Conditions.

ARTICLE 9—ENGINEER'S STATUS DURING CONSTRUCTION

OWNER's Representative:

9.1 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 Documents and shall not be extended without written consent of OWNER and ENGINEER.

Visits to Site:

9.2 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 will endeavor for the benefit of OWNER to determine, in general, if the Work is proceeding in accordance with the Contract Documents. ENGINEER will not be required to make exhaustive or continuous on-site inspections 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 the basis of such visits and on-site observations, ENGINEER will keep OWNER informed of the progress of the Work and will endeavor to guard OWNER against defective Work. ENGINEER's visits and on-site observations are subject to all the limitations on ENGINEER's authority and responsibility set forth in paragraph 9.13, and particularly, but without limitation, during or as a result of ENGINEER's on-site 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 furnishing or performance of the Work.

Project Representative:

9.3 If OWNER and ENGINEER agree, ENGINEER will furnish a Resident Project Representative to assist ENGINEER in providing more continuous observation of the Work. The responsibilities and authority and limitations thereon of any such Resident Project Representative and assistants will be as provided in paragraph 9.13 and in the Supplementary Conditions. 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 person will be as provided in the Supplementary Conditions.

Clarifications and Interpretations:

9.4 ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents (in the form of Drawings or otherwise) as ENGINEER may determine necessary, which shall be consistent with the intent of and reasonably inferable from Contract Documents. Such written clarifications and interpretations will be binding in OWNER and CONTRACTOR. If OWNER or CONTRACTOR believes that a written clarification or interpretation justifies an adjustment in the Contract Price or the Contract Times and the parties are unable to agree to the amount or extent thereof, if any, OWNER or CONTRACTOR may make a written claim therefore as provided in Article 11 or Article 12.

Authorized variations In Work:

9.5 ENGINEER may authorize minor variations in the Work from the requirements of the Contract Documents which 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. These may be accomplished by a Field Order and will be binding on OWNER and also on CONTRACTOR who shall perform the Work involved promptly. If OWNER or CONTRACTOR believes that a Field Order justifies an adjustment in the Contract Price of the Contract Times and the parties are unable to agree as to the amount or extent thereof, OWNER or CONTRACTOR may make a written claim therefore as provided in Article 11 or 12.

Rejecting Defective work:

9.6 ENGINEER will have authority to disapprove or reject Work which ENGINEER believes to be *defective*, or that ENGINEER believes will not produce a completed Project that conforms to the Contract Documents or that will

prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. ENGINEER will also have authority to require special inspection or testing of the Work as provided in paragraph 13.9, whether or not the Work is fabricated, installed or completed.

Shop Drawings, Change Orders and Payments:

9.7 In connection with ENGINEER's authority as to Shop Drawings and Samples, see paragraphs 6.24 through 6.28 inclusive.

9.8 In connection with ENGINEER's authority as to Change Orders, see Articles 10, 11 and 12.

9.9 In connection with ENGINEER's authority as to Applications for Payment, see Article 14.

Determinations for Unit Prices:

9.10 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 upon OWNER and CONTRACTOR, unless, within ten days after the date of any such decision, either OWNER or CONTRACTOR delivers to the other and to ENGINEER written notice of intention to appeal from ENGINEER's decision and; (i) an appeal from ENGINEER's decision is taken within the time limits and in accordance with the procedures set forth in Exhibit GC-A, "Dispute Resolution Agreement" entered into between OWNER and CONTRACTOR pursuant to Article 16, or (ii) if no such Dispute Resolution Agreement as been entered into, a formal proceeding is instituted by the appealing party in a forum of competent jurisdiction to exercise such rights or remedies as the appealing party may have with respect to ENGINEER's decision, unless otherwise agreed in writing by OWNER and CONTRACTOR. Such appeal will not be subject to the procedures of paragraph 9.11.

Decisions on Disputes:

9.11 ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. Claims, disputes and other matters relating to the acceptability of the Work or the interpretation of the requirements of the Contract Documents pertaining to the performance and furnishing of the Work and Claims under Articles 11 and 12 in respect of changes in the Contract Price or Contract Times will be referred initially to ENGINEER in writing with a request for a formal decision in accordance with this paragraph. Written notice of each such claim, dispute or other matter will be

delivered by the claimant to ENGINEER and the other party to the Agreement promptly (but in no event later than thirty days) after the start of the occurrence or event giving rise thereto, and written supporting data will be submitted to ENGINEER and the other party within sixty days after the start of such occurrence or event unless ENGINEER allows an additional period of time for the submission of additional or more accurate data in support of such claim, dispute or other matter. The opposing party shall submit any response to ENGINEER and the claimant within thirty days after receipt of the claimant's last submittal (unless ENGINEER allows additional time). ENGINEER will render a formal decision in writing within thirty days after receipt of the opposing party's submittal, if any, in accordance with this paragraph. ENGINEER's written decision of such claim, dispute or other matter will be final and binding upon OWNER and CONTRACTOR unless; (i) an appeal from ENGINEER's decision is taken within the time limits and in accordance with the Procedures set forth in EXHIBIT GC-A, "Dispute Resolution Agreement" entered into between OWNER and CONTRACTOR pursuant to Article 16, or (ii) if no such Dispute Resolution Agreement has been entered into, a written notice of intention to appeal from ENGINEER's written decision is delivered by OWNER or CONTRACTOR to the other and to ENGINEER within thirty days after the date of such decision and a formal proceeding is instituted by the appealing party in a forum of competent jurisdiction to exercise such rights or remedies as the appealing party may have with respect to such claim, dispute or other matter in accordance with applicable Laws and Regulations within sixty days of the date of such decision, unless otherwise agreed in writing by OWNER and CONTRACTOR.

9.12 When functioning as interpreter and judge under paragraphs 9.10 and 9.11, ENGINEER will not show partiality to OWNER or CONTRACTOR and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity. The rendering of a decision by ENGINEER pursuant to paragraphs 9.10 or 9.11 with respect to any such claim, dispute or other matter (except any which have been waived by the making or acceptance of final payment as provided in paragraph 14.16) will be a condition precedent to any exercise by OWNER or CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such claim, dispute or other matter pursuant to Article 16.

9.13 Limitations on ENGINEER's Authority and Responsibilities:

9.13.1 Neither ENGINEER's authority or responsibility under this Article 9 or under any other provision of the Contract Documents 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 owed by ENGINEER to CONTRACTOR, any Subcontractor, any Supplier, any

other person or organization, or to any surety for or employee or agent of any of them.

9.13.2 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 furnishing or performance of the Work. ENGINEER will not be responsible for CONTRACTOR's failure to perform or furnish the Work in accordance with the Contract Documents.

9.13.3 ENGINEER will not be responsible for the acts or omissions of CONTRACTOR or of any Subcontractor, any Supplier, or of any other person or organization performing or furnishing any of the Work.

9.13.4 ENGINEER's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds and certificates of inspection, tests and approvals and other documentation required to be delivered by paragraph 14.12 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.

9.13.5 The limitations upon authority and responsibility set forth in this paragraph 9.13 shall also apply to ENGINEER's Consultants, Resident Project Representative and assistants.

ARTICLE 10—CHANGES IN THE WORK

10.1 Without invalidating the Agreement 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 additions, deletions or revisions will be authorized by a Written Amendment, a Change Order or a Work Change Directive. Upon receipt of any such document, CONTRACTOR shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

10.2 If OWNER and CONTRACTOR are unable to agree as to the extent, if any, of an adjustment in the Contract Price or an adjustment of the Contract Times that should be allowed as a result of a Work Change Directive, a claim may be made therefore as provided in Article 11 or Article 12.

10.3 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 and supplemented as provided in paragraphs 3.5 and 3.6 except in the case of an emergency as provided in paragraph 6.23 or in the case of uncovering Work as provided in paragraph 13.9.

10.4 OWNER and CONTRACTOR shall execute appropriate Change Orders recommended by ENGINEER (or Written Amendments) covering:

10.4.1 Changes in the Work which are (i) ordered by OWNER pursuant to paragraph 10.1, (ii) required because of acceptance of *defective* Work under paragraph 13.13 or correcting *defective* Work under paragraph 13.14 or (iii) agreed to by the parties;

10.4.2 Changes in the Contract Price or Contract Times which are agreed to by the parties; and

10.4.3 Changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by ENGINEER pursuant to paragraph 9.11;

provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, CONTRACTOR shall carry on the Work and adhere to the progress schedule as provided in paragraph 6.29.

10.5 If notice 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) is required by the provisions of any Bond to be given to a surety, the giving of any such notice will be CONTRACTOR's responsibility, and the amount of each applicable Bond will be adjusted accordingly.

ARTICLE 11—CHANGE OF CONTRACT PRICE

11.1 The Contract Price constitutes the total compensation (subject to authorized adjustments) payable to CONTRACTOR for performing the Work. All duties, responsibilities and obligations assigned to or undertaken by CONTRACTOR shall be at CONTRACTOR's expense without change in the Contract Price.

11.2 The Contract Price may only be changed by a Change Order or by a Written Amendment. Any claim for an adjustment in the Contract Price shall be based on written notice delivered by the party making the claim to the other party and to ENGINEER promptly (but in no event later than thirty days) after the start of the occurrence or event giving rise to the claim and stating the general nature

of the claim. Notice of the amount of the claim with supporting data shall be delivered within sixty days after the start of such occurrence or event (unless ENGINEER allows additional time for claimant to submit additional or more accurate data in support of the claim) and shall be accompanied by claimant's written statement that the adjustment claimed covers all known amounts to which the claimant is entitled as a result of said occurrence or event. All claims for adjustment in the Contract Price shall be determined by ENGINEER in accordance with paragraph 9.11 if OWNER and CONTRACTOR cannot otherwise agree on the amount involved. No claim for an adjustment in the Contract Price will be valid if not submitted in accordance with this paragraph 11.2.

11.3 The value of any Work covered by a Change Order or of any claim for an adjustment in the Contract Price will be determined as follows:

11.3.1 Where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of paragraphs 11.9.1 through 11.9.3 inclusive);

11.3.2 Where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under paragraph 11.3.2 on the basis of the Cost of the Work (determined as provided in paragraphs 11.4 and 11.5) plus a CONTRACTOR's fee for overhead and profit (determined as provided in paragraph 11.6).

Cost of the Work:

11.4 The term Cost of the Work means the sum of all costs necessarily incurred and paid by CONTRACTOR in the proper performance of the Work. Except as otherwise may be agreed to in writing by OWNER, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items and shall not include any of the costs itemized in paragraph 11.5:

11.4.1 Payroll costs for employees in the direct employ of CONTRACTOR in the performance of the Work under schedules of the job classifications agreed upon by OWNER and CONTRACTOR. Such employees shall include without limitation superintendents, foremen and other personnel employed full-time at the site. 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, vacation and holiday pay applicable thereto. The expenses of performing Work after regular working hours, on Saturday, Sunday or

legal holidays shall be included in the above to the extent authorized by OWNER.

11.4.2 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 herewith. 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.

11.4.3 Payments made by CONTRACTOR to the Subcontractors for Work performed or furnished 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 accepted. 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 paragraphs 11.4, 11.5, 11.6 and 11.7. All subcontracts shall be subject to the other provisions of the Contract Documents insofar as applicable.

11.4.4 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.

11.4.5 Supplemental costs including the following:

11.4.5.1 The proportion of necessary transportation, travel and subsistence expenses of CONTRACTOR's employees incurred in discharge of duties connected with the Work.

11.4.5.2 Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, off 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.

11.4.5.3 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, installation, dismantling and removal thereof—all

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.

11.4.5.4 Sales, consumer, use of similar taxes related to the Work, and for which CONTRACTOR is liable, imposed by Laws and Regulations.

11.4.5.5 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.

11.4.5.6 Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance of otherwise, sustained by CONTRACTOR in connection with the performance and furnishing of the Work (except losses and damages within the deductible amounts of property insurance established by OWNER in accordance with paragraph 5.9), provided they have resulted from causes other than 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. 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. If, however, any such loss or damage requires reconstruction and CONTRACTOR is placed in charge thereof, CONTRACTOR shall be paid for services a fee proportionate to that stated in paragraph 11.6.2.

11.4.5.7 The cost of utilities, fuel and sanitary facilities at the site.

11.4.5.8 Minor expenses such as telegrams, long distance telephone calls, telephone service at the site, expressage and similar petty cash items in connection with the Work.

11.4.5.9 Cost of premiums for additional Bonds and insurance required because of changes in the Work.

11.5 The term Cost of the Work shall not include any of the following:

11.5.1 Payroll costs and other compensation of CONTRACTOR's officers, executives, principals (of partnership and sole proprietorships), general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks and other

personnel employed by CONTRACTOR whether at the site or in CONTRACTOR's principal or a branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in paragraph 11.4.1 or specifically covered by paragraph 11.4.4—all of which are to be considered administrative costs covered by the CONTRACTOR's fee.

11.5.2 Expenses of CONTRACTOR's principal and branch offices other than CONTRACTOR's office at the site.

11.5.3 Any part of CONTRACTOR's capital expenses, including interest on CONTRACTOR's capital employed for the Work and charges against CONTRACTOR for delinquent payments.

11.5.4 Cost of premiums for all Bonds and for all insurance whether or not CONTRACTOR is required by the Contract Documents to purchase and maintain the same (except for the cost of premiums covered by subparagraph 11.4.5.9 above).

11.5.5 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.

Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in paragraph 11.4.

11.6 The CONTRACTOR's fee allowed to CONTRACTOR for overhead and profit shall be determined as follows:

11.6.1 A mutually acceptable fixed fee; or

11.6.2 If a fixed fee is not agreed upon, a fee based on the following percentages of the various portions of the Cost of Work:

11.6.2.1 For costs incurred under paragraphs 11.4.1 and 11.4.2, the CONTRACTOR's fee shall be fifteen percent;

11.6.2.2 For costs incurred under paragraph 11.4.3, the CONTRACTOR's fee shall be five percent;

11.6.2.3 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 11.4.1, 11.4.2, 11.4.3 and 11.6.2 is that the Subcontractor who actually performs or furnishes the Work, at whatever tier, will be paid a fee of fifteen percent of the costs incurred by such Subcontractor under paragraphs

11.4.1 and 11.4.2 and that any higher tier Subcontractor and CONTRACTOR will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

11.6.2.4 No fee shall be payable on the basis of costs itemized under paragraphs 11.4.4, 11.4.5 and 11.5;

11.6.2.5 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

11.6.2.6 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 11.6.2.1 through 11.6.2.5 inclusive.

11.7 Whenever the cost of any Work is to be determined pursuant to paragraphs 11.4 and 11.5, CONTRACTOR will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in form acceptable to ENGINEER an itemized cost breakdown together with supporting data.

Cash Allowances:

11.8 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 furnished and performed for such sums as may be acceptable to OWNER and ENGINEER. CONTRACTOR agrees that:

11.8.1 The 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

11.8.2 CONTRACTOR's costs for unloading and handling on the site, labor, installation costs, overhead, profit and other expenses contemplated for the 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.

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.

11.9 Unit Price Work:

11.9.1 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 established unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement. 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. Determinations of the actual quantities and classifications of Unit Price Work performed by CONTRACTOR will be made by ENGINEER in accordance with paragraph 9.10.

11.9.2 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.

11.9.3 OWNER or CONTRACTOR may make a claim for an adjustment in the Contract Price in accordance with Article 11 if:

11.9.3.1 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; and

11.9.3.2 There is no corresponding adjustment with respect to any other item of Work; and

11.9.3.3 If CONTRACTOR believes that CONTRACTOR 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.

ARTICLE 12—CHANGE OF CONTRACT TIMES

12.1 The Contract Times (or Milestones) may only be changed by a Change Order or a Written Amendment. Any claim for an adjustment of the Contract Times (or Milestones) shall be based on written notice delivered by the party making the claim to the other party and to ENGINEER promptly (but in no event later than thirty days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the extent of the claim with supporting data shall be delivered within sixty days after such occurrence (unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant has reason to believe it is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Times (or Milestones) shall be determined by ENGINEER in

accordance with paragraph 9.11 if OWNER and CONTRACTOR cannot otherwise agree. No claim for an adjustment in the Contract Times (or Milestones) will be valid if not submitted in accordance with the requirements of this paragraph 12.1.

12.2 All time limits stated in the Contract Documents are of the essence of the Agreement.

12.3 Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of CONTRACTOR, the Contract Times (or Milestones) will be extended in an amount equal to the time lost due to such delay if a claim is made therefore as provided in paragraph 12.1. Delays beyond the control of CONTRACTOR shall include, but not be limited to, acts or neglect by OWNER, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions or acts of God. Delays attributable to and within the control of a subcontractor or Supplier shall be deemed to be delays within the control of CONTRACTOR.

12.4 Where CONTRACTOR is prevented from completing any part of the work within the Contract Times (or Milestones) due to delay beyond the control of both OWNER and CONTRACTOR, an extension of the Contract times (or Milestones) in an amount equal to the time lost due to such delay shall be CONTRACTOR's sole and exclusive remedy for such delay. In no event shall OWNER be liable to CONTRACTOR, any Subcontractor, any Supplier, any other person or organization, or to any surety for or employee or agent of any of them, for damages arising out of or resulting from (i) delays caused by or within the control of CONTRACTOR, or (ii) delays beyond the control of both parties including but not limited to fires, floods, epidemics, abnormal weather conditions, acts of God or acts or neglect by utility owners or other contractors performing other work as contemplated by Article 7.

ARTICLE 13—TESTS AND INSPECTIONS: CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.1 *Notice of Defects:* Prompt notice of all defective Work of which OWNER or ENGINEER has actual knowledge will be given to CONTRACTOR. All defective Work may be rejected, corrected or accepted as provided in this Article 13.

Access to Work:

13.2 OWNER, ENGINEER, ENGINEER's Consultants, other representatives and personnel of

OWNER, independent testing laboratories and governmental agencies with jurisdictional interests will have access to the Work at reasonable times for their observation, inspecting and testing. CONTRACTOR shall provide them proper and safe conditions for such access and advise them of CONTRACTOR's site safety procedures and programs so that they may comply therewith as applicable.

Tests and Inspections:

13.3 CONTRACTOR shall give ENGINEER timely notice of readiness of the Work for all required inspections, tests or approvals, and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

13.4 OWNER shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:

13.4.1 For inspections, tests or approvals covered by paragraph 13.5 below;

13.4.2 That costs incurred in connection with tests or inspections conducted pursuant to paragraph 13.9 below shall be paid as provided in said paragraph 13.9; and

13.4.3 As otherwise specifically provided in the Contract Documents.

13.5 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. CONTRACTOR shall also be responsible for arranging and obtain and shall pay all costs in connections with any inspections, tests or approvals required for OWNER's and ENGINEER's acceptance of materials or equipment to be incorporated in the Work, or of materials, mix designs, or equipment submitted for approval prior to CONTRACTOR's purchase thereof for incorporation in the Work.

13.6 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, it must, if requested by ENGINEER, be uncovered for observation.

13.7 Uncovering Work as provided in paragraph 13.6 shall be at CONTRACTOR's expense unless CONTRACTOR has given ENGINEER timely notice of CONTRACTOR's intention to cover the same and ENGINEER has not acted with reasonable promptness in response to such notice.

Uncovering Work:

13.8 If any Work is covered contrary to the written request of ENGINEER, it must, if requested by ENGINEER, be uncovered for ENGINEER's observation and replaced at CONTRACTOR's expense.

13.9 If ENGINEER considers it necessary or advisable that covered Work be observed by ENGINEER or inspected or tested by other. 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, furnishing all necessary labor, material and equipment. If it is found that such Work is *defective*, CONTRACTOR shall pay all claims, costs, losses and damages caused by, arising out of or resulting from 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 OWNER shall be entitled to an appropriate decrease in the Contract Price and, if the parties are unable to agree as to the amount thereof, may make a claim therefore as provided in Article 11. If, however, such 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 Milestones), or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement and reconstruction; and, if the parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a claim therefore as provided in Articles 11 and 12.

OWNER May Stop the Work:

13.10 If the Work is *defective*, or CONTRACTOR fails to supply sufficient skilled workers or suitable materials or equipment, or fails to furnish or perform the Work in such a way that the completed Work will conform to the Contract Documents, 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 or any surety or other party.

Correction or Removal of Defective Work:

13.11 If required by ENGINEER, CONTRACTOR shall promptly, as directed, either correct all *defective* Work, whether or not fabricated, installed or completed, or, if the Work has been rejected by ENGINEER, remove it from the site and replace it with Work that is not *defective*. CONTRACTOR shall pay all claims, costs, losses and damages caused by or resulting from such correction or removal (including but not limited to all costs of repair or replacement of work of others).

13.12 Correction Period:

13.12.1 If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or 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*, CONTRACTOR shall promptly, without cost to OWNER and in accordance with OWNER's written instructions: (i) correct such *defective* Work, or, if it has been rejected by OWNER, remove it from the site and replace it with Work that is not *defective*, and (ii) satisfactorily correct or remove and replace any damage to other Work or the work of others resulting therefrom. If CONTRACTOR does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, OWNER may have the *defective* Work corrected or the rejected Work removed and replaced, and all claims, costs, losses and damages caused by or resulting from such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by CONTRACTOR.

13.12.2 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 or by Written Amendment.

13.12.3 Where *defective* Work (and damage to other Work resulting therefrom) has been corrected, removed or replaced under this paragraph 13.12, 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.

Acceptance of Defective Work:

13.13 If, instead of requiring correction or removal and replacement of *defective* Work, OWNER (and, prior to ENGINEER's recommendation of final payment, also ENGINEER) prefers to accept it, OWNER may do so. 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). If any such acceptance occurs prior to ENGINEER's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, OWNER may make a claim therefore as provided in Article 11. If the acceptance occurs after such recommendation, an appropriate amount will be paid by CONTRACTOR to OWNER.

OWNER May Correct Defective Work:

13.14 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 in accordance with paragraph 13.11, or if CONTRACTOR fails to perform the Work in accordance with Contract Documents, or if CONTRACTOR fails to comply with any other provision of the Contract Documents, OWNER, may, after seven days' written notice to CONTRACTOR, correct and remedy and such deficiency. In exercising the rights and remedies under this paragraph OWNER shall proceed expeditiously. In connection with such corrective and 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, take possession of CONTRACTOR's tools, appliances, construction equipment and machinery at the site 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. All claims, costs, losses and damages incurred or sustained by OWNER in exercising such rights and remedies will be charged against CONTRACTOR and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, OWNER may make a claim therefore as provided in Article 11. 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. CONTRACTOR shall not be allowed an extension of the Contract Times (or Milestones) because of any delay in the performance of the Work attributable to the exercise by OWNER of OWNER's rights and remedies hereunder.

ARTICLE 14—PAYMENTS TO CONTRACTOR AND COMPLETION

Schedule of Values:

14.1 The schedule of values established as provided in paragraph 2.9 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.

Application for Progress Payment:

14.2 At least twenty days before the date established 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 and other arrangements to protect OWNER's interest therein, all of which will be satisfactory to OWNER. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

CONTRACTOR's Warranty of Title:

14.3 CONTRACTOR warrants and guarantees that title to all Work, materials and equipment covered by an Application for Payment, whether incorporated in the Project or not, will pass to OWNER no later than the time of payment free and clear of all Liens.

Review of Applications for Progress Payment:

14.4 ENGINEER will, within ten days after receipt of each Application for Payment, 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. Ten days after presentation of the Application for Payment to OWNER with ENGINEER's recommendation, the amount recommended will (subject to the provisions of the last sentence of paragraph 14.7) become due and when due will be paid by OWNER to CONTRACTOR.

14.5 ENGINEER's recommendation of any payment requested in an Application for Payment will constitute a representation by ENGINEER to OWNER, based on ENGINEER's on-site 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:

14.5.1 The Work has progressed to the point indicated,

14.5.2 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 Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under paragraph 9.10, and to any other qualifications stated in the recommendation), and

14.5.3 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.

However, by recommending any such payment, ENGINEER will not thereby be deemed to have represented that: (i) exhaustive or continuous on-site inspections have been made to check the quality or the quantity of the Work beyond the responsibilities specifically assigned to ENGINEER in the Contract Documents or (ii) that 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.

14.6 ENGINEER's recommendation of any payment, including final payment, shall not mean that ENGINEER is 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 furnishing or performance of Work, or for any failure of CONTRACTOR to perform or furnish Work in accordance with the Contract Documents.

14.7 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 referred to in paragraph 14.5. ENGINEER may also refuse to recommend any such payment, or, because of subsequently discovered evidence or the results of subsequent inspections or tests, nullify any such payment previously recommended, to such extent as may be necessary in ENGINEER's opinion to protect OWNER from loss because:

14.7.1 The Work is *defective*, or completed Work has been damaged requiring correction or replacement,

14.7.2 The Contract Price has been reduced by Written Amendment or Change Order,

14.7.3 OWNER has been required to correct *defective* Work or complete Work in accordance with paragraph 13.14, or

14.7.4 ENGINEER has actual knowledge of the occurrence of any of the events enumerated in paragraphs 15.2.1 through 15.2.4 inclusive.

OWNER may refuse to make payment of the full amount recommended by ENGINEER because:

14.7.5 Claims have been made against OWNER on account of CONTRACTOR's performance or furnishing of the Work.

14.7.6 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.

14.7.7 There are other items entitling OWNER to a set-off against the amount recommended, or

14.7.8 OWNER has actual knowledge of the occurrence of any of the events enumerated in paragraphs 14.7.1 through 14.7.3 or paragraphs 15.2.1 through 15.2.4 inclusive;

but OWNER must give CONTRACTOR immediate written notice (with a copy to ENGINEER) stating the reasons for such action and promptly pay CONTRACTOR the amount so withheld, or any adjustment thereto agreed to by OWNER and CONTRACTOR, when CONTRACTOR corrects to OWNER's satisfaction the reasons for such action.

Substantial Completion:

14.8 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 (except for items specifically listed by CONTRACTOR as incomplete) and request that ENGINEER issue a certificate of Substantial Completion. Within a reasonable time thereafter, 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 therefore. If ENGINEER considers the Work substantially complete, ENGINEER will prepare and deliver to OWNER a tentative certificate of Substantial Completion, which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. OWNER shall have seven days after receipt of the tentative certificate during which to make written objection to ENGINEER as to any provisions of the certificate or attached list. If, after considering such objections, ENGINEER concludes that the Work is not substantially complete, ENGINEER will within fourteen days after submission of the tentative certificate to OWNER notify CONTRACTOR in writing, stating the reasons therefore. If, after consideration of OWNER's objections, ENGINEER considers the Work substantially complete, ENGINEER will within said fourteen days execute and deliver to OWNER and CONTRACTOR a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected)

reflecting such changes from the tentative certificate as ENGINEER believes justified after consideration of any objections from OWNER. At the time of delivery of the tentative certificate of Substantial Completion, ENGINEER will deliver to OWNER and CONTRACTOR a written recommendation as to division of responsibilities pending final payment between OWNER and CONTRACTOR with respect to security, operation, safety, maintenance, heat, utilities, insurance and warranties and guarantees. Unless OWNER and CONTRACTOR agree otherwise in writing and so inform ENGINEER in writing prior to ENGINEER's issuing the definitive certificate of Substantial Completion, ENGINEER's aforesaid recommendation will be binding on OWNER and CONTRACTOR until final payment.

14.9 OWNER shall have the right to exclude CONTRACTOR from the Work after the date of Substantial Completion, but OWNER shall allow CONTRACTOR reasonable access to complete or correct items on the tentative list.

Partial Utilization:

14.10 Use by OWNER at OWNER's option of any substantially completed part of the Work which; (i) has specifically been identified in the Contract Documents, or (ii) 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, may be accomplished prior to Substantial Completion of all the Work subject to the following:

14.10.1 OWNER at the time may request CONTRACTOR in writing to permit OWNER to use any such part of the Work which OWNER believes to be ready for its intended use and substantially complete. If CONTRACTOR agrees that such part of the Work is substantially complete, CONTRACTOR will certify to OWNER and ENGINEER that such part of the work is substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. CONTRACTOR at any time may notify OWNER and ENGINEER in writing that CONTRACTOR considers any such part of the Work ready for its intended use and substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. 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 therefore. If ENGINEER considers that part of the Work to be substantially complete, the provisions of paragraphs 14.8 and 14.9 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.

14.10.2 No occupancy of separate operation of part of the Work will be accomplished prior to compliance with the requirements of paragraph 5.15 in respect of property insurance.

Final Inspection:

14.11 Upon written notice from CONTRACTOR that the entire Work or an agreed portion thereof is complete, ENGINEER will 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 is incomplete or *defective*. CONTRACTOR shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

Final Application for Payment:

14.12 After CONTRACTOR has completed all such corrections to the satisfaction of ENGINEER and delivered in accordance with the Contract Documents all maintenance and operating instructions, schedules, guarantees, Bonds, certificates of other evidence of insurance required by paragraph 5.4, certificates of inspection, marked-up record documents (as provided in paragraph 6.19) and other documents, CONTRACTOR may make application for final payment following the procedure for progress payments. The final Application for Payment shall be accompanied (except as previously delivered) by: (i) all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by subparagraph 5.4.13, (ii) consent of the surety, if any, to final payment, and (iii) complete and legally effective releases or waivers (satisfactory to OWNER) of all Liens arising out of or filed in connection with the Work. In lieu of such releases or waivers of Liens and as approved by OWNER, CONTRACTOR may furnish receipts of releases in full and an affidavit of CONTRACTOR THAT: (i) the releases and receipts include all labor, services, material and equipment for which a Lien could be filed, and (ii) all payrolls, material and equipment bills and other indebtedness connected with the Work for which OWNER or OWNER's property might in any way be responsible 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.

Final Payment and Acceptance:

14.13 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 Documents have been fulfilled, ENGINEER will, within ten days after receipt of the

final Application for Payment, indicate in writing ENGINEER's recommendation of payment and present the Application to OWNER for payment. 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 14.15. Otherwise, ENGINEER will return the Application 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. Thirty days after the presentation to OWNER of the Application and accompanying documentation, in appropriate form and substance and with ENGINEER's recommendation and notice of acceptability, the amount recommended by ENGINEER will become due and will be paid by OWNER to CONTRACTOR.

14.14 If, through no fault of CONTRACTOR, final completion of the Work is significantly delayed and if ENGINEER so confirms, OWNER shall, upon receipt of CONTRACTOR's final Application for Payment and recommendation of ENGINEER, and without terminating the Agreement, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by OWNER for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if Bonds have been furnished as required in paragraph 5.1, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by CONTRACTOR to ENGINEER with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

Waiver of Claims:

14.15 The making and acceptance of final payment will constitute:

14.15.1 A waiver of all claims by OWNER against CONTRACTOR, except claims arising from unsettled Liens, from *defective* Work appearing after final inspection pursuant to paragraph 14.11, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from CONTRACTOR's continuing obligations under the Contract Documents; and

14.15.2 A waiver of all claims by CONTRACTOR against OWNER other than those previously made in writing and still unsettled.

ARTICLE 15—SUSPENSION OF WORK AND TERMINATION

OWNER May Suspend Work:

15.1 At any time and without cause, OWNER may suspend the Work or any portion thereof for a period of not more than ninety days by notice in writing to CONTRACTOR and ENGINEER, which will fix the date on which Work will be resumed. CONTRACTOR shall resume the Work on the date so fixed. CONTRACTOR shall be allowed an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if CONTRACTOR makes an approved claim therefore as provided in Articles 11 and 12.

OWNER May Terminate:

15.2 Upon the occurrence of any one or more of the following events:

15.2.1 If CONTRACTOR persistently fails 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 established under paragraph 2.9 as adjusted from time to time pursuant to paragraph 6.6);

15.2.2 If CONTRACTOR disregards Laws or Regulations of any public body having jurisdiction;

15.2.3 If CONTRACTOR disregards the authority of ENGINEER; or

15.2.4 If CONTRACTOR otherwise violates in any substantial way any provisions of the Contract Documents;

OWNER may, after giving CONTRACTOR (and the surety, if any,) seven days' written notice and to the extent permitted by Laws and Regulations, terminate the services of CONTRACTOR, exclude CONTRACTOR from the site and take possession of the Work and of all CONTRACTOR's tools, appliances, construction equipment and machinery at the site and use the same to the full extent they could be used by CONTRACTOR (without liability to CONTRACTOR for trespass or conversion), 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 finish the Work as OWNER may deem expedient. In such case CONTRACTOR shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the Contract Price exceeds all claims, costs, losses and damages sustained by OWNER arising out of or resulting from completing the Work such excess will be paid to CONTRACTOR. If such claims, costs losses and damages exceed 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, provided that when exercising any rights or remedies under this paragraph OWNER shall not be required to obtain the lowest price for the Work performed.

15.3 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. Any retention or payment of moneys due CONTRACTOR by OWNER will not release CONTRACTOR from liability.

15.4 Upon seven days' written notice to CONTRACTOR and ENGINEER, OWNER may, without cause and without prejudice to any other right or remedy of OWNER, elect to terminate the Agreement. In such case, CONTRACTOR shall be paid (without duplication of any items):

15.4.1 For 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;

15.4.2 For 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;

15.4.3 For all claims, costs, losses and damages incurred in settlement of terminated contracts with Subcontractors, suppliers and others; and

15.4.4 For reasonable expenses directly attributable to termination.

CONTRACTOR shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

CONTRACTOR May Stop Work or Terminate:

15.5 If, through no act or fault of CONTRACTOR, the Work is suspended for a period of more than ninety days by OWNER or under an order of court or other public authority, or ENGINEER fails to act on any Application for Payment within thirty days after it is submitted or OWNER fails for thirty 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 Agreement and recover from OWNER payment on the same terms as provided in paragraph 15.4. In lieu of terminating the Agreement and without prejudice to any other right or remedy, if ENGINEER has failed to act on an Application for Payment within thirty days after it is submitted, or OWNER has failed for thirty days to pay CONTRACTOR any sum finally determined to be due, CONTRACTOR may upon seven day's written notice to OWNER and ENGINEER stop the Work until payment of all such amounts due CONTRACTOR, including interest thereon. The provisions of this paragraph 15.5 are not intended to preclude CONTRACTOR from making claim

under Articles 11 and 12 for an increase in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to CONTRACTOR's stopping Work as permitted by this paragraph.

ARTICLE 16—DISPUTE RESOLUTION

If and to the extent that OWNER and CONTRACTOR have agreed on the method and procedure for resolving disputes between them that may arise under this Agreement, such dispute resolution method and procedure, if any, shall be as set forth in Exhibit GC-A, "Dispute Resolution Agreement," to be attached hereto and made a part hereof. If no such agreement on the method and procedure for resolving such disputes has been reached, and subject to the provisions of paragraphs 9.10, 9.11 and 9.12, OWNER and CONTRACTOR may exercise such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any dispute.

ARTICLE 17—MISCELLANEOUS

Giving Notice:

17.1 Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

Computation of Times:

17.2.1 When any period of time is referred to in the Contract Documents 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.

17.2.2 A calendar day of twenty-four hours measured from midnight to the next midnight will constitute a day.

Notice of Claim:

17.3 Should OWNER or CONTRACTOR suffer injury or damage to person or property because of any error, omission or act of the other party or of any of the other party's employees or agents or others for whose acts the other party is legally liable, claim will be made in writing to the other party within a reasonable time of the first observance of such injury or damage. The provisions of this paragraph 17.3 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitations or repose.

Cumulative Remedies:

17.4 The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto, and, in particular but without limitation, the warranties, guarantees and obligations imposed upon CONTRACTOR by paragraphs 6.12, 6.16, 6.30, 6.31, 6.32, 13.1, 13.12, 13.14, 14.3 and 15.2 and all of the rights and remedies available to OWNER and ENGINEER there under, 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 Documents, and 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.

Professional Fees and Court Costs Included:

17.5 Whenever reference is made to "claims, costs, losses and damages," it shall include in each case, but not be limited to, all fees and charges of engineers, architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs.

**EXHIBIT GC-A to General Conditions of
the Agreement Between OWNER and
CONTRACTOR Dated _____
For use with EJCDC No. 1910-8 (1990 ed.)**

DISPUTE RESOLUTION AGREEMENT

OWNER and CONTRACTOR hereby agree that Article 16 of the General Conditions to the Agreement between OWNER and CONTRACTOR is amended to include the following agreement of the parties:

16.1 All claims, disputes and other matters in question between OWNER and CONTRACTOR arising out of or relating to the Contract documents or the breach thereof (except for claims which have been waived by the making or acceptance of final payment as provided by paragraph 14.15) will be decided by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association then obtaining, subject to the limitations of this Article 16. This agreement so to arbitrate and any other agreement of consent to arbitrate entered into in accordance herewith as provided in this Article 16 will be specifically enforceable under the prevailing law of any court having jurisdiction.

16.2 No demand for arbitration of any claim, dispute or other matter that is required to be referred to ENGINEER initially for decision in accordance with paragraph 9.11 will be made until the earlier of (a) the date on which ENGINEER has rendered a written decision or (b) the thirty-first day after the parties have presented their evidence to ENGINEER if a written decision has not been rendered by ENGINEER before that date. No demand for arbitration of any such claim, dispute or other matter will be made later than thirty days after the date on which ENGINEER has rendered a written decision in respect thereof in accordance with paragraph 9.11; and the failure to demand arbitration within said thirty days' period will result in ENGINEER's decision being final and binding upon OWNER and CONTRACTOR. If ENGINEER renders a decision after arbitration proceedings have been initiated, such decision may be entered as evidence but will not supersede the arbitration proceedings, except where the decision is acceptable to the parties concerned. No demand for arbitration of any written decision of ENGINEER rendered in accordance with paragraph 9.10 will be made later than ten days after the party making such demand has delivered written notice of intention to appeal as provided in paragraph 9.10.

16.3 Notice of the demand for arbitration will be filed in writing with the other party to the Agreement and with the American Arbitration Association, and a copy will be sent to ENGINEER for information. The demand for arbitration will be made within the thirty-day or ten-day period specified in paragraph 16.2 as applicable, and in all other cases within a reasonable time after the claim, dispute or other matter

question has arisen, and in no event shall any such demand be made after the date when institution of legal or equitable proceedings based on such claim, dispute or other matter in question would be barred by the applicable statute of limitations.

16.4 Except as provided in paragraph 16.5 below, no arbitration arising out of or relating to the Contract Documents shall include by consolidation, joinder or in any other manner any other person or entity (including ENGINEER, ENGINEER's Consultant and the officers, directors, agents, employees or consultants of any of them) who is not a part to this contract unless:

16.4.1 The inclusion of such other person or entity is necessary if complete relief is to be afforded among those who are already parties to the arbitration, and

16.4.2 Such other person or entity is substantially involved in a question of law or fact which is common to those who are already parties to the arbitration and which will arise in such proceedings, and

16.4.3 The written consent of the other person or entity sought to be included and of OWNER and CONTRACTOR has been obtained for such inclusion, which consent shall make specific reference to this paragraph; but no such consent shall constitute consent to arbitration of any dispute not specifically described in such consent or to arbitration with any party not specifically identified in such consent.

16.5 Notwithstanding paragraph 16.4 if a claim, dispute or other matter in question between OWNER and CONTRACTOR involves the Work of a Subcontractor, either OWNER or CONTRACTOR may join such Subcontractor as a party to the arbitration between OWNER and CONTRACTOR hereunder. CONTRACTOR shall include in all subcontracts required by paragraph 6.11 a specific provision whereby the Subcontractor consents to being joined in an arbitration between OWNER and CONTRACTOR involving the Work of such Subcontractor. Nothing in this paragraph 16.5 nor in the provision of such subcontract consenting to joinder shall create any claim, right or cause of action in favor of Subcontractor and against OWNER, ENGINEER or ENGINEER's Consultants that does not otherwise exist.

16.6 The award rendered by the arbitrators will be final, judgment may be entered upon it in any court having jurisdiction thereof, and it will not be subject to modification or appeal.

16.7 OWNER and CONTRACTOR agree that they shall first submit any and all unsettled claims, counterclaims, disputes and other matters in question between them arising out of or relating to the Contract Documents or the reach thereof ("disputes"), to mediation by The American Arbitration Association under the Construction Industry Mediation Rules of the American

Arbitration Association prior to either of them initiating against the other a demand for arbitration pursuant to paragraphs 16.1 through 16.6, unless delay in initiating arbitration would irrevocable prejudice one of the parties. The respective thirty and ten day time limits within which to files a demand for arbitration as provided in paragraphs 16.2 and 16.3 above shall be suspended with respect to a dispute submitted to mediation within those same applicable time limits and shall remain suspended until ten days after the termination of the mediation. The mediator of any dispute submitted to mediation under this Agreement shall not serve as arbitrator of such dispute unless otherwise agreed.

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1420 King Street, Alexandria, VA 22314

American Consulting Engineers Council
1015 15th Street, N.W., Washington, DC 20005

American Society of Civil Engineers
345 East 47th Street, New York, NY 10017

Construction Specifications Institute
601 Madison St., Alexandria, VA 22314

SECTION 00800**SUPPLEMENTARY CONDITIONS**

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These Supplementary Conditions Amend or Supplement the Standard General Conditions of the Construction Contract (No. 1910-8, 1990 Edition) and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

SC-1 DEFINITIONS

The terms used in these Supplementary Conditions which are defined in the Standard General Conditions of the Construction Contract (No. 1910-8, 1990 Edition) have the meanings assigned to them in the General Conditions, with the following exception. The term Contract Documents shall also include the Invitation to Bid and the Instructions to Bidders.

SC-2.2 COPIES OF DOCUMENTS

The OWNER shall furnish to the CONTRACTOR the number of sets of Contract Documents as stipulated in the "Instruction to Bidders".

SC-2.3 COMMENCEMENT OF CONTRACT TIMES: NOTICE TO PROCEED

Delete the last sentence of paragraph 2.3 of the General Conditions in its entirety and insert the following in its place:

The Contract time will commence to run on one of the following dates:

2.3.1 The day stipulated in the "Notice to Proceed".

2.3.2 If no "Notice to Proceed" is given, the thirtieth (30th) day after the "Effective Date of the Agreement".

SC-2.7 EXCHANGE OF INSURANCE DATA

Delete Paragraph 2.7 of the General Conditions in its entirety and insert the following in its place:

- 2.7 As an attachment to the Agreement, the successful BIDDER shall deliver to the OWNER all certificates and other evidence of insurance that are required in the General Conditions as modified by the Supplementary Conditions. Contractor shall provide the Engineer certificates to evidence that all required insurance is obtained and maintained throughout the Contract period.

SC-5.4 CONTRACTOR'S LIABILITY INSURANCE

The limits of liability for the insurances required by paragraph 5.4 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Law or Regulations.

- A. **Worker's Compensation:** Insurance shall be provided for all employees engaged in the Work who may come within the protection of the Workers' Compensation law, and where applicable, employer's General Liability Insurance for employees not so protected and shall require all sub-contractors to provide corresponding insurance. The Contractor shall indemnify the Owner and the Engineer against all liabilities, costs and expenses due to accidents or other occurrences covered by the Workers' Compensation law.

Under Paragraphs 5.4.1 of the General Conditions, the limits shall be not less than:

- | | |
|--------------------------|------------------------------------|
| 1. State of Ohio: | Statutory |
| 2. Employer's Liability: | \$100,000.00 Each Accident |
| | \$500,000.00 Disease Policy Limit |
| | \$100,000.00 Disease Each Employee |

- B. **Comprehensive General Liability:** Insurance shall be provided to cover all damages arising out of bodily injuries, including accidental death to one person and for all damages arising out of bodily injuries, including accidental death, to two or more persons in any one occurrence. Insurance shall protect against all property damage arising out of damages to or destruction of property. Coverage shall include collapse or damage to any structure, building or its contents, public or private utility, or pavement during construction and for two (2) years thereafter. Whenever work is to be done by blasting, coverage shall also include all damage of any kind whatsoever that may result from the blasting operation. Insurance shall insure Contractor and all sub-contractors.

Under Paragraphs 5.4.2 through 5.4.5 of the General Conditions:

- | | |
|---|--|
| 1. Bodily Injury: | |
| | \$1,000,000.00 Each Occurrence |
| | \$1,000,000.00 Annual Aggregate, Products and Completed Operations |
| 2. Property Damages: | |
| | \$1,000,000.00 Each Occurrence |
| | \$1,000,000.00 Annual Aggregate |
| 3. Property Damage liability insurance shall provide Explosion, Collapse and Underground coverages. | |
| 4. Personal Injury, with employment exclusion deleted | |
| | \$1,000,000.00 Annual Aggregate |

- C. **Comprehensive Automobile Liability:** insurance shall be provided to cover liability arising from the use and operation of motor vehicles in connection with the performance of the Contract (as customarily defined in liability insurance policies), whether they be owned, hired, or non-owned by the Contractor.

Under Paragraph 5.4.6 of the General Conditions:

1. Bodily Injury:

\$1,000,000.00	Each Person
\$1,000,000.00	Each Accident

2. Property Damages:

\$1,000,000.00	Each Occurrence
----------------	-----------------

SC-5.5 OWNER'S & ENGINEER'S PROTECTIVE LIABILITY INSURANCE

Delete Paragraph 5.5 of the General Conditions in its entirety and insert the following in its place:

5.5.1 The CONTRACTOR shall purchase and maintain additional liability insurance coverage for OWNER and ENGINEER. Contractor's general liability carrier shall issue a separate Protective Liability Policy covering OWNER, ENGINEER and Engineer's Consultants with the following minimum coverages:

1. Bodily Injury:

\$1,000,000.00	Each Occurrence
----------------	-----------------

2. Property Damages:

\$1,000,000.00	Each Occurrence
\$1,000,000.00	Annual Aggregate

5.5.2 Additional coverage pertaining to paragraphs 5.1 through 5.5 shall be provided by the contractor in the form of blanket protection consisting of \$1,000,000.00 umbrella compensation with general liability providing excess coverage over the limits set forth in said paragraphs.

SC-5.6 PROPERTY INSURANCE

Delete Paragraph 5.6 of the General Conditions in its entirety and insert the following in its place:

5.6 The CONTRACTOR shall purchase and maintain property insurance upon the Work at the site to the full insurable value thereof subject to such deductible amounts as may be required by laws and regulations. This insurance shall include the interests of OWNER, CONTRACTOR and Subcontractors in the Work, shall insure against the perils of the fire and extended coverage, shall include "all risk" insurance for physical loss and damage including theft, vandalism and malicious mischief, collapse and water damage, and such other perils as may be provided in these Supplementary Conditions, and shall include damages, losses and expenses arising out of or resulting from any insured loss or incurred in the repair or replacement of any insured property (including fees and charges of engineers, architects, attorneys and other professionals). Such fees will be subject to a deductible amount of \$1,000.00. If not covered under the "all risk" insurance or otherwise provided in these Supplementary Conditions, CONTRACTOR shall purchase and maintain similar property insurance on portions of the Work stored on and off the site or in transit when such portions of the Work are to be included in an Application for Payment. The policies of insurance required to be purchased and maintained by CONTRACTOR in accordance with Paragraphs 5.6 shall contain a provision that the coverage afforded will not be canceled or materially changed until at least thirty days' prior written notice has been given to OWNER.

SC-5.7 BOILER, MACHINERY AND OTHER INSURANCE

Delete Paragraph 5.7 of the General Conditions in its entirety and insert the following in its place:

5.7 The CONTRACTOR shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include interests of OWNER, CONTRACTOR, Subcontractor, ENGINEER and Engineer's Consultants in the Work, all of whom shall be listed as insured or additional insured parties.

SC-5.8 INSURANCE CANCELLATION PROVISIONS

Delete Paragraph 5.8 of the General Conditions in its entirety and insert the following in its place:

- 5.8 All the policies of insurance (or the certificates or other evidence thereof) required to be purchased and maintained by CONTRACTOR in accordance with Paragraph 5.6 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least thirty days prior written notice has been given to OWNER by certified mail and will contain waiver provisions in accordance with Paragraph 5.11.2.

SC-5.10 OTHER SPECIAL INSURANCE

Delete Paragraph 5.10 of the General Conditions in its entirety and add the following:

Railroad Protective Liability Insurance shall be provided when the Work is on railroad right-of-way to protect the railroad company against bodily injury, death, and/or property damage. Limits shall not be less than that required by the railroad company and in no case less than the following:

Bodily Injury

\$2,000,000 per occurrence

\$6,000,000 aggregate per annum

SC-6 CONCERNING SUBCONTRACTORS, SUPPLIERS AND OTHERS

Add the following language at the end of the last sentence of paragraph 6.9.1 of the General Conditions: OWNER or ENGINEER may furnish to any such Subcontractor, Supplier or other person or organization, to the extent practicable, evidence of amounts paid to CONTRACTOR in accordance with CONTRACTOR'S Applications for Payment.

Add the following language at the end of the last sentence of paragraph 6.11 of the General Conditions:

In advance of the Notice of Award, the apparent Successful Bidder, and any other Bidder(s) so requested, will, within seven days after the day of the Bid opening, submit to the OWNER a list of all Subcontractors and other persons and organizations (including those who are to furnish the principal items of material and equipment) proposed for those portions of the Work as to which such identification is so required. Such list shall be accompanied by an experience statement with pertinent information as to similar projects and other evidence of qualification for each such Subcontractor, persons and organization if requested by OWNER. If OWNER or ENGINEER after due investigation has reasonable objection to any proposed Subcontractor, other person or organization, either may, before giving the Notice of Award, request the apparent Successful Bidder to submit an acceptable substitute without an increase in Bid price. If the apparent Successful Bidder declines to make any such substitution, the contract shall not be awarded to such Bidder, but declining to make any such substitution will not constitute grounds for sacrificing the Bid Security. Any Subcontractor, other persons or organization so listed and to whom OWNER or ENGINEER does not make written objection prior to the giving of the Notice of Award will be deemed acceptable to OWNER and ENGINEER.

SC-6.13 PERMITS

Delete Paragraph 6.13 of the General Conditions in its entirety and insert the following in its place:

- 6.13 The OWNER will procure and pay for all permits (excluding inspection fees) which may be required by the Ohio Department of Transportation. CONTRACTOR shall obtain and pay for all other 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 opening of Bids. CONTRACTOR shall pay all charges of utility service companies for connections to the Work and for all charges of such companies for capital costs related thereto.

SC-6.14 LAWS AND REGULATIONS

Regulations regarding additional applicable laws and regulations required under this contract are shown in other sections of these specifications.

SC-7.4 CONSTRUCTION COORDINATOR

The GENERAL CONSTRUCTION CONTRACTOR shall be referred to and defined as the CONSTRUCTION COORDINATOR.

Duties of the CONSTRUCTION COORDINATOR include the following:

1. Safety precautions and procedures at the site.
2. See that permits are obtained.
3. Monitoring compliance with Laws and Regulations.
4. Keeping the site clean during construction.
5. Use of temporary construction facilities.
6. Scheduling purchase and delivery times.
7. Scheduling and coordinating the work of the Prime Contractors.
8. Inspect materials and equipment as received for damage.
9. Inspect installed material and equipment for mechanical, electrical, piping and instrument connections, for correct rotation and lubrication and readiness for delivery to OWNER'S operating personnel.

SC-8.2 OWNER'S RESPONSIBILITIES

Delete Paragraph 8.2 of the General Conditions in its entirety and insert the following in its place:

- 8.2 In the case of termination of the employment of ENGINEER, OWNER shall appoint an engineer whose status under the Contract Documents shall be that of the former ENGINEER.

SC-9.3 PROJECT REPRESENTATION

The duties, responsibilities and limitations of authority of the Resident Project Representative and assistants as described in paragraph 9.3 of the General Conditions are appended and hereby made a part of these Supplementary Conditions as Appendix A.

SC-11.4 & 11.6 COST OF WORK

Delete paragraphs 11.4.1, 11.4.5.9, 11.6.2.1, 11.6.2.2, 11.6 and 11.6.2.4 of the GENERAL CONDITIONS in their entirety and insert the following in its place

- 11.4.1 Payroll costs for employees in the direct employment of CONTRACTOR in the performance of the Work under schedules of job classifications agreed upon by OWNER and CONTRACTOR. 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' or workmen's compensation, health and welfare pension benefits, sick leave, vacation and holiday pay applicable thereto. Such employees shall include superintendents and foremen at the site. The expenses of performing Work after regular working hours, on Saturday, Sunday or legal holidays, shall be included in the above to the extent authorized by the OWNER.

The rate of wage and labor for each employee classification is to be submitted to the ENGINEER prior to beginning work. The rate of wage and labor shall be detailed to show the base hourly rate plus the fringe benefits as herein defined for payroll costs. The defined rate of wage and

Labor cost for each employee classification shall be used for all CHANGE ORDERS not covered under paragraph 11.3.1.

The rate of wage shall be the current rate of wage as determined by the State prevailing wage office.

- 11.4.5.9 Cost of premiums for additional BONDS and INSURANCES required because of changes in work shall not be included in CHANGE ORDER costs but shall be reevaluated and if required adjusted accordingly upon issuance of the certificate of substantial completion by the ENGINEER. Premiums directly relating to property insurance coverage, in accordance with paragraph 5.9, shall be evaluated and adjusted as determined by the ENGINEER for each change order.

SC-11.6 CONTRACTOR'S FEE

Delete Paragraph 11.6 in the General Conditions in its entirety and insert the following in its place:

- 11.6 The CONTRACTOR'S fee allowed to CONTRACTOR for overhead and profit shall be determined as follows:
- 11.6.1 A fee based on the following percentages of the various portions of the cost of the work:
- 11.6.1.1 For costs incurred under paragraphs 11.4.1 and 11.4.2, the CONTRACTOR'S fee shall be the percentage negotiated by the OWNER and CONTRACTOR and limited to a maximum of three and one-quarter percent (3-1/4%) profit and three and one-quarter percent (3-1/4%) for overhead and included in the Contract Agreement Form under overhead and profit percentage for Labor and Material.
- 11.6.1.2 For costs incurred under paragraph 11.4.3, the CONTRACTOR'S fee shall be the percentage negotiated by the OWNER and CONTRACTOR and limited to a maximum of five percent (5%) of the Subcontractor's cost of work and included in the Contract Agreement Form under overhead and profit percentage for Subcontractors.
- 11.6.1.3 No fee shall be payable on the basis of costs itemized under paragraphs 11.4.1 and 11.4.5.9.
- 11.6.1.4 The amount of credit to be allowed by CONTRACTOR to OWNER for any such change which results in a net decrease in cost will be the amount of the actual net decrease plus a decrease in the CONTRACTOR'S fee of the percentage negotiated by the OWNER and CONTRACTOR and included in the Contract Agreement Form.
- 11.6.1.5 When both additions and credits are involved in any one change; the adjustment in CONTRACTOR'S fee shall be completed on the basis of the net change in accordance with paragraphs 11.6.1.1 through 11.6.1.4 inclusive.

SC-13.4 TESTS AND INSPECTIONS

Delete the last sentence of Paragraph 13.4 of the General Conditions in its entirety and insert the following in its place:

The cost of all other inspections, tests and approvals required by the Contract Documents shall be paid by CONTRACTOR (unless otherwise specified).

SC-14.2.1 PAYMENT FOR STORED MATERIALS

- 14.2.1.1 Subsequent to the inclusion of a payment for delivered materials in a progress payment, CONTRACTOR shall submit to the ENGINEER no later than the next payment submission, a partial waiver of liens from each and every supplier for whom delivered materials were paid. If no such waiver is submitted prior to or along with the next payment, the ENGINEER may automatically deduct the amount of delivered materials paid commensurate with that particular item. There shall be no variance to this policy and unless the waiver is in hand, the money shall be deducted.
- 14.2.1.2 No payment for delivered materials shall be made for any items that are scheduled to be incorporated in the work within the next 30 days.
- 14.2.1.3 Delivered materials will not be paid in any given month for a total amount less than \$5,000.00.
- 14.2.1.4 Payment for delivered materials for such items as pipe backfill and roadway sub-base will not be

routinely considered.

- 14.2.2 In case the CONTRACTOR fails to comply with the terms of these specifications or fails to comply with the orders or directions of the ENGINEER herein provided for, the OWNER reserves the right, and the CONTRACTOR hereby assents to the same, to withhold the payment of any estimate that may otherwise be due, until the said terms, orders or directions are complied with to the satisfaction of the ENGINEER.
- 14.2.3 Payment shall be made in accordance with the provisions of the Ohio Revised Code as follows:
 - 14.2.3.1 Acceptable materials delivered to the site but not incorporated in the work will be paid for at ninety percent (90%) of the invoice value of same. Until the job is fifty percent (50%) completed, the contractor will be paid ninety percent (90%) of the estimated value of labor and material completed in estimated form. This ten percent (10%) retention of the first fifty percent (50%) of the job will be held by the Owner until 30 days after completion. After the job is fifty percent (50%) completed, material incorporated in the work and labor will be paid for at one-hundred percent (100%) of the estimated value of same as bid.
 - 14.2.3.2 When the work is completed to the satisfaction of the Owner, the Contractor shall be paid an amount which will bring the total payments to him up to ninety-five percent (95%) of the contract price.
 - 14.2.3.3 Estimates and payments shall be made about the twentieth day of each month unless, as provided by the Act, "When the rate of work and amounts involved are so large that it is deemed advisable by the Owner or Contractor, estimates and payments shall be made twice each month".
 - 14.2.3.4 The Act makes reference to payments of estimates "Unless the Contractor does not prosecute the work with diligence and with the force specified or intended in the contract".
 - 14.2.3.5 Upon approval of the Engineer, the five percent (5%) retainer may be reduced commensurate with partial acceptance of facilities completed and placed in operation.
 - 14.2.3.6 In case the Contractor fails to comply with the terms of these specifications or fails to comply with the orders or directions of the Engineer herein provided for, the Owner reserves the right, and the Contractor hereby assents to the same, to withhold the payment of any estimate that may otherwise be due, until the said terms, orders or directions are complied with and to the satisfaction of the Engineer.

SC-14.4 REVIEW OF APPLICATION FOR PROGRESS PAYMENT

Delete the last sentence of Paragraph 14.4 of the General Conditions in its entirety and insert the following in its place:

Thirty (30) days after presentation of Application for Payment with ENGINEER'S recommendation, the amount recommended will (subject to the provisions of the last sentence of paragraph 14.7) become due and when due will be paid by OWNER to CONTRACTOR.

SC-14.8 SUBSTANTIAL COMPLETION

- 14.8.1 The ENGINEER will conduct one (1) inspection for the Substantial Completion Certificate for each contract when requested to by the CONTRACTOR if the ENGINEER determines that certification can not be issued the CONTRACTOR will be assessed for each additional inspection.

SC-14.11 FINAL INSPECTION

- 14.11.1 The ENGINEER will conduct one (1) inspection for the final payment application review when requested to by the CONTRACTOR. If the ENGINEER determines that the contract is not complete in accordance with the approved contract documents the CONTRACTOR will be assessed for each addition inspection.

SC-15 TERMINATION

Amend the first sentence of Paragraph 15.2.9 of the General Conditions by striking out the words "seven days" and replacing with the words "ten days". As so amended Paragraph 15.2.9 remains in effect.

Amend the first sentence of Section 15.4 of the General Conditions by striking out the words "seven days" and replacing with the words "ten days". As so amended Paragraph 15.4 remains in effect.

Delete the first sentence of Section 15.5 of the General Conditions in its entirety and insert the following in its place:

If, through no act or fault of CONTRACTOR, the Work is suspended for a period of more than ninety days by OWNER or under an order of court or other public authority, or ENGINEER fails to act on any Application for Payment within forty-five days after it is submitted, or OWNER fails for forty-five days to pay CONTRACTOR any sum finally determined to be due, then CONTRACTOR may, upon ten days' written notice to OWNER and ENGINEER, terminate the Agreement and recover from OWNER payment for all Work executed and any expense sustained plus reasonable termination expenses.

SC-18 PRICE BREAKDOWN

Add the following paragraph under a new Article 18 entitled Price Breakdown to the General Conditions:

18.1 The CONTRACTOR shall furnish a price breakdown for the Contract itemized as required by the ENGINEER. Unless otherwise directed, the breakdown shall be in sufficient detail to permit an analysis of all material, labor, equipment, sub-contract and overhead costs as well as profit for each item in the contract and shall cover supported by similar price breakdowns.

SC-21 OVERTIME PAYMENT FOR ENGINEERING AND INSPECTION

Add the following paragraph under a new Article 21 entitled Overtime Payment for Engineering and Inspection to the General Conditions:

21.1 The OWNER shall charge to CONTRACTOR and may deduct from the periodical and final payment for the work all engineering and inspection expenses incurred by OWNER as a result of any overtime work. Charges for various personnel for any such overtime during the regular specified construction period beyond the regular 8 hour day for any time worked on Saturday, Sunday or any legal holiday will be as shown in the following Schedule:

<u>Personnel Class</u>	<u>Charge/Hour</u>
Officer	\$200.00
Sr. Engineer	\$110.00
Engineer II	\$100.00
Technician	\$ 90.00
Draftsman I	\$ 80.00
Draftsman II	\$ 85.00
Construction Manager	\$ 90.00
Construction Engineer	\$ 80.00
Construction Inspector I	\$ 80.00
Construction Inspector II	\$ 90.00
2 Person Survey Crew	\$150.00
3 Person Survey Crew	\$225.00

SC-22 MOBILIZATION REQUIREMENTS

Description

This work shall consist of the performance of construction preparatory operations, including the movement of personnel and equipment to the project site, placement of project identification signs, payment of Department of Highways Inspection Fees and cost of Railroad Protective Liability Insurance as applicable, the cost of providing a field office for the resident observer, if required, and for the establishment of the CONTRACTOR'S offices, buildings and other facilities necessary to begin work on a substantial phase of the contract.

Basis of Payment

Total Original Contract Amount,
Including Mobilization

Total Limits for Partial Payments

More Than To & Including

\$ 0	\$ 100,000	10 percent of total contract amount
\$ 100,000	\$ 500,000	\$10,000 plus 3 percent of total contract over \$100,000
\$ 500,000	\$ 1,500,000	\$22,000 plus 2 percent of total contract over \$500,000
\$1,500,000	More	\$42,500 plus 1 percent of total contract over \$1,500,000

Partial payments shall be as follows:

- (1) One-third (1/3) of the amount established above as the total limit for partial payment, or one-third (1/3) of the amount BID for mobilization, whichever is less, will be released to the CONTRACTOR as the first estimate, payable not less than 15 days after the start of work at the project site.
- (2) The second one-third (1/3) of the amount established above as the total limit for partial payment, or one-third (1/3) of the amount BID for mobilization, whichever is less, shall be released with the estimate payable 30 days after the first estimate.
- (3) The final one (1/3) of the amount established above as the total limit for partial payment, or one-third (1/3) of the amount BID for mobilization, whichever is less, shall be released with the estimate payable 30 days later than the estimate in which the second one-third (1/3) has been paid.

Upon completion of all work on the project, payment of any amount BID for mobilization in excess of the total limit for partial payment will be released.

Nothing herein shall be construed to limit or preclude partial payments otherwise provided for by the contract.

No deduction will be made, nor will any increase be made, in the lump sum mobilization item amount regardless of decreases or increases in the final total contract amount or for any other cause.

END OF SECTION

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DUTIES, RESPONSIBILITIES, & LIMITS OF AUTHORITYDUTIES, RESPONSIBILITIES AND LIMITATIONS OF AUTHORITY
OF RESIDENT PROJECT REPRESENTATIVE
(SC-9.3)**A. GENERAL**

Resident Project Representative is ENGINEER's Agent, will act as directed by and under the supervision of ENGINEER, and will confer with ENGINEER regarding his actions. Resident Project Representative's dealings in matters pertaining to the on-site Work shall in general be only with ENGINEER and CONTRACTOR. Written communication with OWNER will be only through or as directed by ENGINEER.

B. DUTIES AND RESPONSIBILITIES

Resident Project Representative will:

1. Schedules: Review the progress schedule, schedule of Shop Drawing submissions and schedule of values prepared by CONTRACTOR and consult with ENGINEER concerning their acceptability.
2. Liaison:
 - a. Serve as ENGINEER's liaison with CONTRACTOR, working principally through CONTRACTOR's superintendent and assist him in understanding the intent of the Contract Documents. Assist ENGINEER in serving as OWNER's liaison with CONTRACTOR when CONTRACTOR's operations affect OWNER's on-site operations.
 - b. As requested by ENGINEER, assist in obtaining from OWNER additional details or information, when required at the job site for proper execution of the Work.
4. Shop Drawings and Samples:
 - a. Receive and record date of receipt of Shop Drawings and samples, receive samples which are furnished at the site by CONTRACTOR, and notify ENGINEER of their availability for examination.
 - b. Advise ENGINEER and CONTRACTOR or its superintendent immediately of the commencement of any Work requiring a Shop Drawing or sample submission if the submission has not been approved by ENGINEER.
5. Review of Work, Rejection of Defective Work, Inspections and Tests:
 - a. Conduct on-site observations of the Work in progress to assist ENGINEER in determining if the Work is proceeding in accordance with the Contract Documents and that completed Work will conform to the Contract Documents.
 - b. Report to ENGINEER whenever he believes that any Work is unsatisfactory, faulty or defective or does not conform to the Contract Documents, or does not meet the requirements of any inspections, tests or approval required to be made or has been damaged prior to final payment; and advise ENGINEER when he believes Work should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.
 - c. Verify that tests, equipment and systems startups and operating and maintenance instructions are conducted as required by the Contract Documents and in presence of the required personnel, and that CONTRACTOR maintains adequate records thereof; observe, record and report to ENGINEER appropriate details relative to the test procedures and startups.
 - d. Accompany visiting inspectors representing public or other agencies having jurisdiction over the Project, record the outcome of these inspections and report to ENGINEER.
6. Interpretation of Contract Documents: Transmit to CONTRACTOR ENGINEER's clarifications and interpretations of the Contract Documents.
7. Modifications: Consider and evaluate CONTRACTOR's suggestions for modifications in Drawings or Specifications and report them with recommendations to ENGINEER.

8. Records:

- a. Maintain at the job site orderly files for correspondence, reports of job conferences, Shop Drawings and samples submissions, reproductions of original Contract Documents including all addenda, change orders, field orders, additional Drawings issued subsequent to the execution of the Contract, ENGINEER's clarifications and interpretations of the Contract Documents, progress reports, and other Project related documents.
- b. Keep a diary or log book recording hours on the job site, weather conditions, data relative to questions of extras or deductions, list of visiting officials and representatives of manufacturers, fabricators, suppliers and distributors, daily activities, decisions, observations in general and specific observations in more detail as in the case of observing test procedures. Send copies to ENGINEER.
- c. Record names, addresses and telephone numbers of all CONTRACTORS, subcontractors and major suppliers of materials and equipment.

9. Reports:

- a. Furnish ENGINEER periodic reports as required of progress of the Work and Contractor's compliance with the approved progress schedule and schedule of Shop Drawing submissions.
- b. Consult with ENGINEER in advance of scheduled major tests, inspections or start of important phases of the work.
- c. Report immediately to ENGINEER upon the occurrence of any accident.

10. Payment Requisitions: Review applications for payment with CONTRACTOR for compliance with the established procedure for their submission and forward them with recommendations to ENGINEER, noting particularly their relation to the schedule of values, Work completed and materials and equipment delivered at the site but not incorporated in the Work.

11. Certificates, Maintenance and Operation Manuals: During the course of the Work, verify that certificates, maintenance and operation manuals and other data required to be assembled and furnished by CONTRACTOR are applicable to the items actually installed; and deliver this material to ENGINEER for his review and forwarding to OWNER prior to final acceptance of the Work.

12. Completion:

- a. Before ENGINEER issues a Certificate of Substantial Completion, submit to CONTRACTOR a list of observed items requiring completion or correction.
- b. Conduct final inspection in the company of ENGINEER, OWNER and CONTRACTOR and prepare a final list of items to be completed or corrected.
- c. Verify that all items on final list have been completed or corrected and make recommendations to ENGINEER concerning acceptance.

C. LIMITATIONS OF AUTHORITY

Except upon written instructions of ENGINEER, Resident Project Representative:

1. Shall not authorize any deviation from the Contract Documents or approve any substitute materials or equipment.
2. Shall not exceed limitations on ENGINEER's authority as set forth in the Contract Documents.
3. Shall not undertake any of the responsibilities of CONTRACTOR, subcontractors or CONTRACTOR's superintendent, or expedite the Work.
4. Shall not advise on or issue directions relative to any aspect of the means, methods, techniques, sequences or procedures of construction unless such is specifically called for in the Contract Documents.
5. Shall not advise on or issue directions as to safety precautions and programs in connection with the Work.
6. Shall not authorize OWNER to occupy the Project in whole or in part.
7. Shall not participate in specialized field or laboratory tests.

END OF SECTION

SECTION 00820

WAGE DETERMINATION REQUIREMENTS & SCHEDULE

**THE FOLLOWING IS THE WAGE RATE REQUIREMENTS FOR THIS PROJECT
INCLUDING AN ACTIVE WAGE DETERMINATION SCHEDULE.**

**THE CONTRACTOR IS REQUIRED TO FOLLOW ALL DAVIS-BACON WAGE
RATE REQUIREMENTS.**

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Wage Rate Requirements

As used in these provisions "subrecipient" means Village of Crestline.

(a) The following applies to any contract in excess of \$2,000 which is entered into for the actual construction, alteration and/or repair, including painting and decorating, of a public building or public work, or building or work financed in whole or in part from Federal funds or in accordance with guarantees of a Federal agency or financed from funds obtained by pledge of any contract of a Federal agency to make a loan, grant or annual contribution (except where a different meaning is expressly indicated), and which is subject to the labor standards provisions of any of the acts listed in § 5.1.

(1) Minimum wages.

(i) 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 1(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 paragraph (a)(1)(iv) of this section; 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 § 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 paragraph (a)(1)(ii) of this section) 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.

Subrecipients may obtain wage determinations from the U.S. Department of Labor's web site, www.wdol.gov.

(ii)(A) The subrecipient(s), on behalf of EPA, shall require that any class of laborers or mechanics, including helpers, 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. The EPA award official shall approve an additional classification and wage rate and fringe benefits therefore 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 the subrecipient(s) 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 the subrecipient(s) to the State award official. The State award official will transmit the report, to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor,

Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the State award official or will notify the State award official within the 30-day period that additional time is necessary.

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the and the subrecipient(s) do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the award official shall refer the questions, including the views of all interested parties and the recommendation of the State award official, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii)(B) or (C) of this section, 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.

(2) Withholding. The subrecipient(s), shall upon written request of the EPA Award Official or 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, the (Agency) 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.

(3) Payrolls and basic records.

(i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and 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 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 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 1(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.

(ii)(A) The contractor shall submit weekly, for each week in which any contract work is performed, a copy of all payrolls to the subrecipient, that is, the entity that receives the subgrant or loan from the State capitalization grant recipient. Such documentation shall be available on request of the State recipient or EPA. As to each payroll copy received, the subrecipient shall provide written confirmation in a form satisfactory to the State indicating whether or not the project is in compliance with the requirements of 29 CFR 5.5(a)(1) based on the most recent payroll copies for the specified week. The payrolls 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 the weekly payrolls. 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 the subrecipient(s) for transmission to the State or EPA if requested by EPA, the State, 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 section 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 the subrecipient(s).

(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 § 5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under § 5.5 (a)(3)(i) of Regulations, 29 CFR part 5, 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 Regulations, 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 paragraph (a)(3)(ii)(B) of this section.

(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 paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the State, EPA 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, the Federal agency or State 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 classification of 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 this part 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 shall insert in any subcontracts the clauses contained in 29

CFR 5.5(a)(1) through (10) and such other clauses as the EPA determines may be appropriate, 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 29 CFR 5.5.

(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 subrecipient(s), State, EPA, the U.S. Department of Labor, or the employees or their representatives.

(10) Certification of eligibility.

(i) 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).

(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).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

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**Contract Provision For Contracts In Excess Of \$100,000 And Subject To The
Overtime Provisions Of The Contract Work Hours And Safety Standards Act**

The following language must be included in full in any contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These provisions are to be included in addition to the provisions for contracts in excess of \$2,000. As used in these paragraphs, the terms laborers and mechanics include watchmen and guards.

(b) Contract Work Hours and Safety Standards Act. The following applies to any contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. As used in these paragraphs, 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 he or she is employed on such work to work in excess of forty 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 forty hours in such workweek.

(2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (b)(1) of this section the contractor and any subcontractor responsible therefore 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 paragraph (a)(1) of this section, 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 forty hours without payment of the overtime wages required by the clause set forth in paragraph (b)(1) of this section.

(3) Withholding for unpaid wages and liquidated damages. The subrecipient, upon written request of the EPA Award Official or an authorized representative of the Department of Labor, shall 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 contractor, 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 paragraph (b)(2) of this section.

(4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (b)(1) through (4) of this section 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 paragraphs (b)(1) through (4) of this section.

**Contract Provision For Contracts In Excess Of \$100,000 Subject ONLY To The
Contract Work Hours And Safety Standards Act**

In addition to the provisions for contracts in excess of \$2,000, for any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in 29 CFR 5.1, you must insert clauses requiring:

(c) The following applies to any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in 29 CFR 5.1.

The contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid.

The records shall be maintained under this paragraph shall be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the Ohio EPA, EPA and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

General Decision Number: OH140016 04/04/2014 OH16

Superseded General Decision Number: OH20130016

State: Ohio

Construction Type: Building

Counties: Adams, Allen, Ashland, Auglaize, Belmont, Brown, Butler, Clermont, Clinton, Coshocton, Crawford, Delaware, Erie, Fairfield, Fayette, Franklin, Greene, Guernsey, Hancock, Harrison, Highland, Hocking, Holmes, Huron, Jackson, Jefferson, Knox, Licking, Madison, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Perry, Pickaway, Pike, Preble, Richland, Ross, Sandusky, Scioto, Seneca, Tuscarawas, Vinton, Warren, Washington, Wayne, Wood and Wyandot Counties in Ohio.

BUILDING CONSTRUCTION PROJECTS (Does not include single family homes and apartments up to and including four (4) stories)

Modification Number	Publication Date
0	01/03/2014
1	01/17/2014
2	01/31/2014
3	02/14/2014
4	04/04/2014

ASBE0003-001 08/01/2013

ERIE (to Sandusky city limits) & HURON

	Rates	Fringes
Asbestos Workers/Insulator (Includes application of all insulating materials, protective coverings, coatings & finishings to all types of mechanical systems).....	\$ 37.18	18.40

ASBE0008-001 07/01/2013

ADAMS, BROWN, BUTLER (Including Fairfield, Hanover, Liberty, Milford, Morgan, Oxford, Ripley, Ross, St. Clair, Union & Wayne Townships), CLERMONT, HIGHLAND & WARREN (Including Deerfield, Hamilton, Harlan, Salem, Union & Washington Townships)

	Rates	Fringes
Asbestos Workers/Insulator (Includes application of all insulating materials, protective coverings, coatings & finishings to all types of mechanical systems).....	\$ 29.05	13.47

* ASBE0041-003 03/01/2014

ALLEN

	Rates	Fringes
Asbestos Workers/Insulator (Includes application of all insulating materials, protective coverings, coatings and finishings to all types of mechanical systems).....	\$ 29.43	14.60

ASBE0045-001 07/01/2013

ERIE (City limits of Sandusky & Townships of Groton,
Margaretta, Oxford & Perkins), HANCOCK, OTTAWA, SANDUSKY,
SENECA, WOOD & WYANDOT

	Rates	Fringes
Asbestos Workers/Insulator (Includes application of all insulating materials, protective coverings, coatings & finishings to all types of mechanical systems).....	\$ 29.56	22.54

ASBE0050-001 07/01/2013

CRAWFORD, DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN, GUERNSEY,
HOCKING, KNOX, LICKING, MADISON, MORGAN, MORROW, MUSKINGUM,
NOBLE, PERRY, PICKAWAY, ROSS, and VINTON COUNTIES

	Rates	Fringes
Asbestos Worker/Insulator (Includes application of all insulating materials, protective coverings, coatings & finisings to all types of mechanical systems).....	\$ 27.53	12.94

ASBE0050-002 07/01/2013

AUGLAIZE, BUTLER (Lemon & Madison Townships), CLINTON, GREENE,
MIAMI, MONTGOMERY, PREBLE, and WARREN (Clear Creek, Franklin,
Massie, Turtle Creek & Wayne Townships)

	Rates	Fringes
Asbestos Worker/Insulator (Includes application of all insulating materials, protective coverings, coatings & finishings to all types of mechanical systems).....	\$ 25.05	12.60

ASBE0080-004 03/04/2013

JACKSON, PIKE, SCIOTO, and WASHINGTON COUNTIES

	Rates	Fringes
Insulator/asbestos worker (SCOPE OF WORK, includes application of all insulating materials, protective coverings, coatings and finishings to all types of mechanical systems and Hazardous Material Handler).....	\$ 31.04	18.33

ASBE0084-001 07/01/2013

ASHLAND, COSHOCTON, HARRISON, HOLMES, RICHLAND, TUSCARAWAS &
WAYNE

	Rates	Fringes
ASBESTOS WORKER/INSULATOR (Includes application of all insulating materials, protective coverings coatings & finishings to all types of mechanical systems).....	\$ 29.07	16.55

ASBE0207-004 06/01/2012

ALLEN

	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).....	\$ 21.15	12.20

ASBE0207-006 07/01/2013

	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) ADAMS, BROWN, BUTLER (Townships of Fairfield, Hanover, Liberty, Milford, Morgan, Oxford, Ripley,		

Ross, St. Clair, Union & Wayne), CLERMONT, HIGHLAND & WARREN (Townships of Deerfield, Hamilton, Harlan, Salem, Union & Washington) COUNTIES.....\$ 24.50	12.45
ASHLAND, COSHOCTON, ERIE (Post Offices & Townships of: Berlin, Berlin Heights, Birmingham, Florence, Huron, Milan, Shinrock & Vermilion), HARRISON & HURON COUNTIES...\$ 24.50	12.45
AUGLAIZE, BUTLER (Townships of Lemon & Madison), CLINTON, GREENE, MIAMI, MONTGOMERY, PREBLE & WARREN (Townships of Clear Creek, Franklin, Massie, Turtle Creek & Wayne) COUNTIES.....\$ 24.50	12.45
CRAWFORD, DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN, GUERNSEY, HOCKING, KNOX, LICKING, MADISON, MORGAN, MORROW, MUSKINGUM, NOBLE, PERRY, PICKAWAY, ROSS & VINTON COUNTIES.....\$ 24.50	12.45
ERIE (Portion covered by the city limits of Sandusky, Ohio & by the Townships of Groton, Margaretta, Oxford & Perkins), HANCOCK, OTTAWA, SANDUSKY, SENECA, WOOD & WYANDOT COUNTIES.....\$ 25.20	10.30
HOLMES, RICHLAND, TUSCARAWAS & WAYNE COUNTIES.\$ 24.50	12.45

BOIL0085-001 07/01/2013

ALLEN, ASHLAND, AUGLAIZE, CRAWFORD, DELAWARE, ERIE, HANCOCK, HURON, KNOX, MORROW, OTTAWA, RICHLAND, SANDUSKY, SENECA, WOOD & WYANDOT

	Rates	Fringes
BOILERMAKER.....\$ 32.60		23.70

BOIL0105-001 01/01/2013

ADAMS, BROWN, BUTLER, CLERMONT, CLINTON, FAIRFIELD, FAYETTE, FRANKLIN, GREENE, GUERNSEY, HIGHLAND, HOCKING, JACKSON, LICKING, MADISON, MIAMI, MONTGOMERY, MORGAN, MUSKINGUM, NOBLE, PERRY, PICKAWAY, PIKE, PREBLE, ROSS, SCIOTO, VINTON, and WARREN

	Rates	Fringes
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BOILERMAKER.....	\$ 33.76	24.45
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BOIL0154-005 01/01/2013

JEFFERSON

	Rates	Fringes
BOILERMAKER.....	\$ 42.67	24.55

BOIL0667-002 01/01/2013

BELMONT, MONROE & WASHINGTON

	Rates	Fringes
BOILERMAKER.....	\$ 35.98	22.23

BOIL0744-005 01/01/2013

COSHOCTON, HARRISON, HOLMES, TUSCARAWAS & WAYNE

	Rates	Fringes
BOILERMAKER.....	\$ 34.00	25.02

BROH0003-001 07/01/2011

WOOD COUNTY (Townships of Perrysburg, Ross, Lake, Troy, Freedom, Montgomery, Webster, Center, Portage, Middleton, Plain, Liberty, Henry, Washington, Weston, Milton, Jackson & Grand Rapids)

	Rates	Fringes
Bricklayer, Stonemason.....	\$ 28.38	15.78

BROH0003-004 07/01/2013

WOOD COUNTY (Townships of Perrysburg, Ross, Lake, Troy, Freedom, Montgomery, Webster, Center, Portage, Middleton, Plain, Liberty, Henry, Washington, Weston, Milton, Jackson & Grand Rapids)

	Rates	Fringes
FINISHER.....	\$ 24.85	16.36
Marble Setter, Terrazzo		
Worker & Tile Setter.....	\$ 29.48	10.55

BROH0005-005 05/01/2011

ASHLAND, ERIE, HURON & RICHLAND

	Rates	Fringes
Marble Setter Finisher/Tile		
Setter Finisher.....	\$ 26.30	10.23

Terrazzo Worker Finisher.....	\$ 26.00	10.61
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BROH0006-001 05/01/2013

TUSCARAWAS

	Rates	Fringes
Bricklayer, Caulker, Cleaner, Pointer & Stonemason.....	\$ 26.10	11.43

BROH0006-002 05/01/2013

TUSCARAWAS

	Rates	Fringes
FINISHER.....	\$ 21.46	9.94
Marble Setter, Terrazzo Worker, Terrazzo Grinder & Tile Setter.....	\$ 24.07	9.94

BROH0006-004 05/01/2013

TUSCARAWAS

	Rates	Fringes
Cement Mason/Plasterer.....	\$ 26.10	11.43

BROH0008-004 07/01/2013

	Rates	Fringes
Marble Setter Finisher/Terrazzo Worker Finisher COSHOCOTON, HARRISON, HOLMES, JEFFERSON & WAYNE (Excluding Milton & Chippewa Townships) COUNTIES.....	\$ 25.71	4.35
Tile setter finisher COSHOCOTON, HOLMES, JEFFERSON (Townships of Mt. Pleasant, Warren, Salineville & the Village of Dillonvale), & WAYNE (Excluding Milton & Chippewa Townships) COUNTIES.....	\$ 25.71	4.35

BROH0009-001 07/01/2013

BELMONT & MONROE COUNTIES and the Townships of Warren & Mt.
Pleasant and the Village of Dillonvale in JEFFERSON COUNTY

	Rates	Fringes
Bricklayer, Stonemason.....	\$ 25.52	17.14

Marble Setter, Terrazzo		
Worker & Tile Setter.....	\$ 25.52	17.14
Refractory.....	\$ 30.24	17.14

BROH0010-001 07/01/2013

JEFFERSON COUNTY (Brush Creek & Saline Townships)

	Rates	Fringes
BRICKLAYER		
BRICKLAYERS; CAULKERS;		
CLEANERS; CEMENT		
BLOCKLAYERS; MARBLE		
SETTERS; POINTERS;		
STONEMASONS & TERRAZZO		
WORKERS.....	\$ 26.95	15.66
TILE FINISHER.....	\$ 21.95	15.66
TILE SETTER.....	\$ 24.95	15.66

BROH0014-001 07/01/2013

HARRISON & JEFFERSON (Except Mt. Pleasant, Warren, Brush Creek,
Saline & Salineville Townships & the Village of Dillonvale)

	Rates	Fringes
Tile setter finisher.....	\$ 21.95	15.66

BROH0018-001 06/01/2011

BROWN, BUTLER, CLERMONT, PREBLE Gasper, Dixon, Israel, Lanier,
Somers & Gratis Townships) & WARREN

	Rates	Fringes
Bricklayer, Caulker, Cleaner,		
Pointer & Stonemason.....	\$ 26.32	10.26
Refractory.....	\$ 26.97	10.26

BROH0018-004 09/01/2013

BROWN, BUTLER, CLERMONT, PREBLE (Gasper, Dixon, Israel, Lanier,
Somers & Gratis Townships) and WARREN COUNTIES

	Rates	Fringes
Marble Setter, Terrazzo		
Worker & Tile Setter.....	\$ 27.15	10.78

BROH0018-006 09/01/2011

ADAMS, BROWN, BUTLER, CLERMONT, FAYETTE, JACKSON, PIKE, ROSS,
SCIOTO, VINTON, WARREN and WASHINGTON COUNTIES

	Rates	Fringes
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Marble, terrazzo and tile
finisher

Finishers.....	\$ 22.72	10.08
Marble Sanders, Polishers, Waxers & Sawyers.....	\$ 22.37	10.08
Terrazzo Base Grinders (while operating base grinding machine).....	\$ 22.31	10.08

BROH0022-001 06/01/2013

CLINTON, GREENE, HIGHLAND, MIAMI, MONTGOMERY & PREBLE (Jackson,
Monroe, Harrison, Twin, Jefferson & Washington Townships)
COUNTIES

	Rates	Fringes
Bricklayer, Caulker, Cleaner, Pointer & Stonemason.....	\$ 25.63	11.20

BROH0022-002 07/01/2013

CLINTON, GREENE, HIGHLAND, MIAMI, MONTGOMERY & PREBLE (Jackson,
Monroe, Harrison, Twin, Jefferson & Washington Townships)

	Rates	Fringes
Marble Setter, Terrazzo Worker & Tile Setter.....	\$ 23.93	9.82

BROH0022-003 07/01/2013

AUGLAIZE, CLINTON, GREENE, HIGHLAND, MIAMI, MONTGOMERY & PREBLE

	Rates	Fringes
Base Machine Men.....	\$ 22.92	5.41
FINISHER.....	\$ 22.42	5.41

BROH0035-001 07/01/2013

ALLEN and AUGLAIZE COUNTIES

	Rates	Fringes
Bricklayer, Caulker, Cleaner, Pointer, Stonemason & Tile Setter.....	\$ 25.76	12.21

BROH0039-001 06/01/2013

ADAMS & SCIOTO

	Rates	Fringes
BRICKLAYER BRICKLAYERS; CAULKERS; CLEANERS; MARBLE SETTERS; POINTERS; STONEMASONS;		

TERRAZZO WORKERS; & TILE SETTERS.....	\$ 30.69	16.01
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BROH0040-001 06/01/2013

ASHLAND, CRAWFORD, HOLMES, MORROW, RICHLAND, WAYNE and WYANDOT
(Except Crawford, Ridge, Richland & Tymochtee Townships)
COUNTIES

	Rates	Fringes
BRICKLAYER BLOCKLAYERS; CAULKERS; CLEANERS; MARBLE SETTERS; POINTERS; STONEMASONS; TERRAZZO WORKERS & TILE SETTERS.....	\$ 27.56	17.35

FOOTNOTE: Layout Man and Sawman rate: \$1.00 per hour above
journeyman rate.
Free standing stack work ground level to top of stack;
Sandblasting and laying of carbon masonry material in swing
stage and/or scaffold; Ramming and spading of plastics and
gunniting: \$1.50 per hour above journeyman rate.
"Hot" work: \$2.50 above journeyman rate.

BROH0044-001 06/01/2013

	Rates	Fringes
BRICKLAYER COSHOCOTON, FAIRFIELD, GUERNSEY, HOCKING, KNOX, LICKING, MORGAN, MUSKINGUM, NOBLE (Beaver, Buffalo, Seneca & Wayne Townships) & PERRY COUNTIES BRICKLAYERS; CAULKERS; CLEANERS; POINTERS; & STONEMASONS.....	\$ 25.96	12.94
Cement Mason/Plasterer COSHOCOTON & GUERNSEY COUNTIES CEMENT MASONS & PLASTERERS.	\$ 25.96	12.94

BROH0045-001 06/01/2013

FAYETTE, JACKSON, PIKE, ROSS and VINTON COUNTIES

	Rates	Fringes
Bricklayer, Caulker, Cement Mason, Cleaner, Pointer & Stonemason.....	\$ 29.55	12.69

BROH0046-001 06/01/2013

	Rates	Fringes
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BRICKLAYER (CAULKERS; CEMENT
BLOCK LAYERS; CLEANERS;
GUNNITE MASONS; MARBLE
SETTERS; POINTERS; REFRACTORY
MASONS; STONEMASONS;
TERRAZZO WORKERS & TILE
SETTERS)

ERIE, HANCOCK, HURON,
OTTAWA, SANDUSKY, SENECA,
WOOD (Perry & Bloom
Townships) and WYANDOT
(Tymochtee, Crawford,
Ridge & Richland
Townships) COUNTIES & the
Islands of Lake Erie north
of Sandusky.....\$ 28.59 16.36

Cement Mason and plasterer
ERIE, HURON, OTTAWA,
SANDUSKY, SENECA, WOOD
(Perry & Bloom Townships)
and WYANDOT (Tymochtee,
Crawford, Ridge & Richland
Townships) COUNTIES & the
Islands of Lake Erie north
of Sandusky.....\$ 28.59 16.36

Marble Setter Finisher,
Terrazzo Worker Finisher,
Tile Setter Finisher
HANCOCK, OTTAWA, SANDUSKY,
SENECA, WOOD (Perry &
Bloom Townships) and
WYANDOT (Tymochtee,
Crawford, Ridge & Richland
Townships) COUNTIES & the
Islands of Lake Erie north
of Sandusky.....\$ 24.85 16.36

FOOTNOTE: Colored or shake floors and epoxy floors: \$.75 per
hour above journeyman rate.

Layout Man and Sawman; Premium topping materials (emery,
iron, etc.): \$1.00 per hour above journeyman rate.

Free standing stack work ground level to top of stack;
Sandblasting and laying of carbon masonry material in swing
stage and/or scaffold; Vertical slip forms, jump forms or
continuous forming of any kind up to 50 feet; Ramming and
spading of plastics and gunniting: \$1.50 per hour above
journeyman rate.

Vertical slip forms, jump forms or continuous forming of any
kind above 50 feet: 1 1/2 times journeyman rate.

"Hot" work: \$2.50 above journeyman rate.

BROH0052-002 06/01/2013

NOBLE (Brookfield, Noble, Center, Sharon, Olive, Enoch, Stock,
Jackson, Jefferson & Elk Townships) and WASHINGTON COUNTIES

Rates Fringes

BRICKLAYER

Blocklayer, Caulker, Cleaner, Marble Setter, Pointer, Stonemason, Terrazzo Worker & Tile Setter.....	\$ 27.21	14.87
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BROH0055-001 06/01/2013

DELAWARE, FRANKLIN, MADISON and PICKAWAY COUNTIES

	Rates	Fringes
Bricklayer, Caulker, Cleaner, Pointer & Stonemason.....	\$ 27.95	14.56

BROH0055-002 06/01/2011

COSHOCTON, FAIRFIELD, GUERNSEY, HOCKING, KNOX, LICKING,
MORGAN, MUSKINGUM, NOBLE (Beaver, Buffalo, Seneca & Wayne
Townships), & PERRY

	Rates	Fringes
Marble & Tile Setter.....	\$ 25.16	10.53
TERRAZZO WORKER.....	\$ 25.41	10.53

BROH0055-004 06/01/2013

BELMONT, DELAWARE, FAIRFIELD, FRANKLIN, GUERNSEY, HOCKING,
KNOX, LICKING, MADISON, MONROE, MORGAN, MORROW, MUSKINGUM,
NOBLE, PERRY & PICKAWAY

	Rates	Fringes
Marble & Tile Finisher.....	\$ 25.71	4.35
TERRAZZO FINISHER.....	\$ 25.96	4.35

CARP0069-001 06/01/2013

TUSCARAWAS & WAYNE

	Rates	Fringes
Carpenter & Soft Floor Layer.....	\$ 25.44	12.80

CARP0069-005 06/01/2013

COSHOCTON, HOLMES, KNOX & MORROW

	Rates	Fringes
Carpenter & Soft Floor Layer.....	\$ 23.65	12.18

CARP0171-001 06/01/2013

BELMONT, HARRISON, JEFFERSON & MONROE

	Rates	Fringes
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Carpenter & Soft Floor Layer.....\$ 25.89	14.62
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CARP0200-001 06/01/2011

DELAWARE, FAIRFIELD, FRANKLIN, GUERNSEY, LICKING, MADISON,
MORGAN, MUSKINGUM, NOBLE, PERRY and PICKAWAY COUNTIES

	Rates	Fringes
Carpenter & Soft Floor Layer.....\$ 24.89		11.05
PILEDRIVERMAN.....\$ 25.57		11.05

CARP0248-002 07/01/2008

HANCOCK & WOOD

	Rates	Fringes
FLOOR LAYER: Carpet.....\$ 26.35		14.78

CARP0248-003 07/01/2008

HANCOCK

	Rates	Fringes
Carpenter/Lather.....\$ 23.71		13.28

CARP0356-001 06/01/2011

HOCKING, VINTON and WASHINGTON

	Rates	Fringes
CARPENTER.....\$ 26.26		14.40
FLOOR LAYER: Carpet.....\$ 25.63		13.95
PILEDRIVERMAN.....\$ 26.56		14.40

CARP0372-001 07/01/2008

ALLEN & AUGLAIZE

	Rates	Fringes
Carpenter/Lather.....\$ 23.18		13.28

CARP0437-001 06/01/2011

ADAMS, FAYETTE, HIGHLAND, JACKSON, PIKE, ROSS & SCIOTO COUNTIES

	Rates	Fringes
CARPENTER.....\$ 25.33		14.90
PILEDRIVERMAN.....\$ 28.61		14.90

CARP0735-001 06/01/2013

ASHLAND, ERIE, HURON & RICHLAND

Rates	Fringes
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Carpenter & Soft Floor Layer.....	\$ 24.76	12.42

CARP1066-001 09/01/2009		
BROWN, BUTLER, CLERMONT, CLINTON & WARREN		
	Rates	Fringes
MILLWRIGHT.....	\$ 27.55	15.39

CARP1066-002 09/01/2009		
GREENE, MIAMI, MONTGOMERY & PREBLE		
	Rates	Fringes
MILLWRIGHT.....	\$ 26.95	15.39

CARP1241-001 06/01/2011		
DELAWARE, FAIRFIELD, FRANKLIN, GUERNSEY, LICKING, MADISON, MORGAN, MUSKINGUM, NOBLE, PERRY and PICKAWAY COUNTIES		
	Rates	Fringes
MILLWRIGHT.....	\$ 28.00	14.92

CARP1311-002 06/01/2008		
BROWN, BUTLER, CLERMONT, CLINTON & WARREN		
	Rates	Fringes
Carpenter & Piledrivermen (Does not include Walls & Ceiling Work).....	\$ 23.85	9.67

CARP1311-004 06/01/2009		
GREENE, MIAMI, MONTGOMERY & PREBLE		
	Rates	Fringes
Carpenter & Piledrivermen (Does not include Acoustic Ceiling Installers, Drywall Hangers or Metal Stud Framers)...	\$ 23.60	10.92

CARP1311-007 06/01/2008		
BROWN, BUTLER, CLERMONT, CLINTON & WARREN		
	Rates	Fringes
Carpenter/Lather (Walls & Ceiling Work only).....	\$ 23.85	9.67

CARP1311-014 09/01/2006		

GREENE, MIAMI, MONTGOMERY & PREBLE

	Rates	Fringes
FLOOR LAYER: Carpet.....	\$ 21.79	8.83

CARP1311-015 06/01/2009		

GREENE, MIAMI, MONTGOMERY & PREBLE

	Rates	Fringes
Acoustic Ceiling Installer, Drywall Hanger, Lather & Metal Stud Framer.....	\$ 23.60	10.92

CARP1393-001 07/01/2008		

CRAWFORD, HANCOCK, OTTAWA, SANDUSKY, SENECA & WOOD

	Rates	Fringes
Millwright/Piledriverman.....	\$ 27.30	16.05

CARP1393-004 07/01/2008		

ALLEN, AUGLAIZE & WYANDOT

	Rates	Fringes
Millwright/Piledriverman.....	\$ 25.15	15.92

CARP1519-002 06/01/2011		

ADAMS, FAYETTE, HIGHLAND, HOCKING, JACKSON, PIKE, ROSS, SCIOTO
and VINTON COUNTIES

	Rates	Fringes
MILLWRIGHT.....	\$ 26.66	15.76

CARP1755-002 12/01/2011		

WASHINGTON COUNTY

	Rates	Fringes
MILLWRIGHT.....	\$ 32.06	16.54

CARP1871-001 06/01/2013		

ASHLAND, ERIE, HURON & RICHLAND

	Rates	Fringes
MILLWRIGHT.....	\$ 29.43	15.49

CARP1871-002 06/01/2013		

ASHLAND, ERIE, HURON & RICHLAND

	Rates	Fringes
PILEDRIVERMAN.....	\$ 29.48	15.49

 CARP1871-003 06/01/2013

BELMONT, HARRISON, & MONROE

	Rates	Fringes
PILEDRIVERMAN.....	\$ 31.38	13.92

 CARP1871-004 06/01/2013

COSHOCTON, HOLMES, KNOX & MORROW

	Rates	Fringes
PILEDRIVERMAN.....	\$ 24.35	12.96

 CARP1871-005 06/01/2013

BELMONT, HARRISON, JEFFERSON & MONROE

	Rates	Fringes
MILLWRIGHT.....	\$ 30.38	13.92

 CARP1871-011 06/01/2013

COSHOCTON, HOLMES, KNOX & MORROW

	Rates	Fringes
MILLWRIGHT.....	\$ 24.30	12.96

 CARP1871-012 06/01/2013

TUSCARAWAS & WAYNE

	Rates	Fringes
MILLWRIGHT.....	\$ 25.13	13.81

 CARP1871-013 06/01/2013

TUSCARAWAS & WAYNE

	Rates	Fringes
PILEDRIVERMAN.....	\$ 24.93	13.81

 CARP2239-001 07/01/2008

CRAWFORD, OTTAWA, SANDUSKY, SENECA & WYANDOT

	Rates	Fringes
CARPENTER.....	\$ 23.71	13.28

ELEC0008-001 05/27/2013

HANCOCK, OTTAWA, SANDUSKY, SENECA & WOOD

	Rates	Fringes
CABLE SPLICER.....	\$ 37.62	18.52
ELECTRICIAN.....	\$ 35.83	18.52

ELEC0032-001 06/01/2013

ALLEN, AUGLAIZE & WYANDOT (Crawford, Jackson, Marseilles, Mifflin, Ridgeland, Ridge & Salem Townships)

	Rates	Fringes
ELECTRICIAN.....	\$ 27.77	15.02

ELEC0032-002 06/01/1998

ALLEN & WYANDOT (Crawford, Jackson, Marseilles, Mifflin, Richland, Ridge & Salem Townships)

	Rates	Fringes
Line Construction		
Equipment Operator.....	\$ 20.27	4.12+a
Groundman Truck Driver.....	\$ 14.43	3.63+a
Lineman.....	\$ 22.52	4.31+a

FOOTNOTE: a. Half a day's Paid Holiday: The last 4 hours of the workday prior to Christmas or New Year's Day

ELEC0071-002 10/01/2013

ASHLAND, COSHOCTON, CRAWFORD, DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN, GUERNSEY, HIGHLAND, HOCKING, JACKSON (Coal, Jackson, Liberty, Milton, Washington & Wellston Townships), KNOX, LICKING, MADISON, MONROE, MORGAN, MORROW, MUSKINGUM, NOBLE, PERRY, PICKAWAY, PIKE (Beaver, Benton, Jackson, Mifflin, Pebble, Peepee, Perry & Seal Townships), RICHLAND, ROSS, TUSCARAWAS (Auburn, Bucks, Clay, Jefferson, Oxford, Perry, Salem, Rush, Washington & York Townships), VINTON (Clinton, Eagle, Elk, Harrison, Jackson, Richland & Swan Townships), and WASHINGTON COUNTIES

	Rates	Fringes
Line Construction		
Linemen & Cable Splicers....	\$ 33.50	12.05

ELEC0071-003 10/01/2013

AUGLAIZE, CLINTON, GREENE, MIAMI, MONTGOMERY, and PREBLE COUNTIES

	Rates	Fringes
Line Construction		
Equipment Operator.....	\$ 30.15	11.53
Groundman.....	\$ 21.78	9.57
Lineman & Cable Splicers....	\$ 33.50	12.05

ELEC0071-011 10/01/2013

BELMONT, HARRISON, HOLMES, JEFFERSON, and WAYNE COUNTIES

	Rates	Fringes
Line Construction		
Equipment Operator.....	\$ 30.15	11.33
Groundman.....	\$ 21.78	9.57
Lineman & Cable Splicers....	\$ 33.50	12.05

ELEC0071-012 10/01/2013

BROWN, BUTLER, CLERMONT, and WARREN COUNTIES

	Rates	Fringes
Line Construction		
Equipment Operator.....	\$ 30.15	11.33
Groundman.....	\$ 21.78	9.57
Lineman & Cable Splicers....	\$ 33.50	12.05

ELEC0082-001 12/13/2012

CLINTON, GREENE, MIAMI, MONTGOMERY, PREBLE & WARREN (Wayne, Clear Creek & Franklin Townships)

	Rates	Fringes
ELECTRICIAN.....	\$ 26.60	16.75

ELEC0082-005 07/01/2013

CLINTON, GREENE, MIAMI, MONTGOMERY, PREBLE & WARREN (Wayne, Clear Creek & Franklin Townships)

	Rates	Fringes
Sound & Communication Technician		
Cable Puller.....	\$ 9.14	4.91
Installer/Technician.....	\$ 22.50	9.51

ELEC0129-004 03/01/2010

ERIE & HURON (Lyme, Ridgefield, Norwalk, Townsend, Wakeman, Sherman, Peru, Bronson, Hartland, Clarksfield, Norwich, Greenfield, Fairfield, Fitchville & New London Townships)

Rates	Fringes
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ELECTRICIAN.....	\$ 31.00	13.80
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ELEC0141-003 09/01/2013

BELMONT COUNTY

	Rates	Fringes
CABLE SPLICER.....	\$ 31.25	22.63
ELECTRICIAN.....	\$ 31.00	22.63

ELEC0212-001 06/03/2013

BROWN and CLERMONT COUNTIES

	Rates	Fringes
ELECTRICIAN.....	\$ 26.35	16.09

ELEC0212-002 07/01/2013

BROWN & CLERMONT

	Rates	Fringes
Sound & Communication Technician.....	\$ 22.50	9.51

ELEC0245-001 08/26/2013

HANCOCK, OTTAWA, SANDUSKY, SENECA, and WOOD COUTIES

	Rates	Fringes
Line Construction		
Cable Splicer.....	\$ 39.72	24.77%+\$5.00+a
Groundman/Truck Driver.....	\$ 15.11	24.77%+\$5.00+a
Heli-arc Welding.....	\$ 34.84	24.77%+\$5.00+a
Lineman.....	\$ 34.54	24.77%+\$5.00+a
Operator - Class 1.....	\$ 27.63	24.77%+\$5.00+a
Operator - Class 2.....	\$ 24.18	24.77%+\$5.00+a
Traffic Signal & Lighting Technician.....	\$ 31.09	24.77%+\$5.00+a

FOOTNOTE: a. 6 Observed Holidays: New Year's Day; Memorial Day; Independence Day; Labor Day; Thanksgiving Day; & Christmas Day. Employees who work on a holiday shall be paid at a rate of double their applicable classified straight-time rates for the work performed on such holiday.

ELEC0245-004 08/26/2013

ERIE COUNTY

	Rates	Fringes
Line Construction		
Cable Splicer.....	\$ 39.72	24.77%+\$5.00+a
Groundman/Truck Driver.....	\$ 15.11	24.77%+\$5.00+a
Lineman.....	\$ 34.54	24.77%+\$5.00+a

Operator - Class 1.....\$ 27.63 24.77%+\$5.00+a
Operator - Class 2.....\$ 24.18 24.77%+\$5.00+a

FOOTNOTE: a. 6 Observed Holidays: New Year's Day; Memorial Day; Independence Day; Labor Day; Thanksgiving Day; & Christmas Day. Employees who work on a holiday shall be paid at a rate of double their applicable classified straight-time rates for the work performed on such holiday.

ELEC0246-001 10/28/2013

HARRISON and JEFFERSON COUNTIES

	Rates	Fringes
ELECTRICIAN.....	\$ 33.00	27.81+a

FOOTNOTE: a. 1 1/2 Paid Holidays: The last scheduled workday prior to Christmas & 4 hours on Good Friday.

ELEC0306-004 05/27/2013

WAYNE (Baughman, Canaan, Chester, Chippewa, Congress, Green, Milton & Wayne Townships)

	Rates	Fringes
CABLE SPLICER.....	\$ 36.87	5%+14.01
ELECTRICIAN.....	\$ 34.14	5%+14.01

ELEC0317-007 06/01/1998

ADAMS, JACKSON (Bloomfield, Franklin, Hamilton, Lick, Jefferson, Scioto & Madison Townships), PIKE (Camp Creek, Marion, Newton, Scioto, Sunfish & Union Townships), SCIOTO & VINTON (Brown, Knox, Madison, Vinton & Wilkesville Townships)

	Rates	Fringes
Line Construction		
Cable Splicers.....	\$ 23.66	8.48
Equipment Operators.....	\$ 17.14	8.25
Groundmen.....	\$ 13.92	8.14
Linemen.....	\$ 21.42	8.40

ELEC0540-001 01/01/2014

HOLMES, TUSCARAWAS (North of Auburn Clay, Rush & York Townships), and WAYNE (South of Baughman, Chester, Green & Wayne Townships) COUNTIES

	Rates	Fringes
ELECTRICIAN.....	\$ 29.40	20.06

ELEC0540-003 06/05/1997

TUSCARAWAS COUNTY (North of Auburn, Clay, Rush & York Townships)

	Rates	Fringes
Line Construction		
Groundman; & Truck Driver...	\$ 14.65	8.18
Line Equipment Operator....	\$ 19.02	8.69
Lineman; & Cable Splicer....	\$ 21.86	9.01

ELEC0575-001 12/31/2012

ADAMS, FAYETTE, HIGHLAND, HOCKING, JACKSON (Bloomfield, Franklin, Hamilton, Jefferson, Lick, Madison, Scioto, Coal, Jackson, Liberty, Milton & Washington Townships), PICKAWAY (Deer Creek, Perry, Pickaway, Salt Creek & Wayne Townships), PIKE (Beaver, Benton, Jackson, Mifflin, Pebble, PeePee, Perry, Seal, Camp Creek, Newton, Scioto, Sunfish, Union & Marion Townships), ROSS, SCIOTO & VINTON (Clinton, Eagle, Elk, Harrison, Jackson, Richland & Swan Townships)

	Rates	Fringes
ELECTRICIAN.....	\$ 31.20	13.55

ELEC0575-003 06/03/2013

ADAMS, FAYETTE, HIGHLAND, HOCKING, JACKSON, PICKAWAY (Deer Creek, Perry, Pickaway, Salt Creek & Wayne Townships), PIKE, ROSS, SCIOTO & VINTON (Clinton, Eagle, Elk, Harrison, Jackson, Richland & Swan Townships)

	Rates	Fringes
Sound & Communication Technician		
Cable Puller.....	\$ 10.38	6.75
Installer.....	\$ 23.78	9.37

ELEC0648-001 09/03/2012

BUTLER and WARREN COUNTIES (Deerfield, Hamilton, Harlan, Massie, Salem, Turtle Creek, Union & Washington Townships)

	Rates	Fringes
CABLE SPLICER.....	\$ 28.83	15.04
ELECTRICIAN.....	\$ 28.33	15.02

ELEC0683-001 05/27/2013

DELAWARE, FAIRFIELD, FRANKLIN, MADISON, and PICKAWAY (Circleville, Darby, Harrison, Jackson, Madison, Monroe, Muhlenberg, Scioto, Walnut & Washington Townships) COUNTIES

Rates	Fringes
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Electricians:

Cable Splicer.....	\$ 31.20	15.09
Electrician.....	\$ 30.60	15.09

ELEC0683-006 06/03/2013

DELAWARE, FAIRFIELD, FRANKLIN, MADISON & PICKAWAY (Circleville, Darby, Harrison, Jackson, Madison, Monroe, Muhlenberg, Scioto, Walnut & Washington Townships)

	Rates	Fringes
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Sound & Communication

Technician

Cable Puller.....	\$ 11.75	4.20
Installer.....	\$ 24.20	8.93

ELEC0688-001 05/27/2013

ASHLAND, CRAWFORD, HURON (Richmond, New Haven, Ripley & Greenwich Townships), KNOX (Liberty, Clinton, Union, Howard, Monroe, Middleberry, Morris, Wayne, Berlin, Pike, Brown & Jefferson Townships), MORROW, RICHLAND and WYANDOT (Sycamore, Crane, Eden, Pitt, Antrim & Tymochtee Townships) COUNTIES

	Rates	Fringes
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ELECTRICIAN.....	\$ 26.50	15.06
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ELEC0688-004 06/03/2013

ASHLAND, CRAWFORD, HURON (Richmond, New Haven, Ripley & Greenwich Townships), KNOX (Liberty, Clinton, Union, Howard, Monroe, Middleberry, Morris, Wayne, Berlin, Pike, Brown & Jefferson Townships), MORROW, RICHLAND & WYANDOT (Sycamore, Crane, Eden, Pitt, Antrim & Tymochtee Townships)

	Rates	Fringes
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Sound & Communication

Technician

Cable Puller.....	\$ 11.16	5.22
Installer.....	\$ 24.56	8.63

ELEC0972-001 06/01/2012

MONROE, MORGAN, NOBLE, VINTON (Brown, Knox, Madison, Vinton & Wilkesville Townships), and WASHINGTON COUNTIES

	Rates	Fringes
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Electricians:

Cable Splicer.....	\$ 31.61	20.56
Electrician.....	\$ 31.36	20.55

ELEC1105-001 05/27/2013

COSHOCTON, GUERNSEY, KNOX (Jackson, Clay, Morgan, Miller, Milford, Hilliar, Butler, Harrison, Pleasant & College Townships), LICKING, MUSKINGUM, PERRY, and TUSCARAWAS (Auburn, York, Clay, Jefferson, Rush, Oxford, Washington, Salem, Perry & Bucks Townships) COUNTIES

	Rates	Fringes
ELECTRICIAN.....	\$ 28.13	14.56

ELEC1105-002 06/03/2013

COSHOCTON, GUERNSEY, KNOX (Jackson, Clay, Morgan, Miller, Milford, Hillard, Butler, Harrison, Pleasant & College Townships), LICKING, MUSKINGUM, PERRY & TUSCARAWAS (Auburn, York, Clay, Jefferson, Rush, Oxford, Washington, Salem, Perry & Bucks Townships)

	Rates	Fringes
Sound & Communication Technician		
Cable Puller.....	\$ 10.09	7.27
Installer.....	\$ 23.33	9.54

ELEV0006-003 01/01/2013

	Rates	Fringes
ELEVATOR MECHANIC.....	\$ 42.61	25.185 A&B

FOOTNOTE:

A. Employer contributes 8% of regular hourly rate as vacation pay credit for employees with more than 5 years of service, and 6% for 6 months to 5 years of service.

B. Eight Paid Holidays (provided employee has worked 5 consecutive days before and the working day after the holiday): New Years's Day; Memorial Day; Independence Day; Labor Day; Veteran's Day; Thanksgiving Day and the Friday after Thanksgiving Day, and Christmas Day.

ELEV0011-001 01/01/2014

ADAMS, BROWN, BUTLER, CLERMONT, CLINTON, GREENE, HIGHLAND, MIAMI, MONTGOMERY, PREBLE, and WARREN COUNTIES

	Rates	Fringes
ELEVATOR MECHANIC.....	\$ 40.66	26.785+a+b

PAID HOLIDAYS:

a. New Year's Day, Memorial Day, Independence Day, Labor Day, Vetern's Day, Thanksgiving Day, the Friday after Thanksgiving, and Christmas Day.

b. Employer contributes 8% of regular hourly rate to vacation pay credit for employee who has worked in business more than 5 years; 6% for less than 5 years' service.

ELEV0017-001 01/01/2014

ERIE and HURON COUNTIES

	Rates	Fringes
ELEVATOR MECHANIC.....	\$ 45.10	26.785+a+b

PAID HOLIDAYS:

a. New Year's Day, Memorial Day, Independence Day, Labor Day, Vetern's Day, Thanksgiving Day, the Friday after Thanksgiving, and Christmas Day.

b. Employer contributes 8% of regular hourly rate to vacation pay credit for employee who has worked in business more than 5 years; 6% for less than 5 years' service.

ELEV0037-001 01/01/2014

ASHLAND, COSHOCTON, CRAWFORD, DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN, HOCKING, HOLMES, KNOX, LICKING, MADISON, MORGAN, MORROW, MUSKINGUM, PERRY, PICKAWAY, RICHLAND, ROSS, TUSCARAWAS, and VINTON COUNTIES

	Rates	Fringes
ELEVATOR MECHANIC.....	\$ 40.62	26.785+a+b

PAID HOLIDAYS:

a. New Year's Day, Memorial Day, Independence Day, Labor Day, Vetern's Day, Thanksgiving Day, the Friday after Thanksgiving, and Christmas Day.

b. Employer contributes 8% of regular hourly rate to vacation pay credit for employee who has worked in business more than 5 years; 6% for less than 5 years' service.

ELEV0044-001 01/01/2014

ALLEN, AUGLAIZE, HANCOCK, OTTAWA, SANDUSKY, SENECA, WOOD, and WYANDOT COUNTIES

	Rates	Fringes
ELEVATOR MECHANIC.....	\$ 44.06	26.785+a+b

PAID HOLIDAYS:

a. New Year's Day, Memorial Day, Independence Day, Labor Day,

Vetern's Day, Thanksgiving Day, the Friday after
Thanksgiving, and Christmas Day.

b. Employer contributes 8% of regular hourly rate to vacation
pay credit for employee who has worked in business more
than 5 years; 6% for less than 5 years' service.

ELEV0045-001 01/01/2014

WAYNE COUNTY

	Rates	Fringes
ELEVATOR MECHANIC.....	\$ 42.84	27.085+a+b

PAID HOLIDAYS:

a. New Year's Day, Memorial Day, Independence Day, Labor Day,
Vetern's Day, Thanksgiving Day, the Friday after
Thanksgiving, and Christmas Day.

b. Employer contributes 8% of regular hourly rate to vacation
pay credit for employee who has worked in business more
than 5 years; 6% for less than 5 years' service.

ELEV0048-002 01/01/2014

JACKSON, PIKE, and SCIOTO COUNTIES

	Rates	Fringes
ELEVATOR MECHANIC.....	\$ 41.79	26.785+a+b

PAID HOLIDAYS:

a. New Year's Day, Memorial Day, Independence Day, Labor Day,
Vetern's Day, Thanksgiving Day, the Friday after
Thanksgiving, and Christmas Day.

b. Employer contributes 8% of regular hourly rate to vacation
pay credit for employee who has worked in business more
than 5 years; 6% for less than 5 years' service.

ENGI0018-001 05/04/2012

ADAMS, ALLEN, ASHLAND, AUGLAIZE, BELMONT, BROWN, BUTLER,
CLERMONT, CLINTON, COSHOCTON, CRAWFORD, DELAWARE, FAIRFIELD,
FAYETTE, FRANKLIN, GREENE, GUERNSEY, HANCOCK, HARRISON,
HIGHLAND, HOCKING, HOLMES, JACKSON, JEFFERSON, KNOX, LICKING,
MADISON, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM,
NOBLE, OTTAWA, PERRY, PICKAWAY, PIKE, PREBLE, RICHLAND, ROSS,
SANDUSKY, SCIOTO, SENECA, TUSCARAWAS, VINTON, WARREN,
WASHINGTON, WAYNE & WYANDOT

	Rates	Fringes
OPERATOR: Power Equipment		

GROUP 1.....	\$ 32.29	13.01
GROUP 2.....	\$ 32.04	13.01
GROUP 3.....	\$ 31.54	13.01
GROUP 4.....	\$ 31.29	13.01
GROUP 5.....	\$ 31.04	13.01
GROUP 6.....	\$ 30.92	13.01
GROUP 7.....	\$ 29.88	13.01
GROUP 8.....	\$ 28.70	13.01
GROUP 9.....	\$ 23.24	13.01

OPERATING ENGINEER CLASSIFICATIONS

GROUP 1 - Boom & Jib 250' & Over

GROUP 2 - Boom & Jib Over 180' through 249'

GROUP 3 - Boom & Jib 150' through 180'

GROUP 4 - Master Mechanic

GROUP 5 - Barrier Moving Machine; Boiler or Compressor Mounted on Crane (Piggy-Back Operation); Boom Truck (All Types); Cableway; Cherry Picker; Combination Concrete Mixer & Tower; All Concrete Pumps with Booms; Crane (All Types); Crane-Compact, Track or Rubber Over 4,000 lbs Capacity; Crane-Self Erecting, Stationary, Track or Truck (All Configurations); Derrick (All Types); Dragline; Dredge (Dipper, Clam or Suction) 3 Man Crew; Elevating Grader or Euclid Loader; Floating Equipment; Forklift(rough terrain with winch/hoist) Gradall; Helicopter Operator & Helicopter Winch Operator (Hoisting Builders Materials); Hoe (AllTypes); Hoist (Two or More Drums); Horizontal Directional Drill; Hydraulic Gantry (Lift System); Laser Finishing Machine; Laser Screed and Like Equipment; Lift Slab or Panel Jack; Locomotive (All Types); Maintenance Engineer (Mechanic and/or Welder); Mixer, Paving (Multiple Drum); Mobile Concrete Pump With Boom; Panelboard (All Types on Site); Pile Driver; Power Shovel; Prentice Loader; Rail Tamper (with Automatic Lifting & Aligning device); Rotary Drill (All) used on Caisson Work for Foundations & Substructure work; Side Boom; Slip Form Paver; Straddle Carrier (Building Construction on Site); Trench Machine (Over 24" Wide); & Tug Boat

GROUP 6 - Asphalt Paver; Bobcat-type and/or Skid Steer Loader with Hoe Attachment Greater than 7,000 lbs.; Bulldozer; C.M.I. Type Equipment; Endloader; Hydro Milling Machine; Kolman Type Loader (Dirt Loading); Lead Greaseman; Mucking Machine; Pettibone-Rail Equipment; Power Grader; Power Scoop; Power Scraper; Push Cat; Rotomill (All), Grinders & Planers of All Types & Vermeer Type Concrete Saw

GROUP 7 - A-Frame; Air Compressor Pressurizing Shafts or Tunnels; Asphalt Roller (All); Bobcat-type and/or Skid Steer Loader with or without Attachments; Boiler (15 lbs. pressure & over); All Concrete Pumps without Booms & with 5" System; Forklift (Except Masonry); Highway Drills-All Types (with Integral Power); Hoist (One Drum); House Elevator (except those automatic call button controlled); Man Lift; Material Hoist/Elevator; Mud Jack; Pressure Grouting; Pump (Installing or Operating Well Points or

other Type of Dewatering Systems); Pump (4" and over Discharge); Railroad Tie Inserter/Remover; Rotovator (Lime soil Stabilizer); Submersible Pump (4" and over Discharge); Switch & Tie Tamper (w/o lifting & aligning device); Trench Machine (24" & under); & Utility

GROUP 8 - Ballast Relocator; Backfiller & Tamper; Batch Plant; Bar & Joint Installing Machine; Bull Floats; Burlap & Curing Machines; Clefplanes; Compressor on Building Construction; Concrete Mixer, Capacity more than one bag; Concrete Mixer, one bag capacity (side loader); All Concrete Pumps without Booms with 4" or Smaller System; Concrete Spreading Machine; Conveyor, used for handling building materials; Crusher; Deckhand; Drum Fireman in Asphalt Plant; Farm Type Tractor, Pulling Attachments; Finishing Machines; Form Trencher; Generator; Guniting Machine; Hydro-Seeder; Pavement Breaker (Hydraulic or Cable); Post Driver; Post Hole Digger; Pressure Pump (over 1/2" discharge); Road Widening Trencher; Roller (except Asphalt); Self-propelled Power Spreader; Self-propelled Sub-Grader; Shotcrete Machine; Tire Repairman; Tractor (Pulling Sheep Foot Roller or Grader); VAC/ALL; Vibratory Compactor (with Integral Power) & Welder

GROUP 9 - Allen Screed Paver(concrete); Boiler (Less than 15 lbs. pressure); Crane-Compact, Track or Rubber under 4,000 lbs.; Directional Drill "Locator"; Inboard & Outboard Motor Boat Launch; Light Plant; Masonry Forklift; Oiler; Power Driven Heater (Oil Fired); Power Scrubber; Power Sweeper; Pump (Under 4" discharge); & Submersible Pump (Under 4" discharge)

ENGI0018-002 05/04/2011

ERIE & HURON

	Rates	Fringes
OPERATOR: Power Equipment		
Crane (Boom & Jib 200' & Over, Up to 299'); Master Mechanic.....	\$ 34.08	12.80
Crane (Boom & Jib 300' & Over).....	\$ 34.58	12.80
GROUP 1.....	\$ 33.58	12.80
GROUP 2.....	\$ 33.43	12.80
GROUP 3.....	\$ 31.98	12.80
GROUP 4.....	\$ 31.20	12.80
GROUP 5.....	\$ 30.88	12.80
GROUP 6.....	\$ 23.80	12.80

OPERATING ENGINEER CLASSIFICATIONS

GROUP 1 - A-Frame; Boiler or Compressor Operator, Hydraulic Pump & Power Packs Mounted on Crane or Piggy-Back Operation; Boom Truck (All Types); Cableway; Cherry Picker; Combination Concrete Mixer & Tower; All Concrete Pumps; Crane (All Types); Derrick (All Types); Dragline; Dredge (Dipper, Clam or Suction); 3 Man Crew; Elevating Grader or Euclid Loader; Floating Equipment; Gradall; Helicopter

Operator & Helicopter Winch Operator Hoisting Building Materials; Hoe (All Types); Hoist (Two or More Drums); Lift Slab or Panel Jack Operator; Locomotive (All Types); Maintenance Engineer (Mechanic); Mixer; Paving (Multiple Drum); Mobile Concrete Pump with Boom; Panelboard (All types on site); Pile Driver; Power Shovel; Robotic Equipment Operator/Mechanic; Rotary Drill (all), used on Caissons for Foundations & Sub-structure Work; Rough Terrain Forklift with Winch/Hoist; Side Boom; Slip Form Paver; Straddle Carrier; Trench Machine (Over 24" Wide); & Tug Boat

GROUP 2 - Asphalt Paver; Bulldozer; CMI-Type Equipment; Endloader; Horizontal Directional Drill Locator and Operator; Kohlman Type Loader (Dirt Loading); Lead Greaseman; Mucking Machine; Power Grader; Power Scoop; Power Scraper; & Push Cat

GROUP 3 - Air Compressor, Pressurizing Shafts or Tunnels; Asphalt Roller (all); Fork Lift; Hoist, One Drum; House Elevator (Except Automatic Call Button-controlled); Laser Screeds & Like Equipment; Man Lift; Mud Jack; Boiler (Over 15 lbs. Pressure); Pressure Grouting; Pump Operator (Installing or operating Well Points or other type of Dewatering system); Trencher (24" & under); & Utility Operator

GROUP 4 - Compressor on Building construction; Conveyor, building material; Generator; Guniting Machine; Concrete Mixer, Capacity more than one bag; Concrete Mixer, One Bag capacity (Side Loader); Pavement Breaker, Hydraulic or Cable; Post Driver; Post Hole Digger; Road Widening Trencher; Roller; & Welder Operator

GROUP 5 - Backfiller & Tamper; Bar & Joint Installing Machine; Batch Plant; Bullfloat; Burlap and Curing Machine; Cleaning Machine (decontamination included); Clefplane; Concrete Spreading Machine; Crusher; Deckhand; Drum Fireman (Asphalt); Farm-type Tractor, Pulling attachments; Finishing Machine; Fork Lift (Masonry Work); Form Trencher; High Pressure Pump (Over 1/2" discharge); Hydro Seeder; Pump (4" and Over discharge); Submersible Pump (4" and Over discharge); Self-propelled Power Spreader; Self-propelled Sub-grader; Tire Repairman; Tractor, Pulling Sheeps Foot Roller or Grader; & Vibratory Compactor, With Integral Power

GROUP 6 - Inboard & Outboard Motor Boat Launch; Light Plant Operator; Oiler; Signalman; Power Driven Heater (Oil Fired); Power Scrubber; Power Sweeper; Power Boiler (Less than 15 lbs. Pressure); Pump (Under 4" discharge); Submersible Pump (Under 4" discharge); Signalperson; Bob Cat-type and/or Skid Steer Loader; Grade Checker; VAC/ALL; Rod Man

ENGI0018-007 05/01/2012

WOOD COUNTY

Rates

Fringes

OPERATOR: Power Equipment

GROUP 1.....	\$ 33.04	13.01
GROUP 2.....	\$ 32.79	13.01
GROUP 3.....	\$ 32.29	13.01
GROUP 4.....	\$ 32.04	13.01
GROUP 5.....	\$ 31.79	13.01
GROUP 6.....	\$ 31.67	13.01
GROUP 7.....	\$ 30.63	13.01
GROUP 8.....	\$ 29.45	13.01
GROUP 9.....	\$ 23.99	13.01

OPERATING ENGINEER CLASSIFICATIONS

GROUP 1 - Boom & Jib 250' & Over

GROUP 2 - Boom & Jib Over 180' through 249'

GROUP 3 - Boom & Jib 150' through 180'

GROUP 4 - Master Mechanic

GROUP 5 - Barrier Moving Machine; Boiler or Compressor Mounted on Crane (Piggy-Back Operation); Boom Truck (all types); Cableway; Cherry Picker; Combination Concrete Mixer & Tower; Concrete Pump with Booms; Crane (all types); Crane-Compact, Track or Rubber over 4,000 lbs. Capacity; Crane-Self Erecting, Stationary, Track or Truck (all configurations); Derrick (all types); Dragline; Dredge (Dipper, Clam or Suction) 3 Man Crew; Elevating Grader or Euclid Loader; Floating Equipment; Forklift (rough terrain with winch/hoist) Gradall; Helicopter Operator, Hoisting Building Materials; Hoes (all types); Hoists (with two or more drums in use); Horizontal Directional Drill; Hydraulic Gantry (lift system); Laser Finishing Machine; Laser Screed and Like Equipment; Lift Slab or Panel Jack; Locomotive (all types); Maintenance Engineer (Mechanic and/or welder); Mixer Paving (Multiple Drum); Mobile Concrete Pump (With Boom); Panelboard (all types on site); Pile Driver; Power Shovel; Prentice Loader; Rail Tamper (with automatic lifting & aligning device); Rotary Drill (all) used on Caissons for Foundations & Substructure work; Side Boom; Slip Form Paver; Straddle Carrier (building construction on site); Trench Machine (Over 24" Wide); & Tug Boat

GROUP 6 - Asphalt Paver; Bobcat-type and/or Skid Steer Loader with Hoe Attachment greater than 7,000 lbs.; Bulldozer; C.M.I. Type Equipment; Endloader; Hydro Milling Machine; Kolman Type Loader (Dirt Loading); Lead Greaseman; Mucking Machine; Pettibone-Rail Equipment; Power Grader; Power Scoop; Power Scraper; Push Cat; Rotomill (all), Grinders and Planers of All Types; & Vermeer Type Concrete Saw

GROUP 7 - A-Frame; Air Compressor, Pressurizing Shafts or Tunnels; Asphalt Roller (all); Bobcat-type and/or Skid Steer Loader with or without Attachments; Boiler (15 lbs. pressure and over); All concrete Pumps (without booms with 5" system); Fork Lifts (except masonry); Highway Drills-all types (with Integral Power); Hoist (One Drum); House Elevator (except those automatic call button controlled); Man Lift; Material Hoist/Elevator; Mud Jack; Pressure Grouting; Pump (Installing or Operating Well Points or

other Type of Dewatering Systems); Pump (4" and over Discharge); Railroad Tie Inserter/Remover; Rotovator (lime soil stabilizer); Submersible Pump (4" and over Discharge); Switch & Tie Tamper w/o lifting & aligning device; Trench Machine (24" & under); & Utility

GROUP 8 - Ballast Relocator; Backfillers & Tampers; Batch Plant; Bar & Joint Installing Machines; Bull Floats; Burlap & Curing Machines; Clefplanes; Compressor on building construction; Concrete Mixer, Capacity more than one bag; Concrete Mixer, one bag capacity, (side loader); All Concrete Pumps without Booms and with 4" System or Smaller; Concrete Spreader; Conveyor, used for handling building material; Crusher; Deckhands; Drum firemen (in asphalt plants); Farm Type Tractor, pulling attachments; Finishing Machine; Form Trencher; Generator; Guniting Machine; Hydro-seeder; Pavement Breaker (Hydraulic or Cable); Post Driver; Post Hole Digger; Pressure Pump (over 1/2" discharge); Road Widening Trencher; Roller (except Asphalt); Self-propelled Power Spreader; Self-propelled Sub-Grader; Shotcrete Machine; Tire Repairman; Tractor, Pulling Sheep Foot Roller or Grader; VAC/ALL; & Vibratory Compactor, with Integral Power

GROUP 9 - Allen Screed Paver(concrete); Boiler (Less than 15 lbs. pressure); Crane-Compact, Track or Rubber under 4,000 lbs. Capacity; Directional Drill "Locator"; Inboard & Outboard Motor Boat Launch; Light Plant; Masonry Fork Lift; Oiler; Power Driven Heater (Oil Fired); Power Scrubber; Power Sweeper; Pump (Under 4" discharge); Signal Person; & Submersible Pump (Under 4" discharge)

IRON0017-001 05/01/2013

ERIE (Eastern 2/3) and HURON (East of a line drawn from the north border through Monroeville & Willard) COUNTIES

	Rates	Fringes
Ironworkers:		
Ornamental, Reinforcing, & Structural.....	\$ 30.85	19.18

IRON0044-001 06/01/2013

ADAMS (Western Part), BROWN, BUTLER (Southern Part), CLERMONT, CLINTON (South of a line drawn from Blanchester to Lynchburg), HIGHLAND (Excluding eastern one-fifth & portion of county inside lines drawn from Marshall to Lynchburg from the northern county line through E. Monroe to Marshall) & WARREN (South of a line drawn from Blanchester through Morrow to the west county line)

	Rates	Fringes
Ironworkers:		
Fence Erector.....	\$ 22.70	18.40
Ornamental; Structural.....	\$ 25.00	18.40

IRON0055-001 07/01/2013

CRAWFORD (Area between lines drawn from where Hwy #598 & #30 meet through North Liberty to the northern border & from said Hwy junction point due west to the border), ERIE (Western one-third), HANCOCK, HURON (West of a line drawn from the northern border through Monroeville & Willard), OTTAWA, SANDUSKY, SENECA, WOOD & WYANDOT (North of Rte. #30)

	Rates	Fringes
Ironworkers:		
Fence Erector.....	\$ 19.40	18.32
Furnaces & Kilns (Temperature units over 125 degrees Fahrenheit).....	\$ 29.00	18.00
Pre-Engineered Metal Building.....	\$ 23.59	19.35
All Other Work.....	\$ 28.32	19.35

IRON0147-001 06/01/2013

ALLEN COUNTY (Northern half)

	Rates	Fringes
IRONWORKER.....	\$ 24.94	18.62

IRON0172-001 06/01/2013

COSHOCTON (West of a line beginning at the northwest county line going through Walhonding & Tunnel Hill to the southern county line), CRAWFORD (South of Rte. #30), DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN, HIGHLAND (Eastern one-fifth), HOCKING, JACKSON (Northern half), KNOX, LICKING, MADISON, MORROW, MUSKINGUM (West of a line starting at Adams Mill going to Adamsville & going from Adamsville through Blue Rock to the southern border), PERRY, PICKAWAY, PIKE, ROSS, VINTON and WYANDOT (South of Rte. #30) COUNTIES

	Rates	Fringes
IRONWORKER.....	\$ 27.67	17.69

IRON0290-001 06/01/2013

ALLEN (Southern half), AUGLAIZE, BUTLER (North of a line drawn from east to the west county line going through Oxford, Darrrtown & Woodsdale), CLINTON (Excluding south of a line drawn from Blanchester to Lynchburg), GREENE, HIGHLAND (Inside lines drawn from Marshall to Lynchburg & from the northern county line through East Monroe to Marshall), MIAMI, MONTGOMERY, PREBLE & WARREN (Excluding south of a line drawn from Blanchester through Morrow to the west county line) COUNTIES

	Rates	Fringes
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IRONWORKER.....	\$ 26.23	18.63
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IRON0372-001 06/01/2013

ADAMS (Western Part), BROWN, BUTLER (Southern Part), CLERMONT, CLINTON (South of a line drawn from Blanchester to Lynchburg), HIGHLAND (Excluding eastern one-fifth & portion of county inside lines drawn from Marshall to Lynchburg from the northern county line through E. Monroe to Marshall) and WARREN (South of a line drawn from Blanchester through Morrow to the west county line) COUNTIES

	Rates	Fringes
IRONWORKER, REINFORCING		
Beyond 30-mile radius of		
Hamilton County Courthouse..	\$ 26.95	18.00
Up to & including 30-mile		
radius of Hamilton County		
Courthouse.....	\$ 26.70	18.00

IRON0549-003 12/01/2012

BELMONT, GUERNSEY, HARRISON, JEFFERSON, MONROE & MUSKINGUM (Excluding portion west of a line starting at Adams Mill going to Adamsville and going from Adamsville through Blue Rock to the south border)

	Rates	Fringes
IRONWORKER.....	\$ 30.00	16.49

IRON0550-001 06/01/2013

ASHLAND, COSHOCTON (E. of a line beginning at NW Co. line going through Walhonding & Tunnel Hill to the South Co. line), HOLMES, HURON (S. of Old Route #224), RICHLAND, TUSCARAWAS & WAYNE

	Rates	Fringes
Ironworkers:Structural,		
Ornamental and Reinforcing.....	\$ 25.26	17.47

IRON0769-003 06/01/2013

ADAMS (Eastern Half), JACKSON (Southern Half) & SCIOTO

	Rates	Fringes
Ironworkers:		
ZONE 1.....	\$ 31.24	20.38
ZONE 2.....	\$ 31.64	20.38
ZONE 3.....	\$ 33.24	20.38

ZONE 1 - Up to 10 mile radius of Union Hall, Ashland, Ky.,
1643 Greenup Ave.

ZONE 2 - 10 to 50 mile radius of Union Hall, Ashland, Ky.,
1643 Greenup Ave.

ZONE 3 - 50 mile radius & over of Union Hall, Ashland, Ky.,
1643 Greenup Ave.

IRON0787-002 06/01/2013

MORGAN, NOBLE & WASHINGTON

	Rates	Fringes
Ironworker.....	\$ 29.13	19.25

LABO0083-001 06/01/2013

ADAMS, HIGHLAND, JACKSON, PIKE, ROSS, SCIOTO & VINTON

	Rates	Fringes
LABORER		
GROUP 1.....	\$ 31.74	9.70
GROUP 2.....	\$ 31.99	9.70
GROUP 3.....	\$ 32.14	9.70

LABORER CLASSIFICATIONS

GROUP 1 - Building & Construction; Carpenter Tender; Bottom Man; Mason Tender; Mortar Mixer; Pipe Layer; Plasterer Tender; Sheeting & Shoring Man; & Signalman

GROUP 2 - Air & Machine Driver Tool Operator; Asphalt Raker & Smoother; Burning & Cutting Torch; Chain Saw; Form Setter (Street & Highway); Hand Spiker; & Powered Concrete Buggy

GROUP 3 - Gunnite Machine Operator; Gunnite Nozzle Man; Miner (Tunnel & Caisson); Mucker (Tunnel & Caisson); & Powder Man & Blaster

HAZARDOUS & HIGH WORK IN EXCESS OF 25 FEET ABOVE SOLID BASE -
\$.25 PREMIUM

WORKERS HANDLING CREOSOTED OR INJURIOUS CHEMICALLY TREATED MATERIALS - \$.25 PREMIUM

THE ERECTION, ALTERATION, REPAIR OR DEMOLITION OF REINFORCED CONCRETE CHIMNEYS, MASONRY CHIMNEYS, SILOS, & FURNACES RECEIVE THE FOLLOWING RATES:

0 TO 25 FEET - BASE RATE
25 TO 100 FEET - \$1.00 PREMIUM
100 TO 150 FEET - \$1.25 PREMIUM
150 TO 200 FEET - \$1.50 PREMIUM
200 TO 250 FEET - \$1.75 PREMIUM
OVER 250 FEET - \$2.00 PREMIUM

LABO0134-001 05/01/2013

COSHOCTON, HOLMES & TUSCARAWAS

	Rates	Fringes
LABORER		
GROUP 1.....	\$ 21.43	9.70
GROUP 2.....	\$ 21.83	9.70
GROUP 3.....	\$ 22.36	9.70
GROUP 4.....	\$ 22.78	9.70

LABORER CLASSIFICATIONS

GROUP 1 - Building & Construction; Signalman; Flagman;
Carpenter Tender; Finisher Tender; Concrete Handler;
Utility Construction; Guard Rail Erector; & Hazardous Waste
Removal (Level D) Personal Protective Equipment (PPE)

GROUP 2 - Bottom Man; Scaffold Builder; Tunnel; Pipe Layer;
Air & Power Driven Tool; Burner on Demolition Work;
Swinging Scaffold; Mucker; Caisson Worker; Cofferdam
Worker; Powder Man & Dynamite Blaster; Creosote Worker;
Form Setter; Plasterer Tender; Hod Carrier; All Confined
Space Work; Furnaces; Pickel Tubs; Acid Pits & Hazardous
Waste Removal (Level C) Personal Protective Equipment (PPE)

GROUP 3 - Mason Tender; Mortar Mixer; Stonemason Tender; Skid
Steer Loader; & Hazardous Waste Removal (Level B) Personal
Protective Equipment (PPE)

GROUP 4 - Gunnite Operator; & Hazardous Waste Removal (Level
A) Personal Protective Equipment (PPE)

LABO0265-001 07/01/2013

BROWN, CLERMONT & CLINTON

	Rates	Fringes
LABORER		
GROUP 1.....	\$ 21.45	10.90
GROUP 2.....	\$ 21.55	10.90
GROUP 3.....	\$ 21.60	10.90
GROUP 4.....	\$ 21.65	10.90
GROUP 5.....	\$ 21.95	10.90
GROUP 6.....	\$ 22.20	10.90

LABORER CLASSIFICATIONS

GROUP 1 - Building and Common Laborer; Asbestos Removal;
Cement Mason Tender; Hand-Operated Mechanical Mule;
Mechanical Mule; Mechanical Sweeper; Signaler; Flagger;
Wrecking Laborer

GROUP 2 - Bottom Man; Pipe Layer

GROUP 3 - Skid Steer; Burning Torch Operator; Jack Hammer;
Air Spade; Chipping Hammer; Mechanical and Air Tamper
Operator; Mechanical Concrete Buggy; Power Operated
Mechanical Mule; Concrete Pump Hose Man; Vibrator Man;
CERCLA Trained Hazardous Material Removal-Levels A,B,C

GROUP 4 - Bottom Jack Hammer Man
GROUP 5 - Tunnel Laborer
GROUP 6 - Gunnite Nozzle Operator

LABO0265-003 07/01/2013

BROWN, CLERMONT, and CLINTON COUNTIES

	Rates	Fringes
Plasterer tender		
Mixer Pump Operator.....	\$ 21.60	10.90
Tender.....	\$ 21.45	10.90

LABO0265-007 06/01/2013

BROWN, CLERMONT & CLINTON

	Rates	Fringes
Laborer: Mason Tender.....	\$ 21.65	10.90

LABO0329-001 05/01/2013

ALLEN and AUGLAIZE COUNTIES

	Rates	Fringes
LABORER		
GROUP 1.....	\$ 22.71	9.75
GROUP 2.....	\$ 22.86	9.75
GROUP 3.....	\$ 23.01	9.75
GROUP 4.....	\$ 23.21	9.75

LABORER CLASSIFICATION

GROUP 1 - Building; Signal Person; Power Wheelbarrow or Power Buggy; Removal of Asbestos & Hazardous Waste (Levels C & D)

GROUP 2 - Vibrator; Cement Finisher Tender; Cement Raker; Asphalt Raker; Tamper & Packer; Pump Man Under 4" Discharge; Caisson; Cofferdam; Tunnel; Spiker Railroad (By Hand); Pot Tender; Torch Man; Demolition; Machine Driven Tools (Gas, Electric, Air)

GROUP 3 - Plaster Tender; Mortar Mixer; Cylinder, Shaft; Sewer, Water Conduit; Gas, Oil Pipeline, except Mainlines; Sewer Bottom Man; Sewer Pipe Layer; Manhole Builder; Blaster Tender; Wagon Drill Tender; Jack Hammer; Gunnite Operator; Mucker (Tunnel & Caisson) Free Air; Miner (Tunnel & Caisson) Free Air; Sand Blaster; Blaster-Powder Man; Wagon Drill/Operator; & Removal of Toxic & Hazardous Waste (Levels A & B)

GROUP 4 - Mason Tender

LABO0423-001 06/01/2013

FAIRFIELD, FAYETTE, FRANKLIN, HOCKING, LICKING, MADISON &
PICKAWAY

	Rates	Fringes
LABORER		
GROUP 1.....	\$ 22.63	9.70
GROUP 2.....	\$ 22.94	9.70
GROUP 3.....	\$ 23.25	9.70
GROUP 4.....	\$ 23.56	9.70

LABORER CLASSIFICATIONS

GROUP 1 - General laborers; Carpenter tender; Cathodic protection; Cleaning debris; Cleaning of all material; General clean-up including vacuum cleaning, scraping and cleaning of walls and floors; Landscape; Installation and removal of fencing; Sod layers; All portable heaters; Flagman; Loading and unloading of all trucks; Handling and conveying all materials; Washing of all windows; Conveyor belt; Jurisdiction over the use of all water pumps up to and including 3 inch intake

GROUP 2 - Skid steer specialist; Concrete specialist; Brick tender; Stone mason tender; Plaster tender; Mortar mixer and; operator; Cement mason tender; Construction specialist; All scaffold builders; Bush hammering; Jack hammer operator; Air or electrical pneumatic tool operator; Power driven tools; Power buggy operators; Pouring and placement of all concrete; Power wheelbarrow operator; Asphalt and blacktop rakers; Wall wrecker and bar man on demolition; Sand blasting and chipping; Welders on demolitions; Grade checkers; A person on a bucket pouring concrete; Guniting nozzle man; Wagon and churn drill operator; Concrete saw operator; Brush feeders on pulverizers; Pipe layers; Pavers set in sand; Bottom man; Laser gun; Burners; Sand blasting of concrete; Vibrator man; Steward; Signal man; Caisson; Caisson bottom man; Pile drivers; Asbestos and lead abatement laborers; Hazardous waste level B

GROUP 3 - Hazardous waste level C

GROUP 4 - Hazardous waste level D

LABO0480-001 05/01/2013

ERIE, HURON, OTTAWA and SANDUSKY COUNTIES

	Rates	Fringes
LABORER		
GROUP 1.....	\$ 24.26	10.70
GROUP 2.....	\$ 24.46	10.70
GROUP 3.....	\$ 24.86	10.70

LABORER CLASSIFICATIONS

GROUP 1 - Building & Construction Laborer; Signalman;
Flagman; Tool Cribman; Carpenter Tender; Finisher Tender;
Concrete Handler; Utility Construction Laborer; Guard Rail
Erector; Railroad Spur Work; Hazardous Waste Worker Level D

GROUP 2 - Bottom Man; Scaffold Builder; Tunnel Laborer; Pipe
Layer; Air & Power Driven Tool; Burner on Demolition Work;
Swinging Scaffold; Mucker; Caisson Worker; Cofferdam
Worker; Powder Man & Dynamite Blaster; Creosote Worker;
Mortar Mixer; Skid Steer; Concrete Specialist; Form Setter;
Mason Tender; Plasterer Tender; Hod Carrier; Laser Beam
set-up Man; Stonemason Tender; All Wet & Dry Vacuum
Devices; Hazardous Waste Worker Level C

GROUP 3 - Gunnite Operator; Dry Sandblast; Caustic Lime
Worker (wearing apparel required); Hazardous Waste Worker
Level A & B

LABO0500-001 07/01/2010

WOOD COUNTY

	Rates	Fringes
LABORER		
GROUP 1.....	\$ 23.32	10.64
GROUP 2.....	\$ 23.52	10.64
GROUP 3.....	\$ 23.72	10.64
GROUP 4.....	\$ 23.82	10.64
GROUP 5.....	\$ 13.80	10.64
GROUP 6.....	\$ 16.82	10.64

LABORER CLASSIFICATIONS

GROUP 1 - Building & Construction Laborer; Signalperson;
Flagperson; Carpenter Tender; Utility Construction; Guard
Rail Erector; Deep Cleaning; Hazardous Waste (Level A)

GROUP 2 - Finisher Tender; Concrete Handler; Bottom Man;
Scaffold Builder; Tunnel Laborer; Pipelayer; Air & Power
Driven Tools; Burner on Demolition Work; Swinging Scaffold;
Mucker; Caisson Worker; Cofferdam Worker; Powder Man &
Dynamite Blaster; Creosote Worker; Mortar Mixer; Form
Setter; Mason Tender; Plasterer Tender; Hod Carrier; Laser
Beam Set Up Man; Stonemason Tender; Hazardous Waste (Level
B)

GROUP 3 - Gunite Operator; Hazardous Waste (Level C)

GROUP 4 - Hazardous Waste (Level D)

GROUP 5 - Parking & Landscaping

GROUP 6 - Installation of Fencing

FIREBRICK WORK OVER 50 FEET, EXPEDITERS, HOT PAY, BOTTOM MAN
& TOP MAN SHALL BE PAID \$.75 PER HOUR OVER GROUP 1.

LABO0530-001 06/01/2012

GUERNSEY, MUSKINGUM, NOBLE & PERRY

	Rates	Fringes
LABORER		
GROUP 1.....	\$ 22.32	8.15
GROUP 2.....	\$ 22.57	8.15
GROUP 3.....	\$ 22.82	8.15
GROUP 4.....	\$ 24.72	8.15

LABORER CLASSIFICATIONS

GROUP 1 - Building & Construction; Carpenter Tender; Tree Planter; Landscape Tree Trimmer; & Asbestos Removal, Hazardous Waste Removal

GROUP 2 - Air & Machine Driven Tool Operator; Asphalt Plant Aggrement Operator; Asphalt Plant Mixer Man; Car Pusher and Tunnel Laborer; Caulker; Cement Handler; Concrete Puddler (Behind Mixer); Curb Cutter & Setter; Cutting with Burning Torch; Dumpman; Hand Spiker (Railroad); Jackhammer Operator; Mucker (Tunnel & Caisson); Pipelayer; Proportioning Plant Operator; Pump Man; Road Form Setter; Sewer Bottom Man; Sheeting & Shoring Man; Vibrator Operator; & Yarnier & Wrench Man

GROUP 3 - Mason Tender; Mortar Mixer Man; Brick Slinger; Stone Mason Tender; Plaster Tender; Lock Tender; Brick Dropper

GROUP 4 - Powder Man or Blaster; & Toxic/Hazardous Waste

LABO0534-001 06/01/2013

BUTLER & WARREN

	Rates	Fringes
LABORER		
GROUP 1.....	\$ 23.29	9.75
GROUP 2.....	\$ 23.39	9.75
GROUP 3.....	\$ 23.49	9.75
GROUP 4.....	\$ 23.62	9.75
GROUP 5.....	\$ 23.87	9.75
GROUP 6.....	\$ 23.64	9.75

LABORER CLASSIFICATIONS

GROUP 1 - Building & Common Laborer; All General Laborers Including Landscaping; Rough Rider; All Pumps 4" or Smaller; Small Pump Portable Generators - Bobcat to Cleanup; Firewatch & Monitor (Safety Person)

GROUP 2 - Asphalt Raker; Tamper; Smoother; Hand Air Pump; Hand Air Tamper Chisel; Power Tamper; Switch; Assemblies; Handling & Laying Precast Concrete Floor & Deck

GROUP 3 - Concrete Specialist; Skid Steer (with attachments to perform laborers' duties); Jack Hammer and Concrete

Busterman; Barco Tamper Man; Power Georgia Buggy Man; Power Sweeper Man; Vibrator; Concrete Saw Man; Rail Spikers; Acetylene Burner Pipe Layers; Bos'N or Cradleman; Bottom Man; Chipping Hammer; Grade Checker; Form Cleanout and Blowout Man; Red Concrete Coloring Man (Electrical Safety)

GROUP 4 - Mason Tender; Mortar Mixer & Scaffold Builder

GROUP 5 - Forklift for Mason; All Work involving Refractory Materials including Demolition; Asbestos Removal & Hazardous Waste Removal (Handling, control, removal, abatement, encapsulation or disposal of asbestos & hazardous waste)

GROUP 6 - Gunnite Man; Sand Blaster; Concrete & Grout Pump & Hose Man; Blast Trac; Miner & Mucker, Free Air; Powderman or Blaster; Mortar or Gypsum Machineman; Scuba Diver

LAB00574-001 05/01/2013

	Rates	Fringes
LABORER		
DELAWARE COUNTY		
GROUP 1.....	\$ 22.48	9.70
GROUP 2.....	\$ 22.79	9.70
GROUP 3.....	\$ 23.10	9.70
GROUP 4.....	\$ 23.41	9.70
HANCOCK, SENECA & WYANDOT COUNTIES		
GROUP 1.....	\$ 24.05	9.70
GROUP 2.....	\$ 24.35	9.70
GROUP 3.....	\$ 24.55	9.70
GROUP 4.....	\$ 24.75	9.70

LABORER CLASSIFICATIONS

GROUP 1: Building & Construction; Signalman; Flagman; Carpenter Tender; Finisher Tender; Concrete Handler; Utility Construction; Guard Rail Erector; Fence Installer; Caulker; & Hazardous Waste (Level A)

GROUP 2: Bottom Man; Scaffold; Mucker; Caisson Worker; Powder Man; Dynamite Blaster; Creosote Worker; Mortar Mixer; Form Setter; Plasterer Tender; Hod Carrier; Stonemason Tender & Hazardous Waste (Level B)

GROUP 3: Mason Tender; Guniting Operator & Hazardous Waste (Level C)

GROUP 4: Hazardous Waste (Level D)

LAB00639-001 06/01/2013

MONROE, MORGAN & WASHINGTON

	Rates	Fringes
LABORER		

GROUP 1.....	\$ 28.22	9.70
GROUP 2.....	\$ 28.22	9.70

LABORER CLASSIFICATIONS

GROUP 1 - Asphalt Plant Agfremeter; Asphalt Plant Miner Man; Brick Slinger; Building & Construction; Car Pusher & Tunnel Laborer; Carpenter Tender; Cement Handler; Concrete Puddler Behind Mixer; Concrete Smoother; Drum Fireperson; Dump Man Batch Truck; Flagperson; Landscape Planter; Proportioning Plant Operator; Rammer Man; & Spreader Box Man

GROUP 2 - Air, Gas or Machine Driven Tool; Asphalt Raker; Tamper, Forker, Shoveler or Smoother; Caulker, Yarner & Wrenchman; Cement Mason Tender; Curb Setter & Cutter; Form Setter; Grade Checker; Jackhammer Operator; Mason Tender; Mortar Mixer; Mucker (Tunnel & Caisson); Pipelayer; Pump Man (4" & Under); Sewer Bottom Man; Sheeting & Shoring Man; Stonemason Tender; Vibrator Operator; Plasterer Tender; Hand Spiker (Railroad); Concrete & Georgia Buggy Pusher; Deep Trench Work (Over 6'); Cutting & Burning Torch; Hydro-Water Jet Operator; Brick Dropper; Lock Tender; Miner (Tunnel & Caisson); Powderman or Blaster; & Signalperson

LABO0809-001 07/01/2013

HARRISON & JEFFERSON

	Rates	Fringes
LABORER.....	\$ 22.22	10.70

Asbestos Work; Hazardous Waste Work; Instrument & Laser; and Lead Based Paint Removal - Additional \$.50 per hour

Hot Pay - Additional \$1.00 per hour when working with other crafts receiving hot pay

LABO1015-001 05/01/2013

WAYNE

	Rates	Fringes
LABORER		
GROUP 1.....	\$ 22.62	9.70
GROUP 2.....	\$ 23.02	9.70
GROUP 3.....	\$ 23.37	9.70
GROUP 4.....	\$ 23.32	9.70

LABORER CLASSIFICATIONS

GROUP 1 - Building & Construction; Signalman; Flagman; Carpenter Tender; Finisher Tender; Concrete Handler; Utility Construction; Guard Rail Erector; & Hazardous Waste Removal (Level D) Personal Protective Equipment (PPE)

GROUP 2 - Bottom Man; Scaffold Builder; Tunnel; Pipe Layer; Air & Power Driven Tool; Burner on Demolition Work;

Swinging Scaffold; Mucker; Caisson Worker; Cofferdam Worker; Powder Man & Dynamite Blaster; Creosote Worker; Form Setter; Plasterer Tender; Hod Carrier; All Confined Space Work; Furnaces; Pickel Tubs; Acid Pits & Hazardous Waste Removal (Level C) Personal Protective Equipment (PPE)

GROUP 3 - Mason Tender; Mortar Mixer; Stonemason Tender; Skid, Steer Loader; & Hazardous Waste Removal (Level B) Personal Protective Equipment (PPE)

GROUP 4 - Gunnite Operator; & Hazardous Waste Removal (Level A) Personal Protective Equipment (PPE)

LABO1149-002 12/01/2012

BELMONT COUNTY

	Rates	Fringes
LABORER		
GROUP 1.....	\$ 20.72	13.95
GROUP 2.....	\$ 20.72	13.95
GROUP 3.....	\$ 21.72	13.95

LABORER CLASSIFICATIONS

GROUP 1: Laborers, Carpenter tender, Flagmen, Water boy, Demolition worker, Tool room attendants, Fire watch, Watchmen, and Landscape laborer.

GROUP 2: Powderman on concrete pump hose, Powderman tender, Semi-skilled laborer, Scaffold builders, Chainmen & Rodmen, Grade checker, Signal man, Brick masons tenders, Plasterers tenders, Cement masons tenders, Stone masons tenders, Lathers tenders, Tile setters tenders, Mortar mixers, Jackhammer operators, Vibrater operators, Tamper Operator, Pavement buster operators, Chipping and peening hammer operators, Air siphon and air pump operators, Riprap finishers, Concrete saw operators, Concrete technicians, Power saw operators, Chain saw operators, Motorized buggy operators, Pipe layers tenders, Drill operators tenders, Sheeters and shorers, Post hole diggers operators, Asphalt rakers, Lance and/or water blaster operators, Blacksmith tenders, Batch house scale operators, Workmen working with acid mortar, Mastic asphalt and acid brick, Workmen working in acid and with cresote, Nozzlemen for gunnite or sandblasting, Ride or walk roller tampers, Deep ditch and manholes vertical 6 ft. or more, and Scaffolding work over 50 ft. (inside or out).

GROUP 3: Blacksmith, Powderman, Air track operator, Pipe layer (including laser beam set-up), Burner, and Lead Based Paint Removal Laborer.

LABO1216-001 05/01/2013

ASHLAND, CRAWFORD, KNOX, MORROW and RICHLAND COUNTIES

Rates	Fringes
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LABORER

GROUP 1.....	\$ 24.67	9.70
GROUP 2.....	\$ 24.87	9.70
GROUP 3.....	\$ 25.17	9.70

LABORER CLASSIFICATIONS

GROUP 1 - Building & Construction Laborer; Signalman; Flagman; Tool Cribman; Carpenter Tender; Finisher Tender; Concrete Handler; Utility Construction Laborer; Guard Rail Erector; Railroad Spur Work; Hazardous Waste Worker Level D

GROUP 2 - Bottom Man; Scaffold Builder; Tunnel Laborer; Pipe Layer; Air & Power Driven Tool; Burner on Demolition Work; Swinging Scaffold; Mucker; Caisson Worker; Cofferdam Worker; Powder Man & Dynamite Blaster; Creosote Worker; Mortar Mixer; Skid Steer; Concrete Specialist; Form Setter; Mason Tender; Plasterer Tender; Hod Carrier; Laser Beam set-up Man; Stonemason Tender; All Wet & Dry Vacuum Devices; Hazardous Waste Worker Level C

GROUP 3 - Gunnite Operator; Dry Sandblast; Caustic Lime Worker (wearing apparel required); Hazardous Waste Worker Level A & B

LABO1410-001 06/01/2013

GREENE, MIAMI, MONTGOMERY & PREBLE

	Rates	Fringes
LABORER		
GROUP 1.....	\$ 21.75	9.70
GROUP 2.....	\$ 22.35	9.70
GROUP 3.....	\$ 22.85	9.70

LABORER CLASSIFICATIONS

GROUP 1 - Building & Construction Laborer; Railroad Laborers, Asbestos and Hazardous Waste (Levels A, B, C, & D); Concrete Crew, Form Setter, Pipelayer; Bottom Man; Burner (Cutting Torch); All Machine & Power Driven Tools; Sandblaster; Yardman - Landscaping; Sewer Jet; Waterperson; Unloading of Furniture & Fixtures; Final Clean-Up; Signal Men

GROUP 2 - Mason Tender for Bricklayers; Flexicore; Firebrick Tender (Blast Furnaces, Soaking Pits, Stoves & Stacks); Plasterer Tenders

GROUP 3 - Tender Operator

PAIN0006-011 02/01/2013

ALLEN, AUGLAIZE, HANCOCK & WYANDOT (W. half)

Rates	Fringes
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GLAZIER.....\$ 19.90 8.68

PAIN0007-001 07/01/2013

OTTAWA (Excluding Allen, Bay, Bono, Catawba Island, Clay
Center, Curtice, Danbury, Eagle Beach, Elliston, Elmore, Erie,
Fishback, Gem Beach & Genova) & WOOD

	Rates	Fringes
PAINTER (NEW COMMERCIAL BUILDING WORK)		
GROUP 1.....	\$ 23.92	14.48
GROUP 2.....	\$ 24.17	14.48
GROUP 3.....	\$ 24.42	14.48
GROUP 4.....	\$ 24.52	14.48
GROUP 5.....	\$ 24.62	14.48
GROUP 6.....	\$ 24.67	14.48
GROUP 7.....	\$ 24.92	14.48
GROUP 8.....	\$ 25.67	14.48

REPAINT IS 90% OF JR

PAINTER CLASSIFICATIONS

GROUP 1 - Brush; Paperhanger; Drywall Taper & Finisher; Spray
& Sandblasting Pot Tender

GROUP 2 - All Surfaces 30 ft. or over where material is
applied to or labor performed on above ground level
(exterior), floor level (interior)

GROUP 3 - Swing Stage & Chair

GROUP 4 - Lead Paint Abatement

GROUP 5 - All Methods of Spray

GROUP 6 - Epoxy (excluding water based) for Solvent Based,
Catalyzed Materials of Two or More Component Materials, to
Include Solvent Based Conversion Varnish

GROUP 7 - Spray Solvent Based Material; Sand & Abrasive
Blasting

GROUP 8 - Epoxy Spray (excluding water based)

PAIN0012-007 05/01/2013

BUTLER

	Rates	Fringes
PAINTER		
GROUP 1.....	\$ 23.39	8.36
GROUP 2.....	\$ 23.89	8.36
GROUP 3.....	\$ 24.14	8.36
GROUP 4.....	\$ 24.39	8.36

PAINTERS CLASSIFICATIONS

GROUP 1: Brush & Roller; Paperhanger; & Drywall Taping

GROUP 2: Spray

GROUP 3: Sandblasting; & Waterblasting

GROUP 4: Lead Abatement

PAIN0012-009 05/01/2013

BROWN, CLERMONT, CLINTON & WARREN

	Rates	Fringes
PAINTER		
GROUP 1.....	\$ 23.39	8.36
GROUP 2.....	\$ 23.89	8.36
GROUP 3.....	\$ 24.14	8.36
GROUP 4.....	\$ 24.39	8.36

PAINTER CLASSIFICATIONS

GROUP 1: Brush; Roller; Paperhanger & Drywall Taping

GROUP 2: Spray

GROUP 3: Sandblasting; Waterblasting

GROUP 4: Lead Abatement

PAIN0012-013 11/01/2013

DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN, MADISON, PICKAWAY & ROSS

	Rates	Fringes
PAINTER		
Brush; Paperhanger;		
Roller; & Wall Washing.....	\$ 24.45	10.56
Drywall Sander.....	\$ 24.20	10.56
Drywall Taper & Finisher....	\$ 24.85	10.56
Sandblasting;		
Steamcleaning;		
Waterblasting (3500 PSI or		
Over)& Hazardous Work.....	\$ 25.15	10.56
Spray.....	\$ 24.95	10.56
Structural Steel & Swing		
Stage.....	\$ 24.75	10.56

PAIN0053-002 12/01/2009

MONROE, NOBLE & WASHINGTON

	Rates	Fringes
GLAZIER.....	\$ 25.99	8.30

PAIN0091-008 12/01/2011

BELMONT, GUERNSEY, HARRISON, HOCKING, MORGAN, and VINTON
COUNTIES

	Rates	Fringes
GLAZIER.....	\$ 26.23	11.39

PAIN0091-009 12/01/2008

JEFFERSON

	Rates	Fringes
GLAZIER.....	\$ 24.60	9.00

PAIN0093-002 12/01/2013

GUERNSEY, HOCKING, MONROE, MORGAN, NOBLE and WASHINGTON COUNTIES

	Rates	Fringes
PAINTER (Drywall Finishers, Wall Covers, Dryvit & Stucco)....	\$ 23.58	15.10

PAIN0181-002 05/01/2013

ERIE (Excluding NW tip to Route #4), & HURON (NE part)

	Rates	Fringes
GLAZIER.....	\$ 30.49	13.43

PAIN0249-001 05/01/2013

GREENE, MIAMI, MONTGOMERY & PREBLE

	Rates	Fringes
PAINTER		
GROUP 1 - Brush; Roller.....	\$ 22.89	8.98
GROUP 2 - Spackling & Drywall Finishing; Vinyl - Paper Wallcovering.....	\$ 22.89	8.98
GROUP 3 - Swing & Scaffold; Structural Steel; High Tension Electrical Equipment; Hot Pipes.....	\$ 22.70	8.98
GROUP 4 - Spray; Sandblasting; Steam Cleaning; & Lead Paint Abatement.....	\$ 23.29	8.98
GROUP 5 - Steeplejack Work - Church Steeples, Smoke Stacks & Hazardous Work.....	\$ 23.84	8.98
GROUP 6 - Coal Tar.....	\$ 24.39	8.98

PAIN0356-001 09/01/2009

KNOX, LICKING, MUSKINGUM, and PERRY

	Rates	Fringes
PAINTER		
Brush; Roller;		
Paperhanger; Wall Washer;		
Drywall Sander; Drywall		
Taper; and Finisher.....	\$ 20.93	7.25
Sandblasting; Steam		
Cleaning; Waterblasting;		
and Hazardous Work.....	\$ 25.82	7.25
Spray.....	\$ 21.40	7.25
Structural Steel and Swing		
Stage.....	\$ 25.42	7.25
Tanks; Stacks; and Towers...	\$ 28.63	7.25

PAIN0372-001 11/01/2011

DELAWARE, FAIRFIELD, FAYETTE (West of State Rte. #41),
FRANKLIN, JACKSON, LICKING, MADISON, MUSKINGUM, PERRY,
PICKAWAY, PIKE, and ROSS

	Rates	Fringes
GLAZIER.....	\$ 22.60	11.02+a

FOOTNOTE: a. 1 Paid Holiday: Labor Day.

* PAIN0387-001 11/01/2013

ADAMS, BROWN, BUTLER, CLERMONT, CLINTON, FAYETTE (Eastern
part), GREENE, HIGHLAND, MIAMI, MONTGOMERY, PREBLE, and WARREN
COUNTIES

	Rates	Fringes
GLAZIER.....	\$ 24.65	12.20

PAIN0406-003 06/01/2007

ASHLAND, CRAWFORD, HURON (S. half), KNOX, MORROW, RICHLAND,
AND WYANDOT (E. half)

	Rates	Fringes
GLAZIER.....	\$ 22.82	8.30

PAIN0438-001 12/01/2013

BELMONT, HARRISON and JEFFERSON COUNTIES

	Rates	Fringes
PAINTER (Drywall Finisher, Wall Covers, Dryvit & Stucco)....	\$ 23.77	14.85

PAIN0555-001 06/01/2013

ADAMS, HIGHLAND, JACKSON, PIKE & SCIOTO

	Rates	Fringes
PAINTER		
GROUP 1.....	\$ 24.62	13.67
GROUP 2.....	\$ 25.93	13.67

PAINTER CLASSIFICATIONS

GROUP 1 - Brush; Roller; Taping; & Wallcovering

GROUP 2 - Floor Sanding; Power Tools; Sandblasting; Spray;
Steam Cleaning; Pressure Washing; Lead Abatement; Hazardous
Waste, Toxic Materials; Epoxy & Two Component Materials

PAIN0603-001 06/01/2012

COSHOCTON, HOLMES, TUSCARAWAS & WAYNE

	Rates	Fringes
PAINTER		
Brush & Roller.....	\$ 19.70	11.00
Drywall Taper With Machines.	\$ 20.45	11.00
Drywall Taper.....	\$ 20.10	11.00
Paperhanger.....	\$ 19.80	11.00
Spray.....	\$ 20.20	11.00

Wipe Down Man & Taper, Swing Stage, Ladder Jack & Window Jack
- Plus \$.30 per hour

Epoxy Application: Class 3 - Plus \$.50 per hour; Class 4 -
Plus \$1.00 per hour

Drywall Finisher - When using journeyman's own stilts or
automatic tools: Plus \$.80 per hour

PAIN0639-001 05/01/2011

	Rates	Fringes
Sign Painter & Erector.....	\$ 20.61	3.50+a+b+c

FOOTNOTES: a. 7 Paid Holidays: New Year's Day; Memorial Day;
July 4th; Labor Day; Thanksgiving Day; Christmas Day & 1
Floating Day

b. Vacation Pay: After 1 year's service - 5 days' paid
vacation; After 2, but less than 10 years' service - 10
days' paid vacation; After 10, but less than 20 years'
service - 15 days' paid vacation; After 20 years' service -
20 days' paid vacation

c. Funeral leave up to 3 days maximum paid leave for death of
mother, father, brother, sister, spouse, child,
mother-in-law, father-in-law, grandparent and inlaw
provided employee attends funeral

PAIN0788-001 06/01/2011

ASHLAND, CRAWFORD, ERIE, HANCOCK, HURON, MORROW, OTTAWA (Allen, Bay, Bono, Catawba Island, Clay Center, Curtice, Danbury, Eagle Beach, Elliston, Elmore, Erie, Fishback, Gem Beach & Genoa), RICHLAND, SANDUSKY, SENECA & WYANDOT

	Rates	Fringes
PAINTER		
Brush & Roller.....	\$ 22.25	10.56
Drywall.....	\$ 23.25	10.56
Paperhanging.....	\$ 22.65	10.56
Structural Steel.....	\$ 23.85	10.56

WINTER REPAINT: Between December 1 to March 31 - 90% JR

\$.50 PER HOUR SHALL BE ADDED TO THE RATE OF PAY FOR THE CLASSIFICATION OF WORK:

While working swingstage, boatswain chair, needle beam and horizontal cable.

While operating sprayguns, sandblasting, cobblasting, high pressure waterblasting (4000 psi), and for automatic taping and finishing tools for drywall.

\$1.00 PER HOUR SHALL BE ADDED TO THE RATE OF PAY FOR THE CLASSIFICATION OF WORK:

For the application of catalized epoxy, including latex epoxy that is deemed hazardous, lead abatement, or for work or material where special precautions beyond normal work duties must be taken.

For working on stacks, tanks, and towers over 40 feet in height.

PAIN0813-004 12/01/2008

VINTON

	Rates	Fringes
PAINTER (Painter, Drywall Finisher, Wall Covers & Dryvit and Stucco).....	\$ 22.68	10.00

PAIN0948-001 08/01/2012

ERIE (NW tip of county to Route #4), OTTAWA, SANDUSKY, SENECA and WOOD COUNTIES

	Rates	Fringes
GLAZIER.....	\$ 26.58	12.96

PAIN1020-001 04/01/2013

ALLEN and AUGLAIZE COUNTIES

	Rates	Fringes
PAINTER		
Brush, Roller, & Spray (of waterbourne products).....	\$ 20.20	11.08
Drywall Finishing & Taping..	\$ 21.75	11.08
Lead Abatement.....	\$ 24.60	11.08
Sandblasting, Pressure Cleaning, & Spray (of alkyd, epoxys and petroleum based products)...	\$ 20.95	11.08
Wallcoverings, Swing Stage, Chair, Spiders, & Cherry Pickers.....	\$ 20.45	11.08

All Surfaces 40 ft. or over where material is applied to or
labor performed on, above ground level (exterior), floor
level (interior) - \$.50 premium

Applying Coal Tar Products - \$1.00 premium

PAIN1162-001 05/01/2013

COSHOCTON, HOLMES, TUSCARAWAS & WAYNE

	Rates	Fringes
GLAZIER.....	\$ 23.16	11.93

PAIN1195-004 12/01/2009

SCIOTO

	Rates	Fringes
GLAZIER.....	\$ 28.50	5.70

PLAS0039-001 07/01/2010

BELMONT, HARRISON and JEFFERSON COUNTIES

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...	\$ 25.98	10.20
PLASTERER.....	\$ 25.98	10.02

PLAS0132-001 06/01/2013

CLINTON, GREENE, MIAMI, MONTGOMERY & PREBLE

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...	\$ 21.51	14.57

PLAS0132-003 05/01/2013

CLINTON, GREENE, MIAMI, MONTGOMERY and PREBLE COUNTIES

	Rates	Fringes
PLASTERER.....	\$ 22.75	13.30

PLAS0132-005 06/01/2013		

BROWN, BUTLER, CLERMONT, HIGHLAND & WARREN

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...	\$ 22.00	11.65

PLAS0132-008 06/01/2013		

ASHLAND, CRAWFORD, DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN,
HOCKING, KNOX, LICKING, MADISON, MONROE, MORGAN, MORROW,
MUSKINGUM, NOBLE, PERRY, PICKAWAY, RICHLAND, ROSS, WASHINGTON
and WYANDOT (Excluding Tymochtee, Crawford, Ridge & Richland
Townships) COUNTIES

	Rates	Fringes
PLASTERER.....	\$ 23.10	12.19

PLAS0132-009 06/01/2013		

ADAMS, JACKSON, PIKE and SCIOTO COUNTIES

	Rates	Fringes
Cement Mason/Plasterer.....	\$ 29.09	17.99

PLAS0132-010 06/01/2013		

ASHLAND, CRAWFORD, DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN,
HOCKING, KNOX, LICKING, MADISON, MONROE, MORGAN, MORROW,
MUSKINGUM, NOBLE, PERRY, PICKAWAY, RICHLAND, ROSS, WASHINGTON
and WYANDOT (Excluding the townships of Tymochtee, Crawford,
Ridge & Richland) COUNTIES

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...	\$ 23.98	13.20

PLAS0132-016 06/01/2013		

BROWN, BUTLER, CLEMONT, HIGHLAND and WARREN COUNTIES

	Rates	Fringes
PLASTERER.....	\$ 22.00	11.65

PLAS0886-001 08/01/2011		

HANCOCK and WOOD COUNTIES

Rates	Fringes
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CEMENT MASON/CONCRETE FINISHER...	\$ 27.47	13.70
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PLAS0886-003 08/01/2011

ALLEN and AUGLAIZE COUNTIES

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...	\$ 27.47	13.70

PLAS0886-004 08/01/2011

ALLEN, AUGLAIZE, HANCOCK and WOOD (Excluding Perry & Bloom Townships) COUNTIES

	Rates	Fringes
Drywall.....	\$ 25.46	13.70
PLASTERER.....	\$ 27.47	13.70

PLUM0042-001 07/01/2013

ASHLAND, CRAWFORD, ERIE, HURON, KNOX, MORROW, RICHLAND & WYANDOT

	Rates	Fringes
Plumber, Pipefitter, Steamfitter.....	\$ 30.40	18.87

PLUM0050-001 09/01/2013

HANCOCK, OTTAWA, SANDUSKY, SENECA & WOOD

	Rates	Fringes
Plumber, Pipefitter, Steamfitter.....	\$ 36.65	22.54

PLUM0083-001 07/01/2013

BELMONT & MONROE (North of Rte. #78)

	Rates	Fringes
Plumber and Steamfitter.....	\$ 25.42	27.83

PLUM0094-001 05/01/2013

WAYNE COUNTY

	Rates	Fringes
PLUMBER/PIPEFITTER.....	\$ 32.08	16.04

PLUM0162-001 06/01/2013

CLINTON, FAYETTE, GREENE, MIAMI, MONTGOMERY & PREBLE

	Rates	Fringes
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Plumber, Pipefitter, Steamfitter.....	\$ 27.95	19.57
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PLUM0168-001 06/01/2013

MONROE (South of Rte. #78), MORGAN (South of Rte. #78) &
WASHINGTON

	Rates	Fringes
PLUMBER/PIPEFITTER.....	\$ 33.83	18.47

PLUM0189-001 06/01/2013

DELAWARE, FAIRFIELD, FRANKLIN, HOCKING, LICKING, MADISON,
PERRY, PICKAWAY & ROSS

	Rates	Fringes
Plumber, Pipefitter, Steamfitter.....	\$ 34.08	20.06

PLUM0392-001 06/01/2013

BROWN, BUTLER, CLERMONT & WARREN

	Rates	Fringes
PLUMBER/PIPEFITTER.....	\$ 29.60	17.09

PLUM0495-001 06/01/2013

COSHOCTON, GUERNSEY, HARRISON, HOLMES, JEFFERSON, MORGAN (South
to State Rte. #78 & from McConnelssville west on State Rte. #37
to the Perry County Line), MUSKINGUM, NOBLE, and TUSCARAWAS
COUNTIES

	Rates	Fringes
Plumber, Pipefitter, Steamfitter.....	\$ 34.82	19.36

PLUM0577-001 06/01/2013

ADAMS, HIGHLAND, JACKSON, PIKE, SCIOTO & VINTON

	Rates	Fringes
Plumber, Pipefitter, Steamfitter Manufacturing Plants, Testing Facilities, Enrichment Plants, Compressor Stations, Power Generating Plants, Coke Plants, Co-Generation Plants, Chemical Plants,		

Incinerators & Steel Mills..\$ 30.30	21.48
All Other Work.....\$ 26.05	21.13

 PLUM0776-001 07/01/2013

ALLEN and AUGLAIZE COUNTIES

	Rates	Fringes
Plumber, Pipefitter, Steamfitter.....	\$ 32.20	20.24

 ROOF0042-001 08/01/2012

BROWN, BUTLER, CLERMONT and WARREN COUNTIES

	Rates	Fringes
ROOFER		
Pitch.....	\$ 27.31	12.30
Roofer.....	\$ 26.31	12.30

 ROOF0044-001 05/01/2012

ERIE, OTTAWA & SANDUSKY

	Rates	Fringes
ROOFER.....	\$ 28.76	16.02

 ROOF0075-001 05/01/2011

ALLEN, CLINTON, GREENE, HIGHLAND, MIAMI, MONTGOMERY & PREBLE

	Rates	Fringes
ROOFER		
Composition, Damp & Waterproof.....	\$ 22.63	12.76
Slate, Tile & Asbestos.....	\$ 22.85	12.76

 ROOF0086-001 09/01/2011

AUGLAIZE, DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN, HOCKING,
 KNOX, LICKING, MADISON, MORROW, PERRY, PICKAWAY, ROSS & WYANDOT

	Rates	Fringes
ROOFER.....	\$ 24.40	12.26

 ROOF0088-001 06/01/2012

ASHLAND, COSHOCTON, CRAWFORD, HOLMES, HURON, RICHLAND, SENECA,
 TUSCARAWAS, and WAYNE COUNTIES

	Rates	Fringes
ROOFER.....	\$ 23.70	12.94

ROOF0134-001 07/01/2011

HANCOCK & WOOD

	Rates	Fringes
ROOFER.....	\$ 23.85	15.78

ROOF0185-001 06/01/2011

ADAMS, JACKSON, PIKE, SCIOTO & VINTON

	Rates	Fringes
ROOFER.....	\$ 27.00	11.58

ROOF0188-001 07/01/2012

BELMONT, HARRISON, JEFFERSON & MONROE

	Rates	Fringes
ROOFER		
Coal Tar Pitch & Waterproofing.....	\$ 26.57	12.21
Roofer.....	\$ 26.32	12.21

ROOF0242-001 06/01/2010

GUERNSEY, MORGAN, MUSKINGUM, NOBLE, and WASHINGTON COUNTIES

	Rates	Fringes
ROOFER.....	\$ 24.31	10.10

SFOH0669-001 07/01/2013

ADAMS, ALLEN, ASHLAND, AUGLAIZE, BELMONT, BROWN, BUTLER, CLERMONT, CLINTON, COSHOCTON, CRAWFORD, DELAWARE, ERIE, FAIRFIELD, FAYETTE, FRANKLIN, GREENE, GUERNSEY, HANCOCK, HARRISON, HIGHLAND, HOCKING, HOLMES, HURON, JACKSON, JEFFERSON, KNOX, LICKING, MADISON, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, OTTAWA, PERRY, PICKAWAY, PIKE, PREBLE, RICHLAND, ROSS, SANDUSKY, SCIOTO, SENECA, TUSCARAWAS, VINTON, WARREN, WASHINGTON, WAYNE, WOOD and WYANDOT COUNTIES

	Rates	Fringes
SPRINKLER FITTER.....	\$ 32.52	19.09

SHEE0024-001 01/01/2010

ALLEN, AUGLAIZE, BUTLER, CLINTON, GREENE, MIAMI, MONTGOMERY, PREBLE, WARREN, and WYANDOT COUNTIES

	Rates	Fringes
Sheet metal worker.....	\$ 26.41	16.82

SHEE0024-002 06/01/2012

BROWN, CLERMONT & HIGHLAND

	Rates	Fringes
Sheet metal worker.....	\$ 26.86	17.08

SHEE0024-007 01/01/2010

ADAMS, DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN, GUERNSEY,
HOCKING, JACKSON, KNOX, LICKING, MADISON, MORGAN, MORROW,
MUSKINGUM, NOBLE, PERRY, PICKAWAY, PIKE, ROSS, SCIOTO, and
VINTON COUNTIES

	Rates	Fringes
Sheet metal worker.....	\$ 25.50	17.60

SHEE0033-004 08/01/2013

ASHLAND, COSHOCTON, CRAWFORD, HOLMES, RICHLAND, TUSCARAWAS and
WAYNE COUNTIES

	Rates	Fringes
Sheet metal worker.....	\$ 29.51	21.07

* SHEE0033-006 06/01/2013

ERIE, HURON & SANDUSKY

	Rates	Fringes
Sheet metal worker.....	\$ 28.57	18.58

* SHEE0033-009 01/01/2014

WASHINGTON COUNTY

	Rates	Fringes
Sheet metal worker.....	\$ 28.89	20.84

* SHEE0033-011 01/01/2014

BELMONT, HARRISON, JEFFERSON & MONROE

	Rates	Fringes
Sheet metal worker.....	\$ 29.08	19.99

SHEE0033-021 07/01/2013

HANCOCK, OTTAWA, SENECA, and WOOD COUNTIES

	Rates	Fringes
SHEET METAL WORKER.....	\$ 31.43	24.01

TEAM0020-001 05/01/2008

ERIE, HANCOCK (From the southern boundary of the city of Findlay to the northern boundary of Hancock County), HURON, OTTAWA, SANDUSKY, SENECA & WOOD COUNTIES

	Rates	Fringes
TRUCK DRIVER		
GROUP 1.....	\$ 24.69	10.01
GROUP 2.....	\$ 26.33	10.01

GROUP 1 - Pickup; Straight; Single Axle; Tandem Axle

GROUP 2 - Heavy Duty; Five Axle or Over; Winch; Carry-Alls; Low Boy; Articulating Dump

TEAM0092-003 07/01/2013

COSHOCTON, FAIRFIELD, GUERNSEY, HARRISON, HOCKING, JEFFERSON (South to Short Creek), LICKING, MORGAN, MUSKINGUM, NOBLE & PERRY COUNTIES

	Rates	Fringes
Truck drivers:		
GROUP 1.....	\$ 24.60	12.81
GROUP 2.....	\$ 24.64	12.81
GROUP 3.....	\$ 24.68	12.81
GROUP 4.....	\$ 25.38	12.81
GROUP 5.....	\$ 25.27	12.81
GROUP 6.....	\$ 25.50	12.81

CLASSIFICATIONS

GROUP 1 - End Dump; Dumpster; Turnarocker; Ross Carrier; Athry Wagon; Greaser; Tiremen; Articulated Dump

GROUP 2 - Flatboy Material Tuck, Dump & and Semi-Dump Truck

GROUP 3 - Tank Trucks (straight & semi)

GROUP 4 - Mechanic

GROUP 5 - Lowboy Trailer; Winch Truck; A-Frame; Forktruck; Distributor Truck (front & back end) & Truck Crane

GROUP 6 - Semi Trailer & Tractor Trailer

TEAM0175-001 10/01/2012

WASHINGTON

	Rates	Fringes
TRUCK DRIVER		

GROUP 1.....	\$ 24.87	14.64
GROUP 2.....	\$ 24.98	14.64
GROUP 3.....	\$ 25.13	14.64
GROUP 4.....	\$ 25.28	14.64
GROUP 5.....	\$ 25.54	14.64
GROUP 6.....	\$ 25.64	14.64
GROUP 7.....	\$ 25.80	14.64

TRUCK DRIVER CLASSIFICATIONS

GROUP 1 - Pick-Up; Panel; John Deere Gators or Similar Equipment

GROUP 2 - Flat Body Material (Straight Jobs); Dump (Up to 5 cu. yds.); Greaser; Tank (Straight)

GROUP 3 - Dump (5 cu. yds. & over); Semi-Dump; Semi-Trailer (whether Flat, Rack or Pole and hauled or pushed by truck or tractor); Agitator or Mixed (Up to 5 cu. yds.); Tank (Semi); & Monorail

GROUP 4 - Low Boy Trailer; Winch; Fork; Distributor (Front & Back End); Truck Crane; Agitator or Mixer (5 cu. yds. & over); Hydraulic Tail Gate; & Farm Type Tractor

GROUP 5 - Euclid; Dumpster; Turnarocker; Ross Carrier; Athey Wagon or Similar Equipment; A-Frame; Hydrolift; & Dual Purpose

GROUP 6 - Mechanic

GROUP 7 - Master Mechanic (3 or more mechanics employed)

TEAM0697-001 07/01/2012

BELMONT, JEFFERSON (North to Short Creek) & MONROE

	Rates	Fringes
TRUCK DRIVER		
GROUP 1 - Pickup.....	\$ 23.31	13.97
GROUP 2 - Greaser.....	\$ 23.32	13.97
GROUP 3 - Flatbed Material; Dump & Semi-Dump..	\$ 23.36	13.97
GROUP 4 - Tank (straight & semi).....	\$ 23.39	13.97
GROUP 5 - Semi-Tractor Trailer.....	\$ 23.41	13.97
GROUP 6 - Pole-Trailer.....	\$ 23.51	13.97
GROUP 7 - Agitator & Mixer (Up to 5 cu. yds.)....	\$ 23.59	13.97
GROUP 8 - Euclid; Dumpster; Turnarocker; Ross Carrier; & Athey Wagon.	\$ 23.64	13.97
GROUP 9 - Agitator & Mixer (Over 5 cu. yds.)....	\$ 23.67	13.97
GROUP 10 - Lowboy Trailer; Winch; Fork & Distributor (Front & Back End); & Truck Crane.....	\$ 23.94	13.97

GROUP 11 - A-Frame.....	\$ 24.01	13.97
Group 12 - Mechanic.....	\$ 24.04	13.97

TEAM0908-001 05/16/2013

ALLEN, AUGLAIZE, and HANCOCK (From the southern boundary of the city of Findlay to the southern boundary of Hancock County) COUNTIES

	Rates	Fringes
TRUCK DRIVER		
Lowboy.....	\$ 22.68	6.81+a

FOOTNOTE: a. \$263.20 per week

TEAM9999-001 01/01/2013

ADAMS, ASHLAND, BROWN, BUTLER, CLERMONT, CLINTON, CRAWFORD, DELAWARE, FAYETTE, FRANKLIN, GREENE, HIGHLAND, HOLMES, JACKSON, KNOX, MADISON, MIAMI, MONTGOMERY, MORROW, PICKAWAY, PIKE, PREBLE, RICHLAND, ROSS, SCIOTO, TUSCARAWAS, VINTON, WARREN, WAYNE, & WYANDOT

	Rates	Fringes
TRUCK DRIVER		
GROUP 1.....	\$ 20.59	8.57
GROUP 2.....	\$ 21.01	8.57

TRUCK DRIVER CLASSIFICATIONS

GROUP 1 - Asphalt Distributor; Batch; 4- Wheel Service; 4-Wheel Dump; Oil Distributor & Tandem

GROUP 2 - Tractor-Trailer Combination; Fuel; Pole Trailer; Ready Mix; Semi-Tractor; & Asphalt Oil Spraybar Man When Operated From Cab; 5 Axles & Over; Belly Dump; End Dump; Articulated Dump; Heavy Duty Equipment; Low Boy; & Truck Mechanic

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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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) (ii)).

The body of each wage determination lists the classification

and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is union or non-union.

Union Identifiers

An identifier enclosed in dotted lines beginning with characters other than "SU" denotes that the union classification and rate have found to be prevailing for that classification. Example: PLUM0198-005 07/01/2011. The first four letters , PLUM, indicate the international union and the four-digit number, 0198, that follows 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, 07/01/2011, following these characters is the effective date of the most current negotiated rate/collective bargaining agreement which would be July 1, 2011 in the above example.

Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rates.

0000/9999: weighted union wage rates will be published annually each January.

Non-Union Identifiers

Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union majority rates, LA indicates the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date.

Survey wage rates will remain in effect and will not change until a new survey is conducted.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write 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 the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write 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 by 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

4.) All decisions by the Administrative Review Board are final.

=====

END OF GENERAL DECISION

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SECTION 00900

ADDENDA

1. All Addenda issued by the Owner/Engineer shall be inserted into this section.
2. If Addenda is issued, all prospective bidders are hereby notified that the Addenda forms a part of the Bidding and Contract documents and modifies the original bidding and contract documents issued. Acknowledge receipt of this addendum in the space provided in the bid proposal section of the specifications. Failure to do so may subject the bidder to disqualification.

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SECTION 00940

NON-DISCRIMINATION IN EMPLOYMENT

TO: _____
(Name of union or organization of workers)

The undersigned currently hold contract(s) with _____ involving funds or credit of the U.S. Government of subcontractor(s) with a prime contractor holding such contract(s).

You are advised that under the provisions of the above contract(s) or subcontract(s) and in accordance with Executive Order No. 11246, Section 202, dated September 24, 1965, the undersigned is obliged not to discriminate against any employee or applicant for employment because of race, color, religion, sex, handicap, familial status, or national origin. This obligation not to discriminate in employment includes, but is not limited to, the following:

HIRING, PLACEMENT, UPGRADING, TRANSFER OR DEMOTION, RECRUITMENT, ADVERTISING, OR SOLICITATION FOR EMPLOYMENT, TRAINING DURING EMPLOYMENT, RATES OF PAY OR OTHER FORMS OF COMPENSATION, SELECTION FOR TRAINING INCLUDING APPRENTICESHIP, LAYOFF OR TERMINATION.

This notice is furnished to you pursuant to the provisions of the above contract(s) or subcontract(s) and Executive Order No. 11246.

(Contractor or Subcontractor)

END OF SECTION

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SECTION 00950

RESPONSIBILITY OF THE CONTRACTORS

1. A copy of the wage determination must be posted by the contractor and maintained where it can be seen easily by all of the employees.
2. All employees working on the site must be paid at least once a week.
3. Rates of pay shall be at least the minimum shown on the wage determination for each classification.
4. Employees must be paid for overtime at 1-1/2 the regular rate for all time over 8 hours any day or over 40 hours in a week, whichever is the greater overtime.
5. Each employee must be paid the full amount earned less only those deductions approved, allowed, or required by Federal, State or Local statutes or ordinances.
6. No classification of employee shall be employed on the project unless the classification appears on the wage determination.
7. Each week as work progresses, the contractor must submit to the Authority a copy of all weekly payrolls and required attachments stipulated therein.
8. All weekly payrolls shall contain or have attached the following:
 - (a) Name of each employee. Also show address when employee is first entered on payrolls and whenever his address changes thereafter.
 - (b) Classification of employees (same as shown on wage determination or provisional approval).
 - (c) Rate of pay not less than that shown on the wage determination.
 - (d) Hours worked each day and total for each week for each employee.
 - (e) All deductions made.
 - (f) Net amount paid employee.
 - (g) The following certification:

"I certify that the payroll is correct and complete, that the wage rates contained therein are not less than the applicable rates contained in the Wage Determination decision of the Secretary of Labor, and that the classification set forth for each laborer or mechanic conforms to the work he performs."

Signature

Title

(h) The following weekly anti-kickback statement:

I _____, _____ do hereby state: I pay or
(Name of Signatory Party) (Title)
supervise the payment of the persons employed by _____
(Contractor or Subcontractor)

on the _____ that during the payroll period commencing
(Building or Work)

on the _____ day of _____, 20____, and ending on the _____ day of _____,
20____, 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 from the full weekly wages earned by any person, other
than permissible deductions, as defined in Regulations, Part 3 (29 CFR Part 3) issued by the Secretary of
Labor under the Copeland Act, as amended (48 Stat. 948, 63 Stat. 108, 72 Stat. 967) "(paragraph describing
deductions, if any)."

9. All prime contractors shall include the wage determination and all labor standards provision in all subcontractors as herein specified.
10. The contractor shall make employment records available for inspection by authorized representatives of the Department of Housing and Urban Development, and the Department of Labor, and will permit employees to be interviewed during working hours by these representatives. Payroll records will be maintained during the course of the work by the General Contractor, including a copy of the payroll of each subcontractor, and they shall be preserved for a period of 3 years thereafter.
11. Each monthly engineering estimate must be accompanied by the following certificate executed by each prime contractor employing mechanics and laborers at the site on the work in which the Federal Government is the participant:

Principal Contractor - _____

Project Name - _____

I, _____, as official representative of the above name and
(Name and Title)

principal contractor, do hereby certify as follows:

- () All Labor Standards Requirements have been fulfilled by the principal contractor and all subcontractors under this contract; or
- () There is an honest dispute regarding the required provisions, Explanation:

_____, _____
(Signature) (Title) (Date)

END OF SECTION

DIVISION 1

GENERAL REQUIREMENTS

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SUMMARY OF WORK

PART ONE -GENERAL

1.01 PROJECT LOCATION & CONTACTS

- A. The Project is located at: The project is located at the Village's Existing Wastewater Treatment Plant on Westgate Drive
- B. The Engineer is GGJ,Inc. 35585 Curtis Blvd., Unit C, Eastlake, OH 44095; tele 440-953-1567 fax 440-953-0580, Engineer's contact person is: **John Sabo, PE**
- C. The Owner's contact person is: **Marc Milliron**

1.02 PROJECT DESCRIPTION

- A. The Project includes all work required to complete the improvements indicated by the Contract Drawings, specified, or required for a complete, operating facility. The required work generally includes, but is not limited to, the following brief summary of the work.

SUMMARY OF THE WORK: Conversion of the existing anaerobic digester to an aerobic digester, demolition of existing digester building, installation of a new screw press and conveyor system, and a new 68'x64' pre-engineered steel building.

1.03 SPECIFICATIONS

- A. The Contract Specifications are intended to supplement the Drawings and to further describe the Contractor's required work. All work shall be performed by the appropriate trades. Unless included under another trade's work or specifically excluded, it shall be the responsibility of the Contractor(s) to perform all incidental work, whether or not specific mention is made of each item.
- B. It is advised that the Contractor(s) and their subcontractors familiarize themselves with the complete contents of the project Specifications.

1.04 DRAWING SCHEDULE

N/A

PART TWO - PRODUCTS

N/A

PART THREE – EXECUTION

- A. It is the sole responsibility of the Contractor to complete the project in the allotted time. Unless otherwise agreed to in writing by the Engineer, construction activities shall conform to the Construction Schedule as submitted and approved. If the Contractor deviates from the approved schedule, the Contractor shall notify the Engineer in writing as to the extent of the deviation, the reason(s) for the deviation, and what actions the Contractor intends to take to assure that the project is completed before the project completion date.

END OF SECTION

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PART ONE - GENERAL

1.01 GENERAL CONTENTS AND ASSIGNMENTS

- A. This Section contains general project administrative items and required coordination including:

- 1.02 Work Changes & Modification Procedures
- 1.03 Coordination
- 1.04 Pre-construction Meeting
- 1.05 Progress Meetings
- 1.06 Pre-installation Meetings
- 1.07 Construction Cooperation
- 1.08 Contract Closeout
- 1.09 Emergency Maintenance Supervisors
- 1.10 Application for Payment
- 1.11 Measurement & Payment
- 1.12 Project Closeout

- B. The General Contractor shall serve as a Construction Coordinator.

1.02 WORK CHANGES & MODIFICATION PROCEDURES

- A. The Engineer will advise Contractor of minor variations in the Work not involving an adjustment to Contract Price or Contract Time as authorized by EJCDC, 1990 Edition, Paragraph 9.5 by issuing supplemental instructions on AIA Form G710.
- B. The Engineer may issue a Proposal Request that includes a detailed description of a desired change and the Owner's desired method of payment with appropriate supplementary or revised Drawings and specifications. Contractor shall prepare and submit a proposal to perform the desired change within ten (10) days stating the fixed price or other basis for performing the work change as requested, any time extension requirements, the last date for Owner's acceptance, plus any other pertinent information.
- C. The Contractor may propose a change by submitting a request for change to the Engineer. The request shall describe the proposed change and its full effect on the Work and the work being performed by others. Included shall be a statement describing the reason for the change, any proposed substitutions, the fixed price or basis for determining the change in the Contract Price, and the effect on the Contract Time, if any.
- D. When work changes involve bid unit prices, the change in Contract Price shall be based on the bid unit prices and the number of measured, approved units performed by the Contractor in completing the work change. When work changes do not involve bid unit prices, the change in Contract Price shall be a negotiated fixed price or based on a negotiated basis for determining the Change in Contract Price, as requested by the Owner. If Owner and Contractor cannot agree on the change in price or time, they shall be determined in accordance with the General Conditions.
- E. Change Orders, Work Change Directives, or Written Amendments will be issued in accordance with the General Conditions.
- F. Any claims made by the Contractor shall be made within 14 days of the completion of a claim event and shall be sufficiently supported in detail by documented costs, quantities, employee time and payment records, paid invoices, the justification for any Contract time extension, and other relevant data to allow a complete evaluation of the claim.

1.03 COORDINATION

- A. Coordinate scheduling, submittals, and Work of the various Sections of the Contract Specifications to assure the efficient and orderly sequencing of all interdependent construction elements. Include provisions for accommodating items installed later, if applicable.
- B. Verify that the space and utility requirements and characteristics of operating equipment are compatible with the building space and building utilities. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing such equipment into operation.
- C. Verify and coordinate space requirements for all mechanical and electrical work that is indicated diagrammatically on Drawings, noted, or specified. Follow routing shown for pipes, ducts, and conduit, as closely as practical; place runs parallel with lines of building. Utilize space efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. Except as otherwise indicated, in finished areas, conceal pipes, ducts, and wiring. Coordinate locations of fixtures and outlets with finish elements.
- E. Coordinate completion and clean up of Work in preparation for Substantial Completion.
- F. When Owner obtains occupancy of premises, coordinate access to site to minimize disruption of Owner's activities while correcting defective Work and Work not in accordance with Contract Documents.

1.04 PRE-CONSTRUCTION MEETING

- A. Engineer will schedule a Pre-construction meeting shortly after giving Notice of Award.
- B. Required Attendees at Pre-construction Meeting: Owner, Engineer, Affected Utilities, and Contractor's Construction Manager and Superintendent.
- C. The Contractor is responsible for review of the standard agenda items listed below and all other contract documents prior to this meeting.
- D. Standard Pre-construction Meeting Agenda Items:
 - 1. Execution of Owner-Contractor Agreement
 - 2. Submission of executed bonds and insurance certificates
 - 3. Distribution of Contract Documents
 - 4. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
 - 5. Designation of individuals representing the Contract parties and the Engineer
 - 6. Procedures, processing of field decisions, submittals, substitutions, applications for payments, proposal requests, Change Orders, and Contract closeout procedures
 - 7. Scheduling
 - 8. Scheduling activities of testing laboratories and special consultants
 - 9. Requirements and Preparation for Monthly Progress Meetings
 - 10. Utility Relocation Coordination
 - 11. Use of premises by Owner and Contractor
 - 12. Owner's requirements and occupancy
 - 13. Construction facilities and controls provided by Owner
 - 14. Temporary utilities provided by Owner
 - 15. Survey and layout of structures
 - 16. Security and housekeeping procedures
 - 17. Testing procedures
 - 18. Procedures for maintaining record documents
 - 19. Requirements for start-up of equipment
 - 20. Inspection and acceptance of equipment placed into service during construction period
- E. Engineer will record minutes and distribute copies within 5 working days after the Pre-construction Meeting to participants, with copies to Engineer, Owner, Contractor, and those affected by the discussions or decisions made.

1.05 PROGRESS MEETINGS

- A. Schedule and attend progress meetings at monthly intervals maximum.
- B. Engineer will arrange for progress meetings, prepare agendas with copies for participants, preside at meetings, record minutes of the meeting, and distribute the minutes to all participants within 5 working days.
- C. Attendance Required: Contractor's Superintendent, major Subcontractors and suppliers, Owner, Engineer, as appropriate to agenda items.
- D. The Contractor is responsible for preparing for all Agenda items prior to the meeting.
- E. Standard Agenda Items:
 - 1. Discussion of challenges to previous meeting minutes
 - 2. Review of Work progress
 - 3. Field observations, problems, concerns, and decisions
 - 4. Identification of problems that may impede planned progress.
 - 5. Review of submittals schedule and status of submittals
 - 6. Review of off-site fabrication and delivery schedules
 - 7. Maintenance of progress schedule
 - 8. Corrective measures to regain projected schedules.
 - 9. Planned progress during succeeding work period.
 - 10. Coordination of projected progress
 - 11. Maintenance of quality and work standards
 - 12. Effect of proposed changes on progress schedule and coordination
 - 13. Review of construction photographs and as-built drawing status
 - 14. Other business relating to Work
- F. Revisions to Minutes:
 - 1. Unless the distributed minutes are challenged in writing prior to the next regularly scheduled progress meeting, they shall be considered complete, correctly stated, and accepted.
 - 2. Anyone challenging the distributed minutes shall reproduce and distribute copies of the challenge to all indicated recipients of the particular minutes.
 - 3. Challenges to the prior meeting minutes shall be entertained as a priority item at the next regularly scheduled meeting.

1.06 PRE-INSTALLATION MEETINGS

- A. When required by specific specification Sections, Contractor shall coordinate, schedule and convene a pre-installation meeting at work site a minimum of 10 working days prior to commencing work of the Section.
- B. Required attendance shall be the Engineer, the Contractor's Superintendent, and any other parties directly affecting, or affected by, the Section work.
- C. Notify Engineer 10 days in advance of meeting date.
- D. Contractor shall prepare agenda and preside at meeting:
 - 1. Review conditions of installation, preparation and installation procedures.
 - 2. Review coordination with related work.
- E. Engineer shall record minutes and distribute copies within 5 work days after meeting to participants.

1.07 CONSTRUCTION COOPERATION

- A. All Contractors and sub-contractors shall cooperate with the Construction Coordinator in the allocation of site mobilization areas for field offices and sheds, for existing building access, traffic, and parking facilities.
- B. During construction, all contractors and sub-contractors shall coordinate their use of the site and facilities through the Construction Coordinator.
- C. All contractors shall comply with the Construction Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, recommendations; and resolution of ambiguities and conflicts.
- D. All contractors shall comply with instructions of the Construction Coordinator for use of temporary utilities and construction facilities.
- E. All contractors shall coordinate field engineering and layout work with the Construction Coordinator.

1.08 CONTRACT CLOSEOUT

- A. Procedures:
 - 1. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Engineer's review.
 - 2. Provide submittals to Engineer that are required by governing or other authorities.
 - 3. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- B. Final Cleaning:
 - 1. Perform final cleaning prior to final project assessment.
 - 2. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, [vacuum carpeted and soft surfaces.]
 - 3. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
 - 4. Clean or Replace filters of operating equipment.
 - 5. Clean debris from roofs, gutters, downspouts, and drainage systems.
 - 6. Clean site; sweep paved areas, rake clean landscaped surfaces.
 - 7. Remove waste and surplus materials, rubbish, and construction facilities from the site. Waste removal shall be handled in such a way as to comply with relevant state or local solid waste regulations.
- C. Adjusting:
 - 1. Adjust operating Products and equipment to ensure smooth and unhindered operation.
- D. Project Record Documents:
 - 1. Throughout the progress of the Work, maintain on site and record actual revisions to the Work on one set of the following record documents:
 - a. Drawings.
 - b. Specifications.

- c. Addenda.
 - d. Change Orders and other modifications to the Contract.
 - e. Reviewed Shop Drawings, Product Data, and Samples.
 - f. Manufacturer's instruction for assembly, installation, and adjusting.
- 2. Ensure entries are complete and accurate, enabling future reference by Owner.
- 3. Store record documents separate from documents used for construction.
- 4. Record information concurrent with construction progress.
- 5. In the Specifications, legibly mark and record at each Product section a description of actual Products installed, including the following:
 - a. Manufacturer's name and product model and number.
 - b. Product substitutions or alternates utilized.
 - c. Changes made by Addenda and modifications.
- 6. Record Drawing Requirements – As Built locations of all structures visible at or above grade shall be supplied by a registered surveyor, using data collection equipment.
 - a. AutoCAD base information will be provided by the City/Village or City/Village Engineer to the contractor.
 - b. As-Built data shall use the same horizontal and vertical control as the proposed construction documents.
 - i. Data shall include:
 - 1. All structures visible at grade installed by the contractor, including but not limited to manholes, curb inlets, catch basins, water valves, hydrants, blow-off assembly's, cleanouts and any other objects deemed pertinent to the the project.
 - 2. As-Built rim and invert elevation of all structures shall be provided.
 - 3. Contractor shall keep detailed records of all sewer wye's, tee's, blind connections, or any other below grade features. These records should include measurements from structures that will be visible at grade, in order to accurately show the locations of these below grade objects relative to the data collected by the surveyor.
 - 4. Earthwork intensive projects shall have spot grades collected in order to verify the accuracy of all earthwork and to verify all related pay items.
 - a. Interval of spot grades should be sufficient to generate As-Built contours.
 - 5. Roadway resurfacing or roadway replacement projects shall have spot grades collected at the approximate location of the profile grade line to verify the accuracy relative to the proposed finished grade profile.
 - a. Maximum interval of profile grade elevations is 50'.
 - c. Plan requirements:
 - i. Spot Grades where applicable
 - ii. As-Built locations of all structures visible at grade
 - iii. Rim/Inverts identified for each structure
 - iv. As-Built contours where applicable
 - d. Plans should be submitted to the City/Village Engineer for review prior to final acceptance.
 - i. Plans will be submitted in AutoCAD (.dwg) form along with the appropriate pen setting file to the City/Village Engineer.
 - ii. Submittal should also include Adobe Acrobat (.pdf) files of the As-Built drawings signed and sealed by the registered surveyor.
 - iii. Point files, breaklines and any other data used to generate the As-Built drawings will be provided at the Engineer's request.

7. Submit documents to Engineer with claim for final Application for Payment.

E. Spare Parts and Maintenance Materials:

1. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification sections.
2. Deliver to Project site and place in location as directed; obtain receipt prior to final payment.

1.09 EMERGENCY MAINTENANCE SUPERVISOR

- A. The Contractor shall submit to the Engineer the names, addresses, and telephone numbers of two employees responsible for performing emergency maintenance and repairs when the Contractor is not working. These employees shall be designated in writing by the Contractor as his representatives and shall have full authority to act on his behalf as specified in the General Conditions. At least one of the designated employees shall be available for contacting by telephone any time an emergency arises.

1.10 APPLICATION FOR PAYMENT

- A. Submit Applications on form AIA G702 - Application and Certificate for Payment and AIA G703 - Continuation Sheet, including continuation sheets when required.

B. Preparation of Applications

1. Present required information in typewritten form.
2. Execute certification by signature of authorized officer.
3. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed [and for stored Products].
4. List each authorized Change Order as an extension on AIA G703 - Continuation Sheet, listing Change Order number and dollar amount as for an original item of Work.
5. Prepare Application for Final Payment as specified in Section 01700.

C. Submittal Procedures

1. Submit a minimum of four (4) copies of each Application for Payment and Schedule of Values
2. Submit an updated construction schedule with each Application for Payment.
3. Payment Period: Submit Application for Payment at the end of each month to the Engineer.
4. Submit with transmittal letter as specified for Submittals in Section 01300.
5. Submit two (2) waivers for partial payment.
6. Submit two (2) certified payroll reports for payroll period.
7. If requesting payment for stored materials, submit two (2) payments for stored material form.
8. Submit any other documentation as requested by the Engineer.

D. Substantiating Data

1. When Engineer requires substantiating information, submit data justifying dollar amounts in question.
2. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.11 MEASUREMENT & PAYMENT

- A. Measurement and Payment of Lump Sum Items will be based on Contractor's substantiated estimate of the total Item value completed as accepted by Engineer. Measurement and payment criteria applicable to the unit price Items follows.

1. Use measurement methods delineated in the basis of payment section of the bid proposal forms.
2. Take all measurements and compute quantities. Engineer will verify measurements and quantities.
3. Provide necessary equipment, workers, and survey personnel as required.

- B. The quantities indicated in the Bid Form are for bidding and contract purposes only. Quantities and measurements supplied or placed in the Work in accordance with the Drawings and Specifications and verified by the Engineer determine payment.

1. If the actual Work performed in accordance with the Drawings and Specifications requires greater or fewer quantities than those indicated, provide the required quantities at the unit price bid.

- C. Quantities shall be measured using the following devices and methods.

1. Measurement Devices:

- a. Weigh Scales: Inspected, tested and certified by the applicable state Weights and Measures department within the past year and the Engineer.
- b. Platform Scales: Of sufficient size and capacity to accommodate the conveying vehicle.
- c. Metering Devices: Inspected, tested and certified by the applicable state department within the past year and the Engineer.

2. Measurement by Weight: Concrete reinforcing steel, rolled or formed steel or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weight.

3. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.

4. Measurement by Area: Measured by square dimension using mean length and width or radius.

5. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord. Underground piping shall be measured by the horizontal projection of the longitudinal axis of the pipe.

6. Stipulated Sum/Price Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as a completed item or unit of the Work.

- D. Payment Includes the Following:

1. Full compensation for all required labor, Products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.
2. Final payment for unit price Work will be made on the basis of the actual measurements and quantities accepted by the Engineer multiplied by the unit price for Work incorporated in or made necessary by the Work.

E. Defective Work shall be handled as follows:

1. Replace the Work, or portions of the Work, not conforming to specified requirements.
2. If, in the opinion of the Engineer and/or Owner, it is not practical to remove and replace the Work, the Engineer and/or Owner will direct one of the following remedies:
 - a. The defective Work may remain, but the unit price will be adjusted to a new price at the discretion of the Engineer.
 - b. The defective Work will be partially repaired to the instructions of the Engineer and/or Owner, and the unit price will be adjusted to a new price at the discretion of the Engineer.
3. When an individual specification section identifies a different method, formula, or percentage price reduction, it shall control.
4. The authority of the Engineer and/or Owner to assess defects and make appropriate payment adjustment is final.
5. Payment will not be made for:
 - a. Products wasted or disposed of in a manner that is not acceptable.
 - b. Products determined unacceptable.
 - c. Products not completely unloaded from the transporting vehicle.
 - d. Products placed beyond the lines and levels of the required Work.
 - e. Products not incorporated in the Work.
 - f. Loading, hauling, and disposing of rejected Products.

1.12 CONSTRUCTION CLOSEOUT

- A. Provide an orderly and efficient transfer of the completed Work to the Owner. Comply with requirements stated in Conditions of the Contract and in Specifications for Administrative procedures in closing out the Work.
- B. Prior to requesting inspection by the Engineer, use adequate means to assure that the Work is completed in accordance with the specified requirements and is ready for the requested inspection.
- C. When the Work is substantially complete, the Contractor shall submit to Engineer the following:
 1. A written notice that the Work, or designated portion thereof, is substantially complete.
 2. A list of items that remain to be completed or corrected.
 - a. Within a reasonable time after receipt of such notice, Engineer will make an inspection to determine the status of completion.
 - b. Should Engineer determine that the Work is not substantially complete:
 - 1) Engineer will promptly notify the Contractor in writing, giving the reasons therefore.
 - 2) Contractor shall remedy the deficiencies in the Work, and send another written notice of substantial completion to the Engineer.
 - 3) Engineer will, within a reasonable time after receipt of such notice, re-inspect the Work.
 - c. When the Engineer finds that the Work is substantially complete, Engineer will:
 - 1) Prepare and deliver to the Owner a tentative Certificate of Substantial Completion on a form with a tentative list of items to be completed or corrected before final payment is made.
 - 2) After consideration of any objections made by the Owner as provided in Conditions of the Contract, and when the Engineer considers the Work substantially complete, the Engineer will execute and deliver to the Owner and the Contractor a definite Certificate of Substantial Completion with a revised tentative list of items to be completed or corrected.

D. FINAL INSPECTION

1. When the Work is complete, Contractor shall submit written certification that:
 - a. The Contract Documents have been reviewed.
 - b. The Work has been inspected for compliance with Contract Documents.
 - c. Work has been completed in accordance with Contract Documents.
 - d. The Equipment and systems have been tested in the presence of the Owner's representative and are operational.
 - e. The Work is completed and ready for final inspection.
2. Within a reasonable time after receipt of such notice, the Engineer will make an inspection to verify that status of completion.
 - a. Should the Engineer consider that the Work incomplete or defective:
 - 1) The Engineer will promptly notify the Contractor in writing, listing the incomplete or defective work.
 - 2) The Contractor shall take immediate steps to remedy the stated deficiencies, and send another written certification to Engineer that the Work is complete.
 - 3) Within a reasonable time after receipt of such notice, the Engineer will re-inspect the Work.
3. When the Engineer finds that the Work is acceptable under the Contract Documents, the Engineer will request the Contractor to make closeout submittals.

E. REINSPECTION FEES

1. Should Engineer be required to perform re-inspections due to failure of the Work to comply with the claims of status of completion made by the Contractor:
 - a. The Owner will compensate Engineer for such additional services.
 - b. The Owner will deduct the amount of such compensation from the final payment due the Contractor.

F. CONTRACTOR'S CLOSEOUT SUBMITTALS TO ENGINEER

1. Closeout submittals shall include, but are not necessarily limited to:
 - a. Project Record Documents
 - b. Operation and maintenance data for items so listed in pertinent other Sections of these Specifications, and for other items when so directed by the Engineer.
 - c. Warranties and bonds.
 - d. Keys and keying schedule.
 - e. Spare parts and materials
 - f. Evidence of compliance with requirements of governmental agencies having jurisdiction including, but not necessarily limited to:
 - 1) Certificates of Inspection.
 - 2) Certification of Occupancy.
 - 3) Certificates of Insurance for products and completed operations.

- 4) Evidence of payment of all subcontractors, material suppliers, and laborers having a just claim, and the release of all associated liens.
- 5) List of subcontractors, service organizations, and principal vendors, including names, addresses, and telephone numbers where they can be reached for emergency services at all times including nights, weekends, and holidays.

G. FINAL ADJUSTMENT OF ACCOUNTS

1. Submit a final statement of accounting to Engineer.
2. The Statement shall reflect all adjustments to the Contract Sum:
 - a. The original Contract Sum.
 - b. Additions and deductions resulting from:
 - 1) Previous Change Orders.
 - 2) Allowances.
 - 3) Unit Prices.
 - 4) Deductions for uncorrected Work.
 - 5) Penalties and Bonuses.
 - 6) Deductions for liquidated damages.
 - 7) Deductions for re-inspection payments.
 - 8) Other adjustments.
 - c. Total Contract Sum, as adjusted.
 - d. Previous payments.
 - e. Sum remaining due.
3. The Engineer will prepare a final Change Order, reflecting approved adjustments to the Contract Sum that were not previously made by Change Orders.

H. FINAL APPLICATION FOR PAYMENT

1. The Contractor shall submit the final Application for Payment in accordance with procedures and requirements stated in the Conditions of the Contract.

I. INSTRUCTION

1. The Contractor shall instruct the Owner's personnel in the proper operation and maintenance of systems, equipment, and similar items which were provided as part of the Work.

PART TWO - PRODUCTS

- 2.01 Provide specified products as required.

PART THREE - EXECUTION

- 3.01 Comply with requirements

PART FOUR - SPECIAL PROVISIONS

None

END OF SECTION

SECTION 01013

OBSTRUCTIONS ENCOUNTERED

PART ONE - GENERAL

1.01 OBSTRUCTIONS ENCOUNTERED

- A. In addition to showing the improvements to be constructed under this Contract, the drawings show certain information obtained by the Owner regarding the pipes, conduits, and other structures which exist along the site of the work, both at and below the surface of the ground. The Owner expressly disclaims any responsibility for the accuracy and completeness of the information given on the drawings with regard to existing structures, and the Contractor will not be entitled to any extra compensation on account of inaccuracy or incompleteness of such information, said structures being shown only for the convenience of the Contractor, who must verify the information to his own satisfaction. The giving of this information upon the contract drawings will not relieve the Contractor of his obligation to support and protect all pipes, conduits, and other structures which may be encountered during the construction of this Contract.

PART TWO - PRODUCTS

Not Used

PART THREE - EXECUTION

Not Used

PART FOUR - SPECIAL PROVISIONS

None

END OF SECTION

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CONTRACT CONSIDERATIONS

PART ONE - GENERAL

1.01 SECTION INCLUDES

- A. Cash allowances.
- B. Contingency allowance
- C. Schedule of values

1.02 RELATED SECTIONS

- A. Section 01011 – Summary of Project
- B. Section 00682- Applications for Payment
- C. Section 01030 - Alternates

1.03 SCHEDULE OF VALUES

- A. Submit a type printed schedule on AIA Form G703 - Application and Certificate for Payment Continuation Sheet.
- B. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.
- C. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the major specification Section. Identify site mobilization, bonds and insurance, and any item as requested by the Engineer.
- D. Include in each line item, the amount of Allowances specified in this section. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by the unit cost to achieve the total for the item.
- E. Include within each line item, a direct proportional amount of Contractor's overhead and profit.
- F. Revise schedule to list approved Change Orders, with each Application for Payment.

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

Not Used.

PART FOUR - SPECIAL PROVISIONS

None

END OF SECTION

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SECTION 01030

ALTERNATES

PART ONE - GENERAL

1.01 SECTION INCLUDES

- A. Submission procedures.
- B. Documentation of changes to Contract Price and Contract Time.

1.02 RELATED SECTIONS

- A. Agreement: Incorporating monetary value of accepted Alternates.
- B. Instructions to Bidders, Bid Form, Supplements to Bid Forms: Requirements for Alternates.

1.03 SUBMISSION REQUIREMENTS

- A. Submit Alternates identifying the effect on adjacent or related components.
- B. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at the Owner's option. Accepted Alternates will be identified in the Owner-Contractor Agreement.
- C. Coordinate related work and modify surrounding work to integrate the Work of each Alternate.

1.04 SELECTION AND AWARD OF ALTERNATES

- A. Indicate variation of Bid Price for Alternates described below and listed in the [SUPPLEMENTS TO] BID FORM document. This form requests a "difference" in Bid Price by adding to or deducting from the base Bid Price.
- B. Bids will be evaluated on the base bid price plus alternate(s) when required, that yields the lowest combined total needed for the project.

PART TWO - PRODUCTS

Not Used

PART THREE - EXECUTION

Not Used

PART FOUR - SPECIAL PROVISIONS

None

END OF SECTION

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PART ONE - GENERAL

1.01 DESCRIPTION

A. Work included:

1. Throughout the Contract Documents, references are made to trade and association codes and standards that define qualities and types of workmanship and materials, and establish methods for testing and reporting on pertinent characteristics.
2. Where materials or workmanship are required by the Contract Documents to meet or exceed the specifically named codes or standards, it is the Contractor's responsibility to provide materials and workmanship that meet or exceed the latest edition of the specifically named code or standard.
3. It also is the Contractor's responsibility, when required by the Contract Documents or requested by the Engineer, to deliver to the Engineer all required proof that the materials and workmanship meet or exceed the edition requirements on the date that bids are received of the specifically named code or standard. Such proof shall be in the form of a certified report of tests conducted by a testing agency approved for that purpose by the Engineer.

- B. Related work described elsewhere:** Specifically named codes or standards occurring on the Drawings and in other Sections of the Specifications.

1.02 QUALITY ASSURANCE

A. Familiarity with pertinent codes and standards:

In procuring all items used in this Work, it is the Contractor's responsibility to verify the detailed requirements of the referenced named codes and standards and to verify that the items procured for use in this Work meet or exceed the project Specification requirements. Except when a specific publication date is specified, the publication in effect on the date of Contract Document signing shall be considered the latest edition and shall apply. Contractor shall maintain a copy of the applicable referenced codes and standards on the project site. Any conflicts between the association codes and standards, and the project Specifications, shall be brought to the attention of the Engineer for resolution. Engineer's decision shall be final.

B. Rejection of non-complying items:

The Engineer reserves the right to reject items incorporated into the Work that fail to meet the specified minimum requirements. The Engineer further reserves the right, and without prejudice to other recourse the Engineer may take, to accept non-complying items subject to an adjustment in the Contract Amount as approved by the Engineer and the Owner.

C. Applicable standards listed in these Specifications include, but are not necessarily limited to standards promulgated by the following agencies and organizations:

1. AASHTO - American Association of State Highway and Transportation Officials, 444 North Capital Street, N.W., Washington, D.C. 20001
2. ACI - American Concrete Institute, Box 19150, Redford Station, Detroit, Michigan 48129
3. AGMA - American Gear Manufacturers Association
4. AI - Asphalt Institute, Asphalt Institute Building, College Park, MD 20740
5. AISC - American Iron and Steel Construction, Inc. 1221 Avenue of the Americas, New York, New York 10020

6. AISI - American Iron and Steel Institute, 1000 16th Street, N.W., Washington, D.C. 20036
7. AMCA - Air Movement and Control Association, 30 West University Drive, Arlington Heights, IL 60004
8. ANSI - American National Standards Institute (successor to USASI and ASA), 1430 Broadway, New York, New York 10018
9. ARI - Air-Conditioning and Refrigeration Institute, 1815 North Fort Myer Drive, Arlington, VA 22209
10. ASHRAE - American Society of Heating, Refrigerating and Air Conditioning Engineers, 345 East 47th Street, New York, NY 10017
11. ASME - American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017
12. ASTM - American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103
13. AWWA - American Water Works Association, 6666 West Quincy Avenue, Denver, Colorado 80235
14. AWS - American Welding Society, 2501 N.W. 7th Street, Miami, Florida 33125
15. AWWA - American Water Works Association, 6666 West Quincy Avenue, Denver, Colorado 80235
16. CLFMI - Chain Link Fence Manufacturers Institute, 1101 Connecticut Avenue, Washington, D.C. 20036
17. CRSI - Concrete Reinforcing Steel Institute, 228 North LaSalle Street, Chicago, Illinois 60610
18. FM - Factory Mutual System, 1151 Boston-Providence Turnpike, Norwood, MA 02062
19. FS - Federal Specifications, General Services Administration, Specifications and Consumer Information Distribution Section (WFSIS), Washington Navy Yard, Building 197, Washington, D.C. 20407
20. GA - Gypsum Association, 1603 Orrington Avenue, Evanston, IL 60201
21. IEEE - Institute of Electrical and Electronic Engineers
22. ISA - Instrument Society of America
23. MIL - Military Specifications, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120
24. MLSFA - Metal Lath/Steel Framing Association, 221 North LaSalle Street, Chicago, IL 60601
25. NAAMM - National Association of Architectural Metal Manufacturers, 221 North LaSalle Street, Chicago, IL 60601
26. NEC - National Electrical Code, 470 Atlantic Avenue, Boston, Massachusetts 02210
27. NEMA - National Electrical Manufacturers Association, 2101 L Street, N.W., Washington, D.C. 20037
28. NFPA - National Fire Protection Association, 470 Atlantic Avenue, Boston, MA 02210
29. NFPA - National Forest Products Association, 1619 Massachusetts Avenue, N.W., Washington, D.C. 20036
30. NTMA - National Terrazzo and Mosaic Association, 3166 Des Plaines Avenue, Des Plaines, IL 60018
31. ODOT - Ohio Department of Transportation, 1980 W. Broad Street, Columbus, OH 43223
32. OSHA - Occupational Safety and Health Act
33. PCA - Portland Cement Association, 5420 Old Orchard Road, Skokie, Illinois 20076

34. PCI - Prestressed Concrete Institute, 20 North Wacker Drive, Chicago, IL 60606
35. PENNDOT – Pennsylvania Department of Transportation, Keystone Building, 400 North Street, Harrisburg, PA 17120
36. PS - Product Standard, U.S. Department of Commerce, Washington, D.C. 20203
37. SDI - Steel Deck Institute, Box 3812, St. Louis, MO 63122
38. SDI - Steel Door Institute, 712 Lakewood Center North, Cleveland, OH 44107
39. SJI - Steel Joist Institute, 1703 Parham Road, Suite 204, Richmond, VA 23229
40. SSPC - Steel Structures Painting Council
41. TCA - Title Council of America, Inc., Box 326, Princeton, NJ 08540
42. UL - Underwriters' Laboratories, Inc., 333 Pfingston Road, Northbrook, IL 60062
43. Uni-B - Uni-Bell Plastic Pipe Association, 2655 Villa Creek Drive, Suite 164, Dallas, Texas 75234
44. WVDOH – West Virginia Department of Highways, Contract Administration Division, West Virginia Division of Highways, 1900 Kanawha Boulevard, East, Building 5, Room 737, Charleston, WV 25305-0430

PART TWO - PRODUCTS

N/A

PART THREE - EXECUTION

N/A

PART FOUR - SPECIAL PROVISIONS

None

END OF SECTION

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SECTION 01300

SUBMITTALS

PART ONE - GENERAL

1.01 SECTION 01300 INCLUDES:

- A. 1.02 Related Sections
- B. 1.03 Submittal Procedures (For the Record, Shop Drawings for Review & Approval, General Information, and For Operation and Maintenance Requirements)
- C. 1.04 Proposed Products list
- D. 1.05 Substitutions
- E. 1.06 Samples
- F. 1.07 Manufacturer's installation instructions
- G. 1.08 Manufacturers' certificates
- H. 1.09 Operation & Maintenance Manuals
- I. 1.10 Construction Schedule
- J. 1.11 Schedule of Values
- K. 1.12 Workers' Compensation Certificates
- L. 1.13 Product and Work Item Warranties and Bonds

1.02 RELATED SECTIONS

- A. When specific or more comprehensive submittals are required than are described herein, they are specified in stand alone Sections or within other technical Sections.

1.03 SUBMITTAL PROCEDURES

- A. The Contractor shall transmit all submittals (except for laboratory testing results) to the Engineer using AIA Form G810 or approved equal. Submittals from subcontractors, suppliers, or others will not be accepted. Laboratory testing results shall be sent directly from the Laboratory to the Engineer, as specified in Section 01410 Testing Laboratory Services.
- B. Sequentially number the transmittal form. Mark revised submittals with the original number plus a sequential alphabetical extension.
- C. The Contractor shall stamp and clearly identify Submittal Date, Project Title and Location; Contractor's Name and Address, Specification Section, Purpose of the Submittal (Record Purposes, Review & Approval, General Information, and Operation & Maintenance requirements); the person who performed the submittal review, and other identification that may be appropriate.
 - 1. Submittals for Record Purposes include laboratory test results, licenses, permits, and installation and calibration certificates. Laboratory test results shall be signed by an authorized agent of the independent laboratory performing the tests and will be used for comparing to the specification requirements. The Contractor shall obtain all licenses and permits required by Local, State, and Federal laws. Where requested, the Contractor shall submit installation and calibration certificates from manufacturers indicating the manufacturer's satisfaction with the installation, the calibration, and the operation of the manufacturer's equipment.
 - 2. Submittals for Review & Approval include Construction Schedules, Construction Drawings, Shop Drawings, Manufacturer's literature and certifications, Supplier's literature and certifications, Design data, Samples, Schedule of values, and other related or requested data.

Shop Drawings: Submittals for Review

- a. Submit scaled, accurate drawings for review. After found to be in general conformance with the Drawings and Specifications, Engineer will distribute in accordance with PART THREE - EXECUTION

- b. Submit the number of opaque reproductions desired by the Contractor, plus three (3) copies, which will be retained by Engineer for distribution. If Contractor requires more than four copies for its use, Contractor shall reimburse Engineer for the time required to markup the extra copies requested.
- c. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this Project.
- d. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- e. All Shop Drawings submitted for review shall be stamped with the review block shown below:

<input type="checkbox"/>	REVIEWED AND FOUND TO BE IN GENERAL CONFORMANCE WITH THE DRAWINGS AND SPECIFICATIONS.
<input type="checkbox"/>	REVIEWED AND FOUND, AS NOTED, TO BE IN GENERAL CONFORMANCE WITH THE DRAWINGS AND SPECIFICATIONS.
<input type="checkbox"/>	SUBMITTAL DOES NOT CONFORM TO THE DRAWINGS AND SPECIFICATIONS AND THE CONTRACTOR WILL ASSUME ALL LIABILITY FOR ITS FUNCTIONAL PERFORMANCE.
<input type="checkbox"/>	REVISE AND RE-SUBMIT
<input type="checkbox"/>	REJECTED
REVIEW IS ONLY FOR GENERAL CONFORMANCE WITH THE DESIGN CONCEPT AND THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS. ANY CORRECTIONS OR COMMENTS MADE DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH THE REQUIREMENTS OF THE CONTRACT DRAWINGS AND SPECIFICATIONS. REVIEW OF A SPECIFIC ITEM DOES NOT INCLUDE THE REVIEW OF AN ASSEMBLY OF WHICH THE ITEM IS A COMPONENT. CONTRACTOR IS RESPONSIBLE FOR: DIMENSIONS, WHICH SHALL BE CONFIRMED AND CORRELATED AT THE JOB SITE; INFORMATION PERTAINING TO FABRICATION PROCESSES; THE MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES OF CONSTRUCTION; THE COORDINATION OF THE WORK WITH THAT OF ALL OTHER TRADES; AND PERFORMING ALL WORK IN A SAFE AND SATISFACTORY MANNER.	
GGJ, INC. CONSULTING ENGINEERS	
DATE _____ BY _____	

- 3. General Information is typically additional information requested to meet the general needs of the project.
- 4. Operation & Maintenance information is required for all equipment. See OPERATION & MAINTENANCE MANUALS below.
- D. Prior to making submittals to the Engineer, the Contractor shall verify important field measurements and product dimensions. Carefully review for correctness, suitability, and fit.
- E. Apply Contractor's stamp and sign, thereby certifying that Contractor has carefully reviewed the material submitted, verified the products & product dimensions, checked field measurements and product dimensions, reviewed adjacent construction Work, coordinated related information, and that the product or material for which it is seeking Engineer's approval is in accordance with the requirements of Contract Documents.
- F. The Contractor shall make its submittals in an order that expedites the Project. Deliver to Engineer - Attention [Project Name] Construction Manager at 35585 Curtis Blvd., Unit C, Eastlake, Ohio 44095. Coordinate submission of related items.

- G. For each submittal for review, allow 20 working days excluding delivery time to and from the contractor. If certain submittals require expediting, the Contractor may request that the submittal be expedited. The Engineer will place the requested expedited submittal ahead of the other project submittals and make a reasonable effort to assist in completing the review as soon as possible. The Engineer, however, shall not be responsible for any delays to the un-expedited project submittals caused by its reviewing of the expedited submittals first.
 - H. Identify all variations from the Contract Documents. Note any product or system limitations that may be detrimental to the successful performance of the completed Work.
 - I. Provide space for Contractor's and Engineer's review stamps.
 - J. When a submittal is being resubmitted, identify all changes made since the previous submission, and identify submittal with original section number followed by an alphabetical letter extension e.g. A, B, C . . . to identify the re-submittal level.
 - K. Distribute copies of reviewed submittals as appropriate. Engineer will distribute reviewed submittals to Owner and Project Field Representative. Instruct parties to promptly report any inability to comply with provisions.
 - L. Maintain an accurate submittal log for the duration of the Work, including mailing and received dates, the status of each submittal, and the resulting outcome of each submittal. Make the submittal log available to the Engineer for review upon request. Notify Engineer in writing if any of Contractor's submittals have not been responded to in a timely manner.
- 1.04 PROPOSED PRODUCTS LIST
- A. Within 15 days from the effective date of the Owner-Contractor Contract, submit a list of all manufacturers' major equipment and products proposed for use, identifying the name of the manufacturer, trade name and model number of each product or piece of equipment.
 - B. For products specified only by referenced standards, give manufacturer, trade name, model or catalog designation and referenced standards.
- 1.05 SUBSTITUTIONS
- A. Unless otherwise specified, substitutions will be considered only when substantiated by the Contractor's submittal of a complete request for substitution within forty-five (45) calendar days after the Contractor has received Owner's Notice to Proceed. The request for substitution shall include any proposed deduct or increase in price offered for Owner accepting the substitution.
 - B. The Contractor shall accompany any request for substitution with such drawings, specifications, samples, manufacturer's literature, performance data, and other information necessary to describe and completely evaluate the proposed substitution. The burden of proof shall be on the Contractor.
 - C. If any substitution will affect a correlated function, adjacent construction, or the work of other trades or contractors, the necessary changes and modifications to the affected work shall be identified and included in the request for substitution.
 - D. Approval of any request for substitution shall not relieve the Contractor from the responsibility for any deficiency that may exist in the substitution or for any departures or deviations from the requirements of the Contract Documents. Except as otherwise expressly specified by the Contractor in the request for substitution and expressly approved in writing by the Engineer, the Contractor shall be deemed to warrant by the request that the proposed substitution will satisfy all standards and requirements satisfied by the originally specified products or procedure and that the approval of the request for substitution shall not be deemed to modify the Contract Documents with respect thereto.
 - E. Major Equipment Evaluation:
 - 1. Any request for substitution of equipment identified elsewhere in the Drawings or Specifications as being subject to "Major Equipment Evaluation" shall identify five (5) installations similar to that proposed. The following information regarding each installation shall be provided.

- a. Name and location of facility.
 - b. Brief description (size, number, performance, etc.).
 - c. Names, addresses and telephone numbers of owner, operator, design engineer and general contractor responsible for equipment installation.
 - d. The following dates: Order placed, delivery, start-up and full operation.
2. Provide the manufacturer's standard published Operation and Maintenance Manual. Identify any modifications to the procedures identified that are specific to the equipment to be supplied. For the specific equipment proposed, provide the frequency of scheduled maintenance procedures and the total expected time required for routine maintenance.
 3. A performance evaluation will be conducted by the Engineer and will include interviews with people other than those identified by the Contractor, manufacturer, or supplier. At a minimum, the following questions will be asked:
 - a. Were there any delays or problems with delivery of equipment attributable to the manufacturer?
 - b. Describe any equipment breakdowns.
 - c. Describe manufacturer's service responsiveness during warranty.
 - d. Describe manufacturer's service responsiveness following warranty.
 - e. Describe any costs (whether covered by manufacturer or not) associated with equipment failures following installation.
 - f. Is/was operation and maintenance, as recommended by manufacturer/supplier, adequate?
 - g. Describe the equipment process performance. How long to achieve satisfactory performance? How do actual and manufacturer performance compare? How long has required/satisfactory performance been continuously achieved?

1.06 SAMPLES

- A. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- B. Submit samples of finishes from the full range of manufacturers' standard colors or in custom colors selected by Owner/Engineer, textures, and patterns for Engineer's review.
- C. Include identification on each sample, with full Project information.
- D. Submit the number of samples specified in individual specification sections, one of which will be retained by Engineer.
- E. Reviewed samples that may be used in the Work are indicated in individual specification sections.

1.07 MANUFACTURER INSTALLATION INSTRUCTIONS

- A. Manufacturer installation instructions shall be submitted for owner information, prior to installation.
- B. When appropriate, submit printed instructions for delivery, storage, assembly, installation, startup, adjusting, and finishing to Engineer.
- C. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.08 MANUFACTURER CERTIFICATES

- A. When appropriate or specified in individual specification sections, submit manufacturer certifications to Engineer.
- B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results of material or Product, but must be acceptable to Engineer.

1.09 OPERATION & MAINTENANCE MANUALS

- A. Contractor shall compile and furnish three (3) finalized copies of the reviewed Manual covering all equipment as follows:
 - 1. Submittals shall include but not be limited to descriptive literature, bulletins and spec sheets that describe the equipment, system, or item; the operation of the equipment, system, or item; a detailed list of equipment components and appurtenances including manufacturer & model number where appropriate; notice of any items required for operation that are not included; utility requirements; general arrangement drawings; materials of construction, assembly data, dimensional data; performance curves, certifications and guarantees; parts lists with ordering numbers and suppliers, assembly drawings, recommended spare parts to keep on site; lubrication and routine maintenance requirements; schematic wiring and piping diagrams; calibration procedures and specifications; related data on instrumentation and control equipment; drive data; operation & maintenance data; equipment supplier's name & address; and other pertinent data as is applicable.
 - a. When the data submitted includes more than one model or item, the Contractor shall clearly mark the items and model that is being submitted for review.
 - b. Manuals shall be tailored for the contract work and be prepared by the Contractor. The manuals shall have a heavy plastic or fiberboard cover and contain all data associated with the equipment or system, as installed, including a copy of the material found by the Engineer to be in general accordance with the Drawings and Specifications. Manuals shall be printed on or be folded to 8-1/2 x 11 in. size whenever practical. Drawings shall be reduced, when practical, or provided in full size and placed in an envelope or pocket bound into the manual. The Contractor shall include clearly marked divider tabs to separate specification section equipment and to improve the ease of use. Provide a detailed Table of Contents, and use a manual title label identifying the contents of the manual. Label shall include "O & M Manual for [Project Name]", the General Contractor's Name, and the Year project was placed into service. Manuals shall be submitted in completed form and be approved by the Engineer not less than 30 days prior to the date of final acceptance.

1.10 CONSTRUCTION SCHEDULE

- A. Immediately after signing the Contract, each prime Contractor shall prepare a graphic construction schedule, indicating the work to be executed during each month and the rate of expected progress to secure completion on or before the project completion date. Copies of the construction schedule, upon which has been indicated the actual progress, shall be furnished to the Engineer with each requisition for payment.
- B. Should the rate of progress fall materially behind the scheduled rate of progress, and unless the delay is authorized by the Engineer in writing, each offending Contractor shall furnish additional labor, work overtime, or take other necessary means required to complete the work on or before the project completion date. No additional compensation beyond the set Contract price shall be paid for action taken or overtime expense incurred in maintaining scheduled progress.
- C. Each prime Contractor on the project shall give its progress schedule to the General Contractor for incorporation in a combined project schedule.
- D. The General Contractor shall prepare a combined Project Progress Schedule and shall update it monthly for presentation at project progress meetings. A copy of the combined Project Progress Schedule shall be submitted with the respective periodic estimate.
- E. All project schedules shall be on 11" x 17" or smaller size paper to facilitate ease of reproduction.

1.11 SCHEDULE OF VALUES

- A. Provide a detailed breakdown of the agreed Contract Sum showing values allocated to each of the various parts of the Work, as specified herein and in other provisions of the Contract Documents.
A Schedule of values is required to be compatible with the "continuation sheet" accompanying applications for payment.
- B. Type dated schedule on 8 1/2 in. X 11 in. white paper; Contractor's standard forms and computer printouts will be considered for approval by Engineer upon Contractor's request. Identify schedule with Project title, Name & Address of Contractor, and date of submission.
- C. Schedule shall list separately the installed labor and material value of the component parts of the Work in sufficient detail to serve as a basis for computing values for progress payments during construction.
 - 1. Identify each line item with the number and title of the respective major section of the specifications.
 - 2. Each item shall include a directly proportional amount of the Contractor's overhead and profit.
 - 3. For items where progress payments will be requested for stored materials, breakdown the value into the cost of the materials, delivered and unloaded; and the total installed value.
 - 4. For completed construction, subdivide as needed to identify costs for audit, inventory, insurance and replacement cost purposes.
- D. When so required by the Engineer, provide copies of the subcontracts or other data acceptable to the Engineer, substantiating the sums described.
- E. Use required means to assure arithmetical accuracy of the sums described.

1.12 INSURANCE CERTIFICATES

- A. Submit a copy of the Contractor's current Workers' Compensation Certificate and all renewal Certificates until the date that Final payment is due. Coverage shall not lapse for any reason.

1.13 PRODUCT AND WORK ITEM WARRANTIES AND BONDS

- A. Form of Submittals
 - 1. Bind in commercial quality 8-1/2 x 11 inch three D side ring binders with durable plastic covers.
 - 2. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor [and equipment supplier]; and name of responsible company principal.
 - 3. Table of Contents: Neatly type Table of Contents of the binder manual, with each item identified with the number and title of the specification section in which specified, and the name of Product or work item.
 - 4. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
- B. Preparation of Submittals
 - 1. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.
 - 2. Verify that documents are in proper form, contain full information, and are notarized.
 - 3. Co-execute submittals when required.
 - 4. Retain warranties and bonds until time specified for submittal.

C. Time of Submittals

1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
2. Make other submittals within ten days after Date of Substantial Completion, prior to final Application for Payment.
3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART TWO - PRODUCTS

N/A

PART THREE - EXECUTION

3.01 DISTRIBUTION

- A. Distribution of reviewed and approved submittals will be made by the Engineer in accordance with PART FOUR of the individual specifications if addressed there, otherwise distribution will be as follows:
 1. Information for Record - One copy to Owner, Engineer, and Resident Project Representative.
 2. Review and Approval - After finding to be in general accordance with the Drawings and Specifications, the Engineer will issue a Construction Bulletin and distribute copies to the Contractor (the number submitted for its needs); one copy each for Owner, Engineer, and Resident Project Representative.

3.02 PERFORMANCE OF WORK

- A. Complete all work associated with submittals or required above.

PART FOUR - SPECIAL PROVISIONS

None

END OF SECTION

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PART ONE - GENERAL

1.01 SECTION INCLUDES

- A. Selection and payment.
- B. Contractor submittals.
- C. Laboratory responsibilities.
- D. Laboratory reports.
- E. Limits on testing laboratory authority.
- F. Contractor responsibilities.
- G. Schedule of inspections and tests.

1.02 RELATED SECTIONS

- A. Information Available to Bidders: Soil investigation data.
- B. General Conditions: Inspections, testing, and approvals required by public authorities.
- C. Section 01300 - Submittals: Manufacturer's certificates.
- D. Section 01700 - Contract Closeout: Project record documents.
- E. Individual Specification Sections: Inspections and tests required, and standards for testing.

1.03 REFERENCES

- A. ASTM C802 - Practice for Conducting an Inter-laboratory Test Program to Determine the Precision of Test Methods for Construction.
- B. ASTM C1021 - Practice for Laboratories Engaged in the Testing of Building Sealants.
- C. ASTM C1077 - Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.
- D. ASTM C1093 - Practice for Accreditation of Testing Agencies for Unit Masonry.
- E. ASTM D290 - Recommended Practice for Bituminous Mixing Plant Inspection.
- F. ASTM D3740 - Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
- G. ASTM D4561 - Practice for Quality Control Systems for an Inspection and Testing Agency for Bituminous Paving Materials.
- H. ASTM E329 - Practice for Use in the Evaluation of Inspection and Testing Agencies as Used in Construction.
- I. ASTM E543 - Practice for Determining the Qualification of Nondestructive Testing Agencies.
- J. ASTM E548 - Practice for Preparation of Criteria for Use in the Evaluation of Testing Laboratories and Inspection Bodies.
- K. ASTM E699 - Practice for Criteria for Evaluation of Agencies Involved in Testing, Quality Assurance, and Evaluating Building Components in Accordance with Test Methods Promulgated by ASTM Committee E6.

1.04 SELECTION AND PAYMENT

- A. Include within the Contract Price an amount sufficient to cover all testing and inspecting required under this Section and other pertinent Sections of these Specifications, and to cover all testing and inspecting required by governmental agencies having jurisdiction and other tests and inspections as are directed by the Engineer.
- B. When initial tests requested by the Engineer indicate non-compliance with the Contract Documents, subsequent retesting occasioned by the non-compliance shall be performed by the same testing laboratory and the costs thereof shall be paid by the Contractor.
- C. Employment of testing laboratory in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

1.05 QUALITY ASSURANCE

- A. Comply with requirements of ASTM C301, ASTM C425, ASTM D2412, ASTM C802, ASTM D2444, ASTM C1021, ASTM C1077, ASTM C1093, ASTM D290, ASTM D3740, ASTM D4561, ASTM E329, ASTM E543, ASTM E548, ASTM E699, and ACI 613, ASTM C42, ASTM C39, and all applicable reference standards in these specifications.
- B. Laboratory: Authorized to operate in State in which Project is located.
- C. Laboratory Staff: Maintain a full time registered Engineer or certified specialist on staff to review services.
- D. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.

1.06 CONTRACTOR SUBMITTALS

- A. Prior to start of Work, submit testing laboratory name, address, and telephone number, and names of full time registered Engineer or specialist and responsible officer.
- B. Submit copy of report of laboratory facilities inspection made by Materials Reference Laboratory of National Bureau of Standards during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.

1.07 LABORATORY RESPONSIBILITIES

- A. Test samples of mixes submitted by Contractor.
- B. Provide qualified personnel at site. Cooperate with Engineer and Contractor in performance of services.
- C. Perform specified inspecting, sampling, and testing of Products in accordance with specified standards.
- D. Ascertain compliance of materials and mixes with requirements of Contract Documents.
- E. Promptly notify Engineer and Contractor of observed irregularities or non-conformance of Work or Products.
- F. Perform additional inspection and tests required by Engineer.
- G. Attend pre-construction meetings and progress meetings.

1.08 LABORATORY REPORTS

- A. After each inspection and test, promptly submit two copies of laboratory report to Engineer, and to Contractor.
- B. Include:
 - 1. Date issued
 - 2. Project title and number
 - 3. Name of inspector

4. Date and time of sampling or inspection
5. Identification of product and specifications section
6. Location in the Project
7. Type of inspection or test
8. Date of test
9. Results of tests
10. Conformance with Contract Documents.

C. When requested by Engineer, provide interpretation of test results.

1.09 LIMITS ON TESTING LABORATORY AUTHORITY

- A. Laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
- B. Laboratory may not approve or accept any portion of the Work.
- C. Laboratory may not assume any duties of Contractor.
- D. Laboratory has no authority to stop the Work.

1.10 CONTRACTOR RESPONSIBILITIES

- A. Deliver to laboratory at designated location, adequate samples of materials proposed to be used which require testing, along with proposed mix designs.
- B. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
- C. Provide incidental labor and facilities:
 1. To provide access to Work to be tested
 2. To obtain and handle samples at the site or at source of Products to be tested
 3. To facilitate tests and inspections
 4. To provide storage and curing of test samples.
- D. Notify Engineer and laboratory 24 hours prior to expected time for operations requiring inspecting and testing services.

1.11 SCHEDULE OF INSPECTIONS AND TESTS

A. SOIL INSPECTION AND TESTING

1. Make required inspections and tests including, but not necessarily limited to:
 - a. Visually inspect on-site and imported fill and backfill, making such tests and retests as are necessary to determine compliance with the Contract requirements and suitability for the proposed purpose.
 - b. Make field density tests on samples from in-place material.
 - c. As pertinent, inspect the progress of excavating, filling and grading; make density tests at fills and backfills; and verify compliance with provisions of the Contract Documents and governmental agencies having jurisdiction.
2. Make and distribute necessary reports and certificates.

B. CONCRETE INSPECTING AND TESTING

1. Portland cement:

- a. Secure from the cement manufacturer Certificates of Compliance delivered directly to the concrete producer for further delivery directly to the testing laboratory.
- b. Require the Certificates of Compliance to positively identify the cement as to production lot, bin or silo number, dating and routing of shipment, and compliance with the specified standards.
- c. If so required by the Engineer, promptly provide such other specific physical and chemical data as requested.

2. Aggregate:

- a. Provide one test unless character of material changes, material is substituted, or additional test is requested by the Engineer.
- b. Sample from conveyor belts or batching gates at the ready-mix plant:
 - 1) Sieve analysis to determine compliance with specified standards and grading.
 - 2) Specify gravity test for compliance with specified standards.

3. Laboratory design mix:

- a. After approval of aggregate, and whenever character or source of material is changed, provide mix design in accordance with ACI 613.
- b. Provide designs for all mixes prepared by a licensed civil engineer.

4. Molded concrete cylinders:

- a. Provide three test cylinders for each 150 cubic yard, or fraction thereof, of each class of concrete of each day's placement.
- b. Test one cylinder at seven (7) days, one at twenty-eight (28) days, and one when so directed.
- c. Report the mix, slump, gauge, location of concrete in the structure and test results.
- d. Take specimens and make tests in accordance with the applicable ASTM standard specifications.

5. Core tests:

- a. Provide only when specifically so directed by the Engineer because of low cylinder test results.
- b. Cut from locations directed by the Engineer, securing in accordance with ASTM C42, and prepare and test in accordance with ASTM C39.

6. Placement inspections:

- a. On concrete over 2000 psi, provide continuous or other inspection as required by governmental agencies having jurisdiction.
- b. Throughout progress of concrete placement, make slump tests to verify conformance with specified slump.
- c. Using all required personnel and equipment throughout progress of concrete placement, verify that finished concrete surfaces will have the level or slope that is required by the Contract Documents.

C. CONCRETE REINFORCEMENT INSPECTING AND TESTING

1. Prior to use, test all reinforcement steel bars for compliance with the specified standards.

- a. Material identified by mill test reports, and certified by the testing laboratory, does not require additional testing. Require the supplier to furnish mill test reports to the testing laboratory for certification.
 - b. Tag identified steel at the supplier's shop. When steel arrives at the job site without such tags, test it as unidentified steel.
2. Unidentified steel:
- a. Have testing laboratory select samples consisting of two (2) pieces of each size, each 18" long.
 - b. Have the testing laboratory make one tensile test and one bend test for each 2-1/2 tons or fraction thereof of each size of unidentified steel.
3. Provide continuous inspection for all welding of reinforcement steel.

D. STRUCTURAL STEEL INSPECTING AND TESTING

1. Prior to use, test all structural steel for compliance with the specified standards.
- a. Material identified by mill test reports and certified by the testing laboratory does not require additional testing. Require the supplier to furnish mill test reports to the laboratory for certification.
 - b. Tag identified steel at the supplier's shop. When steel arrives at the job site without such tags, test it as unidentified steel.
2. Unidentified steel:
- a. Have testing laboratory make one tensile test and one bend test for each five (5) tons or fraction thereof of each shape and size of unidentified structural steel.
3. Shop Welding:
- a. Provide qualified testing laboratory inspector.
 - b. On single pass welds, inspect after completion of welding and prior to painting.
 - c. On multiple pass welds, and on butt welds with cover pass on the back side, provide continuous inspection.
4. Field welding:
- a. Provide continuous inspection by a qualified testing laboratory inspector.

E. SEWER PIPE AND JOINT MATERIAL TESTING

1. Vitrified Clay Pipe
- a. Tests for clay pipe shall be made on four (4) specimens of each size and type of pipe as selected by the Engineer which pipe shall be furnished by the manufacturer. Tests shall be made by an independent testing laboratory approved by the Engineer and shall be at the Contractor's expense. Tests shall be made in accordance with current standards of ASTM C301 and ASTM C425.
 - b. All clay sewer pipe shall be subject to inspection on the job by the Engineer. The purpose of the inspection shall be to cull and reject pipe that, independent of the physical tests, fails to conform to the requirements of these specifications.
2. PVC Pipe
- a. Test for PVC gravity sewer pipe shall be made by an independent testing laboratory, approved by the Engineer and shall be at the Contractor's expense.
 - b. Drop Impact Test: Pipe (6" long section) shall be subjected to impact from a free falling tup (20 lb. Tup

A.) in accordance with ASTM Method of Test D2444. No shattering or splitting shall be evident when the following energy is impacted.

<u>Nominal Size</u>	<u>Ft. - lbs.</u>
4	150
6	210
8	210
10	220

- c. Pipe Stiffness: Minimum pipe stiffness (F/Y) at 5% deflection shall be 46 psi for all sizes when tested in accordance with ASTM Methods of Test D2412, "External Loading Properties of Plastic Pipe by Parallel Plate Loading."
- d. Joint Tightness: Two (2) sections of pipe shall be assembled in accordance with the manufacturer's recommendation. Joints shall be tested in accordance with ASTM D3212, "Joints for Drain and Sewer Plastic Pipe Using Flexible Elastomeric Seals."
- e. Flattening: There shall be no evidence of splitting, cracking or breaking when the pipe is tested as follows: Flatten specimen of pipe six (6) inches long between parallel plates in a suitable press until the distance between the plates is 40 percent of the outside diameter of the pipe. The rate of loading shall be uniform and such that the compression is completed within two to five (2-5) minutes.

3. C900 Pipe

- a. Testing: See Section 02634 PVC PIPE (AWWA C900)

4. Ductile Iron Pipe

- a. Testing: See Section 02625 DUCTILE IRON PIPE & FITTINGS

F. WAIVER OF INSPECTION AND/OR TESTS

- 1. Specified inspections and/or tests may be waived only by the specific approval of the Engineer, and such waivers will be expected to result in credit to the Owner equal to normal cost of such inspection and/or test.

PART TWO - PRODUCTS

Not Used

PART THREE - EXECUTION

Not Used

PART FOUR - SPECIAL PROVISIONS

None

END OF SECTION

TEMPORARY WORK FACILITIES AND PROJECT CONTROLS**PART ONE - GENERAL****1.01 DESCRIPTION**

- A. Section 01500 specifies requirements related to preliminary work and temporary items, facilities, and control of the project Work including:
- 1.02 Conformity with Drawings & Specifications (incl. Field Engineering)
 - 1.03 Cutting & Patching Existing Structures and Buried Improvements
 - 1.04 Maintenance of Existing Operations
 - 1.05 Cooperation of Contractor(s)
 - 1.06 Road Maintenance and Restoration
 - 1.07 Temporary Parking, Access Roads, and Paving of Trenches
 - 1.08 Maintaining Traffic & Utilities in Right-Of-Ways
 - 1.09 Barricades, Signs, Lights, & Site Safety
 - 1.10 Environmental Protection
 - 1.11 Night, Sunday and Holiday Work
 - 1.12 Specific Contractor Responsibilities
 - General Contractor
 - Electrical Contractor
 - Prime Contractors
 - 1.13 Unauthorized Work
 - 1.14 Use of Site
 - 1.15 Use of Explosives
 - 1.16 Construction Photographs
 - 1.17 Construction Audio-Color Video Taping
 - 1.18 Quality Assurance
 - 3.01 Maintenance and Removal
 - 3.02 Water Control
 - 3.03 Erosion and Sediment Control
 - 3.04 Notification of Utility Owners
 - 3.05 Failure to Perform Section Provisions
- B. Other related Sections that may or may not be part of this project work include, Section 01410 Testing Laboratory Services, Section 01590 Field Offices, and others.

1.02 CONFORMITY WITH DRAWINGS & SPECIFICATIONS

- A. All Work shall conform to the lines, grades, cross sections, dimensions, and directions shown on the Drawings and specified unless altered by the Engineer. Alterations and deviations, as may be required or desired, shall be approved in writing by the Engineer.
- B. Field engineering shall be performed by Professional Engineers registered in the State of the project location. Surveying shall be performed by Professional Surveyors registered in the State of the Project location. Engineers and Surveyors, acceptable to the Engineer, shall submit Insurance Certificates giving evidence that they have current Errors and Omissions insurance coverage. The Contractor's Engineers and Surveyors shall,
- 1. Verify and protect all survey control and reference points before starting field construction work. Establish two or more permanent benchmarks on site that are referenced to established control points. Record benchmark location descriptions, with horizontal and vertical data, on Project Record Documents. If a survey control or reference point is disturbed, notify the Owner's Engineer prior to re-establishing. Any discrepancies shall be promptly reported to the Owner's Engineer for resolution.
 - 2. Establish and periodically verify elevations, lines, grades, and levels. Locate and lay out all improvements by surveying or other appropriate instruments. Verify that all proposed improvements are constructed on Owner's property and that dimensions, locations, angles, and elevations of the constructed work are in accordance with the Drawings. On unit price items, determine and certify quantities for payment requests.

- C. Contractor shall maintain a set of Contract Documents solely for use as the Project Record Documents. The Project Record Documents shall note all deviations from the original bid documents and reflect actual constructed conditions. Contractor shall have said documents available at each progress meeting to verify that deviations are being recorded as they are encountered.

1.03 CUTTING & PATCHING STRUCTURES AND BURIED IMPROVEMENTS

- A. Where existing surface structures and buried improvements are shown on the Drawings, their location, depth, configuration, and dimensions are believed to be reasonably representative based on the data used in preparing the Drawings, but such representations are not guaranteed. Such improvements are shown for general informational purposes and shall not be construed to represent that in all cases, the improvements will be as shown on the Drawings.
- B. Where cutting and patching to structures or other buried improvements are noted or required, examine and assess existing conditions prior to commencing the Work, including elements subject to damage or movement during cutting and patching. Beginning to cut or patch shall be Contractor's acceptance of existing conditions.

1. PREPARATION

- a. Provide temporary supports to ensure structural integrity of the Work. Provide devices and methods to protect other improvements from damage.
- b. Provide protection from elements for areas that may be exposed by uncovering work.
- c. Maintain excavations safe and free of water.

2. CUTTING

- a. Execute excavation and backfill as required in accordance with Section 02220 and perform cutting and patching Work.
- b. Uncover work to install improperly sequenced work.
- c. Remove and replace defective or non-conforming work.
- d. Remove samples of installed work for testing when requested.
- e. Provide openings in the Work for the penetration of mechanical and electrical work, or for other purposes.
- f. Employ original installer or qualified equal to perform cutting for weather exposed and moisture resistant elements, and sight-exposed surfaces.
- g. Cut rigid materials using masonry saw, core drill, or other appropriate cutter. Pneumatic tools are not allowed without prior approval.

3. PATCHING

- a. Execute patching to complement adjacent Work.
- b. Fit products together so they properly integrate with other Work.
- c. Execute work by methods that avoid damage to other Work, and that will provide appropriate surfaces to receive patching and finishing.
- d. Employ original installer or qualified equal to perform patching for weather exposed and moisture resistant elements, and sight-exposed surfaces.
- e. Restore work with new products in accordance with requirements of Contract Documents.
- f. Fit work air and water tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

- g. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

1.04 MAINTENANCE OF EXISTING OPERATIONS

- A. The function of all critical existing piping systems, collection systems, treatment facilities, and pumping facilities shall be maintained throughout the construction of the Work. When construction requires interruption of any critical operation or function, the contractor(s) shall first seek written approval from the Owner through the Engineer. Unless approval is secured in writing to the contrary, the contractor(s) shall do whatever is required to maintain continuous operation of the existing systems and facility functions. This may require, but is not limited to bypass pumping, overland piping, temporary treatment units, auxiliary power, and supporting appurtenances. All interruptions shall be kept to a minimum.

1.05 COOPERATION OF CONTRACTOR(S)

- A. The contractor(s) shall plan and perform their work to minimize interference with the operation of the Owner, other contractors, utilities, or public facilities on or near the Work.
- B. The Owner reserves the right to perform other work by contract or otherwise, and to permit other public entities, utilities, or others to perform work on or near the Work site during the construction period. If a conflict arises that cannot be resolved by the conflicting parties, the Owner will determine when and how the Work will proceed. Claims for delay or inconvenience due to such other parties working on the site will not be considered.

1.06 ROAD MAINTENANCE & RESTORATION

- A. Temporary road paving shall be provided and maintained on all pavements disturbed by the Work. Where the Work site is a pumping, treatment, similar, or related facility, and suitable access roads for operating personnel and deliveries shall be provided and maintained, as required.
- B. Permanent pavement and final restoration shall be performed as the project approaches completion but no later than the last paving season prior to the Contract completion date.

1.07 TEMPORARY PARKING, ACCESS ROADS, AND PAVING OF TRENCHES

- A. The Contractor shall provide and maintain adequate temporary parking spaces at locations approved by the Engineer on or near the Work site. The parking spaces shall be used for the contractors' personnel and their visitors. Upon completion of the Work, remove and restore the disturbed area, as required.
- B. Construct temporary all-weather access roads, including bridges and culverts as necessary, to serve the construction area. Width and load bearing capacity of the roads shall be sufficient to provide low maintenance and safe unimpeded traffic flow during construction.
- C. Temporary paving, consisting of a gravel base and a 2-inch wearing course, shall be applied to all trench excavations in paved areas immediately after the excavation trench has been backfilled and compacted. Temporary paving shall be installed and maintained to the level of the surrounding roadway.

1.08 MAINTAINING TRAFFIC & UTILITIES IN RIGHT-OF-WAYS

- A. Where the Work is located on or in public streets, roads, or highways, the Contractor shall perform the work to minimize danger and inconvenience to the public. Roadways and pedestrian paths, affected by the construction work, shall be maintained and kept clean and safe. This includes providing free access to hospitals, schools, and other such facilities, and providing temporary driveways, bridges, stream crossings, and walkways as necessary.
- B. Emergency vehicle access shall be provided to the Work site and to adjacent property at all times. If the work requires closure to vehicle access, the Contractor shall notify and obtain the approval of the Engineer, fire, police, and emergency medical providers of such closure. Closure time shall be kept to a minimum.
- C. Provide free access to all fire hydrants, water valves, gas valves, traffic control panels, and other important utility improvements located on the site and along the line of the work.

- D. Maintain gutters, waterways, and sewer systems affected by the work.

1.09 BARRICADES, SIGNS, LIGHTS & SITE SAFETY

- A. The Contractor shall employ guards for the work, when and as necessary to provide site safety. The Contractor shall erect and maintain such strong and suitable barriers, signs, and warning lights as will effectively prevent accidents and injury to people and property. Adequate lighting shall be maintained between the hours of one-half (1/2) hour before sunset and one-half (1/2) hour after sunrise.
- B. No excavation shall be left open for any significant period awaiting further work by the Contractor's forces or by others. Excavations shall be temporarily backfilled and resurfaced if applicable with a temporary pavement passable to traffic.
- C. In addition to other safety requirements, a fence at least four (4) feet high shall surround any excavation left open at the end of the day.
- D. The Contractor shall be responsible for complying with all local, State, and Federal regulations pursuant to maintaining traffic, safety notification, construction methods and obtaining all necessary construction permits.
- E. Construction safety measures shall comply with Department of Labor Occupational Safety and Health Regulations for Construction.

1.10 ENVIRONMENTAL PROTECTION

- A. When the Work includes an existing sanitary sewerage collection system or a treatment facility, the General Contractor shall be responsible for maintaining all sanitary and process flow streams, and plant functions. Provisions shall be made for the temporary piping, pumping, storage and/or disposal of flow streams during periods when the operation of the sewers or treatment facilities are hindered or disrupted by the Work.
- B. Provide on-site sanitary facilities for project workers.
- C. All prime contractors shall perform their work in such a manner as to eliminate all unnecessary noise, dust, and odors.
- D. Maintain all equipment in compliance with all standards as required by the Occupational Safety and Health Act.
- E. Take whatever action is necessary and provide all labor, tools, equipment, and machinery to adequately handle all wastewater, surface, and flood flows that may be encountered during the performance of the work. At no time shall any contractor cause the discharge of untreated wastewater to the environment.
- F. It shall be the responsibility of each contractor to prevent or limit unnecessary loud noise and the pollution of air and water resulting from the construction operations.
- G. The Contractor shall perform work required to prevent soil from eroding or otherwise entering onto all paved areas and into natural watercourses, ditches, and public sewer systems, and to prevent dust attributable to the construction operations from entering the atmosphere.
- H. Construction sequencing shall be planned to minimize the size and time of exposure of disturbed areas. Scheduling of clearing, grading and stabilization shall reflect the construction capabilities of the Contractor as well as climate factors.
- I. Trenches shall be backfilled at the end of each working day. Backfilling shall be conducted in a manner appropriate to avoid accelerated erosion until temporary and/or permanent stabilization is affected.
- J. Dust from unpaved streets or parking areas and dust remaining after sweeping paved streets shall be controlled with calcium chloride dust palliative or as otherwise directed by the Engineer.
- K. Existing vegetation shall be protected as much as possible during construction.
- L. During construction, all contractors are prohibited from unnecessarily disturbing or uprooting trees and vegetation. Special care shall be taken so as not to disturb trees and vegetation along stream banks and in the

vicinity of streams; dumping soil or debris into streams or on stream banks; changing the course of streams without encroachment permits; leaving coffer dams in streams; leaving temporary stream crossings for equipment; operating equipment in streams; or discharging silt laden water into streams.

- M. All stockpiled topsoil and fill materials shall be protected from soil erosion by the use of a filter fabric or straw bale barrier constructed around the perimeter of the stockpiled material. The stockpiled material shall not be placed within fifty feet of any stream or channel bank.
- N. Stockpiling excavated material shall not be allowed on roadways or right-of-ways unless written permission is received by the Contractor, and transmitted to the Owner, from the legislative agency or property owner responsible for the maintenance of the area where the material is to be stockpiled.
- O. All top soil, excavated from areas where cuts and fills are to be made, shall be stockpiled on a level area enclosed in an erosion barrier and stabilized for use after the final sub grade is completed.
- P. All disturbed unpaved areas that are to be exposed for more than thirty days shall be provided with a seed and mulch cover. The seed shall be a blend of 40% Kentucky bluegrass, 40% Creeping Red Fescue, and 20% Perennial Rye applied at a rate of 5 pounds per 1000 S.F. The seeding shall include a uniform application of 12-12-12 fertilizer applied at a rate of 20 pounds per 1000 square feet and covered by 1/4 inch of soil and straw mulch applied at a rate of three tons per acre or approved equal.
- Q. Mulch shall be used on all areas where temporary or final stabilization cannot be performed due to unfavorable weather conditions. Mulching materials shall be straw, wood, or wood cellulose fibers, or erosion control fabric in conformance with the requirements of the project specifications.
- R. All temporary and final plantings shall be maintained for thirty calendar days after all planting is complete and approved by the Engineer. Maintenance shall include necessary watering, weeding, cultivating, spraying and pruning to keep plant materials in a healthy growing condition, and to keep planted areas neat and attractive during the maintenance period. At the end of the maintenance period, all plant materials shall be in healthy growing condition.
- S. Final stabilization of all disturbed areas shall be performed in compliance with the project Specifications.
- T. Water containing suspended material from any part of the Contractor's operations shall be clarified before discharging to storm sewers, channels, or streams.
- U. The Contractor shall construct and maintain filters, sedimentation traps, or stilling basins with overflows to clarify waters containing suspended materials from fill areas, excavations, deep wells, well points, and disposal sites before discharging to drains or streams.
- V. The Contractor shall carry out cleanup, grading, seeding, planting and restoration of the work area as early as practical as the construction proceeds.
- W. After the construction is completed, the temporary paving and seeding shall be replaced with final paving and seeding as specified.
- X. If rodents are found to be present, provide appropriate rodent control.

1.11 NIGHT, SUNDAY AND HOLIDAY WORK

- A. No work will be permitted at night, Sunday or legal holidays except in the case of emergency. Except for emergency work, the written authorization of the Engineer shall be required. Where no emergency exists, but the Contractor feels it advantageous to work at night, Sunday or legal holidays, the Contractor shall notify the Engineer at least two days in advance, requesting written permission. Any work performed during the absence of the Engineer will be done at the Contractor's risk and responsibility, and may be subject to rejection upon later inspection.

1.12 SPECIFIC CONTRACTOR RESPONSIBILITIES

- A. The General Contractor shall provide all temporary water, heating, lighting, and power required to construct the Work that is not specifically specified to be provided by others, until such time as the Owner takes beneficial use of the work.

1. Pay all utility charges related to providing temporary electrical power and lighting that is required to construct the Work until the Work is placed into the beneficial service of the Owner.
 2. Provide fuel for building/structure temporary heating, if any.
 3. Provide temporary building or structure heat, heating equipment, and security lighting to protect the work until it is complete and ready for Owner's occupancy. Such equipment shall meet all requirements of the N.E.C., O.B.B.C. and the local codes for temporary construction services.
 - a. Any prime contractor that has special, out of the ordinary heating, lighting, or power requirements for the work of its trades, shall provide those special needs including any related equipment.
 4. Provide Resident Engineer's Office (see Section 01590, if included in this project)
 5. Project Sign (see Section 01580, if included in this project)
 6. Provide adequate water for drinking and for construction needs including supply lines as necessary to such locations that will expedite construction.
 7. Provide and maintain barricades, signs, signal lights, fences, guards, flaggers and all other security and safety equipment required to protect the public, the Work, and the Owner's Work-related facilities and operations. Restrict entry to the Work site to authorized people and vehicles. Maintain, and make available to Engineer and Owner upon request, a log of workers and visitors.
 8. Provide environmental protection
 9. Provide temporary paving
 10. Provide temporary construction required to maintain the operation of the existing facilities or existing facility function.
 11. Provide temporary plugs, blind flanges, bulkheads, piping, connections, pumping, valves, sheeting, shoring, bracing, sanitary facilities, treatment process function, and similar work or items that may be needed while constructing the Work.
 12. Provide a temporary Contractor's office located on the Work site until completion of the Contract. An authorized agent shall be present at all times while the work is in progress.
 13. Provide all articles necessary for giving "First Aid to the Injured" on the job site. Maintain and display an adequate plan for the immediate removal and emergency treatment of anyone injured or who becomes critically ill on the work site.
 14. Arrange for the installation of temporary electrical service for construction purposes as well as make provisions to adequately protect all transformers and any associated temporary power equipment throughout the course of construction.
 15. Protect the Work against weather damage and the operations of other trades. The General Contractor shall be responsible for the proper use of all temporary wiring systems until they are removed.
- B. The Electrical Contractor shall provide all temporary electrical service and power distribution, except as specifically excluded, for the Work as called for herein or required.
1. Provide, maintain, and remove when no longer needed, all temporary power service required to maintain all critical treatment processes and operations during the construction of the Work.
 2. Provide and maintain temporary power installations as required by all of the prime contractors for construction purposes (including extending temporary service from the utility supply to the various project construction areas). Required installations and maintenance includes general lighting, power, and telephone requirements; connections for temporary heat; and power installations and telephone hookups to the Engineer's field office and to all prime contractors' trailers and work sheds.

3. Power for any electric arc welding shall be excluded from the requirements for temporary power service. Power for any electric arc welding equipment shall be furnished complete by the contractor whose trades require the welding.
 4. Provide power in accordance with the General Contractor's construction schedule.
 5. Pay all utility charges for step down transformers, metering or other materials.
 6. Provide at least one full-time electrician to satisfy temporary electrical service needs. The electrician shall be on site when any trade is working that requires temporary power. The electrician may be engaged in other phases of the Work while on site. When electrical services are required to serve the needs of other prime contractors outside of normal working hours, payment for the temporary power electrician shall be negotiated between the Electrical Contractor and the prime contractor(s) requiring the extended-time service.
 7. Conform all electrical work for construction purposes to Federal and State (Ohio Safety Code IC-3) requirements as well as the requirements of the National Electrical Code. The cost to obtain and pay for required applications, permits and inspection pertaining to this work shall be included in the Electrical Contractor's bid.
 8. Install temporary work in such a manner as not to interfere with the permanent construction. If interferences do occur, it shall be the responsibility of the Electrical Contractor to make such changes as may be required to overcome the interferences.
 9. Furnish and install not less than 200 watt lamps for general lighting, and all fuses as may be required for a complete job. Replacement of lamps, fuses, including that caused by theft, will be the responsibility of the Electrical Contractor throughout the life of the project.
- C. Any prime contractor that has special heating, lighting, or power requirements for the work of its trades, shall provide the special needs including any related equipment. Power for electric arc welding equipment shall be furnished complete by the trades requiring the welding. Each prime contractor shall provide and pay for its own extensions for lights or power tools beyond the receptacle outlets provided by the Electrical Contractor.
1. Each prime contractor shall properly dispose of all debris removed or resulting from its work.
- 1.13 UNAUTHORIZED WORK
- A. Work done beyond the lines shown on the Drawings, specified, or ordered; work done without required inspection; or any Extra work performed without written authorization will be considered unauthorized work and will not be paid for under the provisions of the Contract. Work so performed may be ordered removed at Contractor's expense.
- 1.14 USE OF SITE
- A. Owner will make a reasonable effort to accommodate the needs of the Contractor for his operation so long as his operation does not materially interfere with the safety or required operation of the site facilities.
 - B. Where the work is to be constructed upon or within a temporary or permanent easement, the easement(s) shown on the Drawings will be secured by the Owner without cost to the Contractor. When the work is constructed in or within 10 feet of an easement, the Contractor shall adequately stake the easement limits and shall not enter upon or occupy any private property that it does not have a written agreement to do so.
 - C. All improvements and surfaces disturbed by the Contractor's work shall be properly maintained during construction and be returned to their original or better condition upon completion of the project.
- 1.15 USE OF EXPLOSIVES
- A. When the use of explosives is authorized by the Engineer, the storage, handling, protection methods, and firing of the explosives shall be performed only by people highly experienced in such work. The Contractor agrees and warrants that when explosives are used, all State laws, local ordinances, and applicable safety requirements will be strictly met. Contractor shall be responsible for all damage resulting from the use of the explosives.

1.16 CONSTRUCTION PHOTOGRAPHS

- A. Unless excluded in PART FOUR, provide photographs by an experienced photographer, acceptable to Engineer, of the site and construction throughout the progress of Work.
- B. Take photographs at least 15 days prior to each application for payment and as necessary to provide the clear, chronological record of construction steps performed in constructing the proposed facilities. Specifically, photographs shall document,
 - 1. Site clearing
 - 2. Excavations and buried pipe installations
 - 3. Foundations and below-ground structures
 - 4. Structural framing
 - 5. Enclosure of building
 - 6. Equipment
 - 7. All other work
 - 8. Final Completion
- C. Take the following photographs to evidence existing conditions when applicable,
 - 1. Interior views: From points that show all locations of proposed work.
 - 2. Exterior views:
 - a. To view each structure and/or all locations of utility and underground services, and to show all work adequately. The average distance between photograph shots along the route of a utility or underground service shall be 50 feet unless otherwise approved by the Engineer.
 - b. Include in photographic coverage all driveways, sidewalks, curbs, ditches, streets, landscaping, trees, shrubs, culverts, catch basins, retaining walls, visible utilities and building exteriors within the zones of influence.
- D. Take photographs of soil erosion and sedimentation controls on a routine basis.
- E. Prints requirements:
 - 1. Full color; three prints of each view; Smooth Paper Surface; High Contrast; Minimum size 4 inch x 6 inch
 - 2. Identify each print on back. Identify name of Project, contract number, phase, orientation of view, name and address of photographer, and photographer's numbered identification of exposure.
 - 3. Identify the date and time of print on front, lower right corner.
 - 4. Photographs shall be inserted into clear vinyl carrier sheets (8-3/8" x 11-3/16") chronologically in numerical order and bound in "D" ring type binders. Each binder shall contain an index identifying each photograph and coordinating it with its specific location.
- F. Digital Files:
 - 1. Deliver Digital Files on disk to Engineer with project record documents. Catalog and index digital files in chronological sequence; provide typed table of contents.

G. Technique:

1. Provide factual presentation.
2. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.

H. Views:

1. Provide photographs from locations as necessary to provide diversified overall views of all the performed work from positions that are to remain accessible throughout the progress of the work
2. Consult with Engineer for instructions on specific views required.

I. Deliver prints with each Application for Payment with transmittal letter specified under Section 01300.

1.17 CONSTRUCTION AUDIO- COLOR DIGITAL RECORDING

A. Unless excluded in PART FOUR, provide audio-color digital video recording on DVD of the project construction site.

1. Provide Pre-Construction, during construction and completion of construction videos of the construction site and existing facilities (interior and exterior) to be affected by the Work.

B. Quality Assurance

1. Secure the services of a professional videographer who is skilled and experienced in construction audio-color video recording and whose work samples are acceptable to the Engineer.
2. Do not replace the videographer without the Engineer's written approval.

C. Submittals

1. Comply with pertinent provisions of Section 01300.
2. Except as otherwise directed and separately paid for, submit three copies of each audio-video DVD.

D. Preliminary Video Record

1. Prior to beginning construction, the General Contractor shall video the construction area to provide a true and accurate video record of the project site. The video shall be a high resolution DVD that will provide for a clear and concise picture playback and for "still" frame reviews.

E. System Description

1. Prior to the start of any construction activities, audio-video recording is required along water and sewer line routes, roadways, and at structures that will or may be affected by the work.
2. The recording equipment must be able to produce quality color pictures for the purpose of providing permanent documentation of existing condition of construction areas.
3. The video portion of the recording shall reproduce a bright, sharp, clear picture with accurate color, free from distortion, drop out, tearing or other forms of picture imperfection.
4. The audio portion of the recording shall be clear, at a proper volume, and free from distortion.

F. Product Data, Samples and Certificates

1. Submit product data on camera and type of DVD to be used, including name, make and model number.
2. Submit sample of work on a prior project, demonstrated for Engineer, to assure quality requirements.

3. Submit written certificate that all requirements of the audio-video color recording were accomplished in accordance with this Section.

G. Equipment

1. Audio-Video Color DVD: Standard Full size 800mb DVD.
2. Camera: Video output from camera capable of producing a minimum of 300 lines of horizontal resolution at center with minimum light lag; produce optimum color imagery with a minimum of 7 foot-candles of illumination; provide a video signal-to-noise ratio of at least 49 Db; produce quality color picture of images at varying distances and angles as required for this project.
3. Alpha-Numeric Displays: Video recording must contain continuous display of simultaneously generated transparent digital information including date and time of recording, engineering stationing, name of street/easement/building, direction of travel, and viewing side.

H. Digital Recording

1. Investigate visually all areas prior to recording, making notation of features not readily visible on DVD. This would include, but not be limited to, culverts, catch basins, manholes, and any obstruction that may be partially buried.
2. Record all measurements including size, type, and condition of features observed during inspection.
3. All recording must be done during times of good visibility. No outside recording will be allowed during periods of visible precipitation or when ground is covered with snow, leaves or debris without written approval of Engineer.
4. Furnish all power for auxiliary lighting required to fill in shadow areas caused by trees, utility poles, road signs, and other such objects, as well as other conditions requiring artificial illumination in order to produce the proper detail and perspective on the recordings.
5. Do not exceed forty-eight (48) feet per minute (15 meter per minute) average rate of speed in the direction of travel during recording. Control direction of travel during recording. Control panning rates and zoom-in, zoom-out rates in a manner that produces clarity of subject during playback.
6. When conventional wheeled vehicle is used for recording, provide eight (8) foot (2.4 m) minimum camera lens to ground distance to insure proper perspective. In areas not accessible to conventional wheeled vehicles, provide coverage by walking or special conveyance but with the same requirement for recorded quality and content as specified herein.
7. Properly identify all DVD's and associated cases by number, location and project name under direction of the Engineer.
8. Begin each recording with the current date, project name, and municipality, general location and viewing side and direction of progress.
9. Conduct all recording in the presence of the Engineer unless waived by the Engineer. The Engineer or a person approved by the Engineer will conduct the audio portion.
10. Include recorded coverage of, but not limited to, all existing driveways, sidewalks, curbs, ditches (drainage pattern is of particular concern), streets (including full width paving condition), landscaping, trees, shrubbery, culverts, catch basins, headwalls, retaining walls, fences, visible utilities, and all building exteriors located within the zone of influence of construction. Of particular concern are existing faults, fractures, defects, or other imperfections. The term street is understood to mean street, highway, avenue, boulevard, road, alley, lane, driveway, parking lot, etc., and all adjacent areas within the possible zone of influence.
11. Houses and buildings to be identified both visibly and audibly by house or building number, when possible, in such a manner that the progress of the recording and the proposed route of construction may be located by reference to houses and buildings.

12. Record by audio-video all easements for the full width of permanent and temporary easements and all other adjacent areas within the zone of influence. Easements are understood to mean all areas not in streets that require recorded coverage by walking or other special conveyance as opposed to normal wheeled conveyance in street areas. Also include in this coverage, areas that are intended to be used for construction access, storage or waste areas, and other Contractor activities.

I. Delivery of DVD's

1. Deliver DVD's to Engineer prior to construction work within area of influence.
 - a. DVD's must be submitted prior to the Contractor's request for the initial progress payment.
2. Supply with DVD's a record of the contents of each DVD on a run sheet identifying each segment in the tape by location; street or easement viewing side, traveling direction, engineering station; referenced to counter numbers. Include a report reviewing findings of visual inspection.
3. Furnish brief report and inventory of all DVD's completed, referenced by location and tape number.
4. All DVD's and written records must be delivered to the Engineer. This information becomes the property of the Owner.
5. The video expense shall be part of the Contractor's obligation.

J. Video Records of Sewers

1. All sewers installed under this contract shall be video recorded in accordance with the following at no additional cost to the Owner:
 - a. After cleaning, manhole sections shall be visually inspected by means of closed-circuit video. The inspection shall be done one manhole section at a time and the flow in the section being inspected will be suitably controlled.
 - b. The video camera used for the inspection shall be one specifically designed and constructed for such inspection. Lighting for the camera shall be suitable to allow a clear picture of the entire periphery of the pipe. The camera shall be operative in 100% humidity conditions. The camera, video monitor, and other components of the video system shall be capable of producing picture quality to the satisfaction of the Engineer.
 - c. The camera shall be moved through the line either direction at a moderate rate, stopping when necessary to permit proper documentation of the sewer's condition. In no case shall the video camera be pulled at a speed greater than 30 feet per minute. Manual winches, power winches, video cable, and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the sewer conditions shall be used to move the camera through the sewer line. If, during the inspection operation, the video camera will not pass through the entire manhole section, the Contractor shall set up his equipment so that the inspection can be performed from the opposite manhole. If again, the camera fails to pass through the entire manhole section, the inspection shall be considered complete and no additional inspection work will be required.
 - d. When manually operated winches are used to pull the television camera through the line, telephones or other suitable means of communication shall be used to set up between the two manholes of the section being inspected to insure good communication between members of the crew.
 - e. Measurement for location of defects and lateral connections shall be above ground by means of a meter device. Marking on the cable, or the like, which would require interpolation for depth of manhole, will not be allowed. Accuracy of the distance meter shall be checked by use of a walking meter, roll-a-tape, or other suitable device. Accuracy shall be satisfactory to the Engineer.
2. Documentation shall be as follows:
 - a. Video Inspection Logs: Printed location records shall be kept by the Contractor that clearly shows the location in relation to an adjacent manhole of each infiltration point observed during inspection. In addition, other points of significance such as locations of building sewers, unusual conditions, roots,

storm sewer connection, broken pipe, presence of scale and corrosion, and other discernible features will be recorded and a copy of such records will be supplied to the Owner.

- b. Photographs: Instant developing, 35 mm, or other standard-size photographs of the video picture of problems shall be taken by the Contractor upon request of the Owner's Representative, as long as such photographing does not interfere with the Contractor's operations.
- c. DVD Recording: The purpose of DVD recording shall be to supply a visual and audio record of problem areas of the lines that may be replayed. DVD recording playback shall be at the same speed that it was recorded.

1.18 QUALITY ASSURANCE

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
 - 1. Comply with manufacturers' instructions, including each step in sequence.
 - 2. Should manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.
 - 3. Comply with specified allowances and standards as minimum quality for the Work except where more stringent codes or specified requirements indicate higher standards or more precise workmanship.
 - 4. Perform work with people qualified to produce quality workmanship.
 - 5. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.
- B. Monitor Tolerances:
 - 1. Monitor tolerance control of installed products to produce acceptable quality Work. Do not permit tolerances to accumulate.
 - 2. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.
 - 3. Adjust products to appropriate dimensions; position before securing in place.
- C. Prepare Mock-Ups:
 - 1. Tests will be performed under provisions identified in product specification sections.
 - 2. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
 - 3. Accepted mock-ups are representative of the quality required for the Work.
 - 4. Where mock-up has been accepted by the Engineer and was specified to be removed; remove mock-up and clear area when directed to do so.
- D. Manufacturers' Field Services and Reports:
 - 1. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment and as applicable, and to initiate instructions when necessary.
 - 2. Submit qualifications of observer to Engineer 30 days in advance of required observations. Observer shall be subject to the approval of Engineer.

3. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
4. Submit a report in duplicate within 30 days of observation to Engineer for information.

E. Workers and Equipment:

1. The Contractor shall employ only competent and efficient workers for each type of work performed. Anyone employed on the Work that is deemed incompetent, disorderly, or who commits trespass upon public or private property adjacent to the work, shall be dismissed when the Engineer so orders. No one, so dismissed, shall be re-employed unless express permission is given by the Engineer. The methods, equipment, and appliances used and the labor employed on the work shall produce an Owner-acceptable quality finished product and shall be sufficient to complete the Contract within the specified time limit.
2. In hiring employees to perform work under this Contract, or any subcontract hereunder, no Contractor, Subcontractor, nor any person acting on their behalf shall discriminate against anyone performing work under this Contract, because of race, sex, creed, color or national origin.

PART TWO - PRODUCTS

- 2.01 Provide specified products as required.

PART THREE - EXECUTION

3.01 MAINTENANCE AND REMOVAL

- A. Maintain temporary facilities and controls as long as needed for safe and proper completion of the Work.
- B. Remove the temporary facilities and controls as rapidly as progress of the Work will safely permit, or as directed by the Engineer.

3.02 WATER CONTROL

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. Protect site from ponding or running water. Provide water barriers as required to protect site from soil erosion.

3.03 EROSION AND SEDIMENT CONTROL

- A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
- B. Minimize amount of bare soil exposed at one time.
- C. Provide temporary measures such as berms, dikes, and drains, to prevent or control water flow.
- D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
- E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
- F. Site clearing and grubbing shall not commence until such time that the contractor is prepared to start construction. Remove only those trees, shrubs, and grasses that must be removed for construction; protect the remainder to preserve aesthetic, habitat, and erosion control values. Install sedimentation controls immediately following access and site clearing and maintain them in effective operating condition during construction until final seeding and site restoration occurs.
- G. Construct diversion channels when required to collect runoff and prevent silt and other eroded materials from entering local drainage courses. Diversion channels will flow to temporary sediment basins, and are to be stabilized through seeding, riprap, or lining with plastic.

- H. Silt fences shall be trenched six to twelve inches deep, the fabric laid in the trench and the soil properly backfilled into the trench to prevent undercutting.
- I. Straw bales shall be trenched a minimum of four inches deep and placed on their ends with the binding material off the ground. Drive two stakes through the bales and into the ground 1-1/2' to 2' deep to secure the bale. Fill the spaces between the bales with loose straw, and properly backfill the trench with soil.
- J. Where a trench excavation occurs parallel to a waterway, a vegetated barrier shall be maintained between the stream and the construction area. All trench soils shall be stockpiled on the side of the trench away from the waterway, and a line of silt barriers established along the edge of construction on the contour between the trench and the waterway.
- K. Any disturbed area that will not be actively under construction for a period of 30 days or more shall be stabilized immediately by seeding and mulching or by anchored straw mulch.
- L. Storm sewer inlets shall be surrounded with silt barriers to prevent silting.
- M. Slopes exceeding 15 percent or that tend to be unstable shall be provided special treatment such as water diversion berms, sod, jute blankets, or excelsior blankets.
- N. If work is suspended for any reason, the contractor shall maintain the soil erosion and sedimentation controls in good operating condition during the suspension of the work. When seasonal conditions permit and the suspension of work is expected to exceed 30 days, the Contractor shall seed, fertilize, and mulch all disturbed areas left exposed when the work is suspended.

3.04 NOTIFICATION OF UTILITY OWNERS

- A. Not less than five (5) days in advance of commencing excavation, notify in writing all utility companies, such as gas, water, electric power, transmission, cable, and telephone, which have installations that could be disturbed by the Work; and make proper provisions for locating, removing, relocating, or otherwise protecting said installations. Make additional utility company contacts and provisions to locate and protect utility company installations, as necessary, as the Work progresses.
- B. Unless shown on the Drawings or otherwise specified to be removed, protect or relocate all active utility installations or improvements encountered by the Work. Service interruptions should be avoided whenever possible but when unavoidable, interruptions should be kept to a minimum. In such cases, promptly notify all those affected
- C. If a utility installation or improvement is damaged, promptly notify those affected, repair or replace to utility standards. Restore service as soon as possible at no additional cost to Owner
- D. If existing utilities are found to interfere with the permanent facilities being constructed under this Section, immediately notify the Engineer and secure appropriate instructions.
- E. Do not proceed with the permanent relocation of utilities until written instructions are received from the Engineer.

3.05 FAILURE TO PERFORM SECTION PROVISIONS

- A. If the Contractor fails to comply with the provisions of this Section, the Owner may, but is not obligated to, cause the unperformed provisions to be completed and deduct the related cost of such work from any monies due the Contractor. If Owner causes unperformed work to be completed, it shall in no way release the Contractor from his liability for the safety of the public and the work.

PART FOUR - PROJECT SPECIFIC REQUIREMENTS

END OF SECTION

PART ONE - GENERAL

1.01 DESCRIPTION

- A. This Section includes the requirements for project identification and miscellaneous informational signs.
- B. The Contractor shall provide and erect a project sign readable from both sides plus miscellaneous informational signs as may be needed (to direct deliveries, locate Contractor's and Engineer's offices, etc.) at locations required or designated by the Engineer.

PART TWO - PRODUCTS

2.01 PROJECT IDENTIFICATION SIGN

- A. The sign shall be new and be made from minimum 3/8-in. thick exterior grade plywood with high density overlay approximately 8 ft wide by 4 ft high.
- B. The sign shall be framed with 2 in. x 6 in. wood with mitered corners. The edge of the sign shall fit 3/4 in. into grooves cut off-centerline in the 6-in. dimension of the frame. The frame shall be bolted to posts with galvanized bolts.
- C. The sign shall have 4 in. x 4 in. x 8 ft. wood posts that are imbedded 3 feet into the ground.
- D. The sign shall be painted by an experienced professional sign painter using exterior quality paint that is adequate to withstand weathering, fading, chipping and peeling for the duration of the construction. Unless specified to the contrary in PART FOUR, the sign shall have a white background and royal blue lettering and border. Lettering shall be Series C of Standard Alphabet for Highway Signs, Public Roads Administration, and Federal Works Agency.
- E. The sign shall be approved by the Engineer and include, in general, the Project title and name of Owner as indicated on Contract Documents, names and titles of authorities, names and titles of Engineer and Consultants, and the Names and field phone numbers of the Prime Contractors. The sign shall resemble and provide the information shown in PART FOUR, if included.

2.02 PROJECT INFORMATION SIGNS

- A. Painted informational signs shall be of the same materials, colors, and lettering as the Project Identification Sign, or standard commercial products with letter sizing adequate to provide legibility at 150 feet distance.
- B. Provide signs on each field office and storage shed, and to direct visitors and traffic into and within the site. Relocate as Work progress requires.
- C. Provide municipal/state traffic agency directional traffic signs to and within site.

PART THREE - EXECUTION

3.01 INSTALLATION

- A. Install project identification sign within 30 days after the date that Contractor is given the Notice to Proceed.
- B. Erect project sign at the designated location or a location with high public visibility adjacent to main entrance to site as approved by Engineer.
- C. Erect supports and framing on secure foundation.
- D. Install sign surface plumb and level. Anchor securely.
- E. Paint all exposed surfaces of sign, supports, and framing.

- F. Install all informational signs as required.

3.02 MAINTENANCE

- A. Maintain signs and supports clean, repair deterioration and damage.

3.03 REMOVAL

- A. Remove signs, framing, supports, and foundations and restore the disturbed area at completion of Project.

PART FOUR - SPECIAL PROVISIONS

None

END OF SECTION

PART ONE - GENERAL

1.01 DESCRIPTION

- A. Work included: Throughout the construction period, maintain the buildings and site in a standard of cleanliness as described in this Section.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and the other Sections in the Specifications.
 - 2. In addition to standards described in this Section, comply with requirements for cleaning as described in pertinent other Sections of these Specifications.

1.02 QUALITY ASSURANCE

- A. Conduct daily inspections, and more often if necessary, to verify that requirements for cleanliness are being met.
- B. In addition to the standards described in this Section, comply with pertinent requirements of the Engineer and the governmental agencies having jurisdiction.

PART TWO - PRODUCTS

2.01 CLEANING MATERIALS AND EQUIPMENT

- A. Provide required personnel, equipment, and materials needed to maintain the specified standards of cleanliness.

2.02 COMPATIBILITY

- A. Use only the cleaning materials and equipment that are compatible with the surface being cleaned, as recommended by the manufacturer of the material.

PART THREE - EXECUTION

3.01 PROGRESS CLEANING

- A. General:
 - 1. Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage, and providing required protection of materials.
 - 2. Do not allow accumulation of scrap, debris, waste material, and other items not required for construction of this Work.
 - 3. At least twice each month, and more often if necessary, completely remove all scrap, debris, and waste material from the job site.
 - 4. Provide adequate storage for all items awaiting removal from the job site, observing requirements for fire protection and protection of the environment.
- B. Site:

1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage.
2. Weekly, and more often if necessary, inspect all arrangements of material stored on the site. Restack, tidy, or otherwise service arrangements to meet the above requirements.
3. Maintain the site in a neat and orderly condition at all times.

C. Structures:

1. Weekly, and more often if necessary, inspect the structures and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage.
2. Weekly, and more often if necessary, sweep interior spaces clean.
 - a. "Clean", for the purpose of this subparagraph, shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and a hand-held broom.
3. As required preparatory to installation of succeeding materials, clean the structures or pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material, using equipment and materials required to achieve the necessary cleanliness.
4. Following the installation of finish floor materials, clean the finish floor daily (and more often if necessary) at all times while work is being performed in the space in which finish materials are installed.
 - a. "Clean", for the purpose of this subparagraph, shall be interpreted as meaning free from foreign material that, in the opinion of the Engineer, may be injurious to the finish floor material.

3.02 FINAL CLEANING

- A. "Clean", for the purpose of this Article, and except as may be specifically provided otherwise, shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials.
- B. Prior to Completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final progress cleaning as described above.

C. Site:

1. Exterior:
 - a. Inspect exterior surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter.
 - b. Remove all traces of splashed materials from adjacent surfaces.
 - c. If necessary to achieve a uniform degree of cleanliness, hose down the exterior of the structure.
 - d. In the event of stubborn stains not removable with water, the Engineer may require light abrasive blasting or other cleaning at no additional cost to the Owner.
2. Interior:
 - a. Inspect interior surface and remove all traces of soil, waste materials, smudges, and other foreign matter.
 - b. Remove all traces of splashed material from adjacent surfaces.
 - c. Remove paint droppings, spots, stains, and dirt from finished surfaces.

3. Glass: Clean inside and outside.

E. Schedule final cleaning as approved by the Engineer to enable the Owner to accept a completely clean Work.

PART FOUR - SPECIAL PROVISIONS

None

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DIVISION 2

SITE WORK

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REMOVAL OF STRUCTURES AND OBSTRUCTIONS ENCOUNTERED

PART ONE - GENERAL

1.01 DESCRIPTION

- A. Work included: Demolition of existing structures and as necessary to clear space for new construction and/or to rehabilitate existing construction.
- B. Related work:
 - 1. Including but not limited to the General Conditions, Supplementary Conditions and Sections of Division 01.
 - 2. All applicable Divisions of the Technical Specifications.

1.02 QUALITY ASSURANCE

- A. State and local requirements shall control the disposal of debris resulting from the removal operation.

1.03 JOB CONDITIONS

- A. The Contractor shall walk the project with the Engineer and identify all structures and obstructions which are to be removed prior to beginning the demolition.
- B. All structures or obstructions to be removed shall be identified with surface paint or plastic colored ribbon for approval by the Engineer.

PART TWO - PRODUCTS

Not Used

PART THREE - EXECUTION

3.01 SUPERSTRUCTURES, TANKS, CHAMBERS & SIMILAR STRUCTURES

- A. Care shall be used in demolishing structural elements which are continuous with structural elements remaining in service. Concrete and masonry shall be cut with masonry or concrete saw before removing the unwanted portions.
- B. Methods and equipment used in demolition work shall be chosen so the structural integrity and water tightness of both newly constructed and existing plant structures remain unimpaired by the performance of the demolition work.
- C. Existing structures and equipment which are damaged in appearance and/or function by performance of demolition work shall be replaced or repaired to approved first-class condition by the contractor at no increase in Contract Price.
- D. Extreme care shall be used when removing existing concrete from around reinforcing steel which must be used for securing new concrete. If this reinforcing steel is damaged, the Contractor shall remove additional existing concrete until sufficient existing reinforcing steel is exposed to provide adequate imbedment length in the new concrete, as approved by the Engineer.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

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PART ONE GENERAL

1.01 DESCRIPTION

- A. Work Included: Grubbing, scalping and otherwise clearing of the construction site in accordance with the drawings and as specified herein or ordered.
- B. Related Work:
 - 1. Including but not limited to the General Conditions, Supplementary Conditions and Sections of Division 1.
 - 2. All applicable Divisions of the Technical Specifications.
- C. Definitions:
 - 1. Clearing is defined as the removal of trees, stumps, bushes, timber, rubbish and any other vegetation, walkway or retaining walls, or debris as necessary to accommodate new construction or recontouring of site. Clearing also involves the removal of fences walls, guard posts, guardrail, signs and other obstructions interfering with the proposed work.
 - 2. Grubbing is defined as the removal from below the surface of the natural ground of stumps, roots and stubs, organic materials and debris.

1.02 QUALITY ASSURANCE

- A. State and local code requirements shall control the disposal of trees, stumps, vegetation and debris. The Contractor shall comply with the requirements of the following:
 - 1. Ohio Department of Transportation
 - 2. Ohio Department of Natural Resources

1.03 SUBMITTALS

- A. Material and debris resulting from the clearing and grubbing operations shall be disposed of off the project site by the Contractor, unless a disposal site is designated on the Drawings. The Contractor shall obtain and submit to the Engineer written permission from the Owner of the property upon which the material and debris are to be placed.

1.04 JOB CONDITIONS

- A. The Contractor may clear all obstructions within the PERMANENT RIGHT-OF-WAY and the CONSTRUCTION EASEMENT OF 15 FEET AS NECESSARY for the completion of the contract and as approved by the Engineer.
- B. The Contractor shall not remove any yard walkway, building access stairs, stone or concrete support wall in excess of the trench width without the approval of the Engineer.
- C. Streets, roads, adjacent property and other facilities to remain shall be protected against damage throughout the work.
- D. Existing trees, shrubs and other objects located outside the trench width shall not be disturbed unless authorized by the Engineer.

PART TWO - PRODUCTS

2.01 MATERIALS

A. Security Fencing:

1. Undamaged picket snow fence, 4' high, formed of wooden slits, tightly woven wire or galvanized chain link fence 4' high.

B. Silt Fence:

1. Install silt fence in accordance with information provided in the Rainwater and Land Development Manual, current edition, Ohio Department of Natural Resources.

C. Tree Wound Dressing:

1. Antiseptic, waterproof asphaltum base paint.

PART THREE - EXECUTION

3.01 PREPARATION

- A. Mark areas to be cleared and grubbed with stakes, flags or plastic colored ribbon for the approval by the Engineer. The Engineer reserves the right to order additional trees or shrubs removed at no additional cost to the Owner, if, in his opinion, they cannot be maintained or have been damaged by the Contractors operation.
- B. Protect benchmarks, utilities, existing trees, shrubs or other landscape features designated for preservation with temporary fencing or barricades satisfactory to the Engineer. No material shall be stored within twenty (20) feet or construction operation carried on within four (4) feet of any tree to be saved or within the protection fencing.

3.02 UTILITY RELOCATIONS

- A. Inform all companies, individuals and others owning or controlling facilities or structures within the limits of the work which have to be relocated, adjusted or reconstructed, in sufficient time for the utility to organize and perform such work in conjunction with or in advance of the Contractor's operations.
- B. The Contractor shall be responsible for the maintenance of all utility service connections.

3.03 CLEARING AND GRUBBING

- A. Only those trees and shrubs shall be removed that are in actual interference with excavation or grading work and such removal shall be subject to approval by the Engineer. The Engineer reserves the right to order additional trees or shrubs removed and/or replaced at no additional cost to the owner if, in his opinion, they cannot be maintained or have been damaged by the Contractor's operations.
- B. All trees, stumps, vegetation and debris not designated to remain shall be cleared and/or grubbed, except for special treatment as follows:
 1. In locations to be seeded, stumps, roots and other protruding obstructions shall be removed to a minimum of six (6) inches below the final ground surface.
 2. The top of the back slope and/or toe of embankment unless otherwise indicated on the plans.
- C. At all times, the Contractor shall remain within the property lines and/or easement areas.
- D. Except in areas to be excavated, all holes resulting from the clearing and grubbing operations shall be backfilled and compacted in accordance with Sections 02130 and 02222.

3.04 STRIPPING AND STOCKPILING TOPSOIL

- A. Strip topsoil to whatever depth it may occur from areas to be excavated, filled or graded and stockpile at a location approved by the Engineer for use in finish grading.
- B. The topsoil is the property of the Owner and shall not be used as backfill or removed from the site.

3.05 DEBRIS DISPOSAL

- A. Trees, logs, branches, brush, stumps, and other debris resulting from clearing and grubbing operations shall become the property of the Contractor and shall be legally disposed of.
- B. Do not deposit or bury on the site debris resulting from the clearing and grubbing work.
- C. Debris may be burned on-site if local ordinances allow open-air burning, if required permits are obtained, and if burning operations are conducted in compliance with local ordinances and regulations.

3.06 RESTORATION

- A. Repair all injuries to bark, trunk, limbs, and roots of remaining plants by properly dressing, cutting, tracing and painting, using approved agricultural practices and materials.
- B. Replace trees, shrubs and plants designated to be saved which are permanently injured or die during the life of the Contract as a result of construction operations with like species acceptable to the project Owner.
- C. Remove protective fences, enclosures and guards upon the completion of the project.
- D. Restore walkways, lawns, guard posts, guardrail, signs and other interferences to the condition equal to that existing before construction operations.
- E. Restoration of all surfaces shall be in accordance with all applicable Sections of the Specifications.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

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TRENCH EXCAVATING, BEDDING & BACKFILL

PART ONE - GENERAL

1.01 DESCRIPTION

- A. Work Included: All trench excavations and fills to the lines and grades given for conduits, pipe lines, etc. as required for the proper completion of the work of this contract as shown on the Contract Drawings.
- B. The trench excavation work item in this contract shall include the removal, handling, re-handling, filling, and disposal of any and all materials (whether they be wet or dry) found unsuitable by the Engineer encountered within the limits of the work and the transportation and placing thereof, and shall include all pumping, bailing, draining, sheeting and shoring, backfill, refill and protection, and sand backfill, together with rolling and tamping where such is required by these specifications and is not specifically included in another item of work in this contract.
- C. Existing ground elevations of the work site(s) are shown by figures and/or by contours on the contract drawings. The contours and elevations of the present ground are believed to be reasonably correct, but do not purport to be absolutely so, and are presented only as an approximation. The Contractor shall satisfy himself, however, by his own actual examination of the site of the work, as to both the existing elevations and the amount of work required under this Section. If the Contractor is not willing to accept the ground surface elevations indicated upon the drawings for payment, he shall notify the Engineer prior to the starting of any excavation work.
- D. Profiles, as shown on the drawings, are generally centerline of pavement and the Contractor, in his site examination, shall determine the variance in elevations over the pipelines.
- E. Related Work:
 - 1. Including but not limited to the General Conditions, Supplementary Conditions and Section of Division 1.
 - 2. All applicable Divisions of the Technical Specifications.

1.02 QUALITY ASSURANCE

- A. State and local code requirements shall control the construction specified herein.
- B. Compaction testing shall be performed by a soil testing laboratory engaged and paid for by the Contractor. Testing shall be in accordance with ASTM Standards:
 - 1. C33 Specification for Concrete Aggregates.
 - 2. D698 Tests for Moisture - Design of Relations of Soils.
 - 3. D1556 Test for Density of Soil-in-Place by the Sand Cone Method.
 - 4. D2922 Test for Density of Soil and Soil Aggregates in Place by Nuclear Methods.

1.03 SUBMITTALS

- A. Certification attesting that the composition analysis of pipe protection and material stone backfill materials meets specification requirements.

1.04 JOB CONDITIONS

- A. Control of Traffic

1. The Contractor shall provide all traffic control measures in accordance and with the approval of the State and local authorities.

B. Utility Services

1. The Contractor shall be responsible for maintaining all building utility service connections during the excavation and backfill process.
2. Immediately report to the utility company and the Engineer any break, leak or other damage to the lines or protective coatings made or discovered.
3. Allow free access to utility company personnel at all times for purposed of maintenance, repair and inspection.

1.05 DEFINITIONS

- A. The term "Excavation" in these specifications shall be construed to mean the proper removal of all materials encountered in making the cut to receive the pipeline and appurtenance, and including earth, shale and rock in accordance with the following:

1. Excavation not in Rock

- a. Excavation not in rock shall be defined as all excavation that does not satisfy the definition of "Rock Excavation" which follows.

2. Rock Excavation

- a. Rock excavation shall be defined as the excavation of solid rock or boulders greater than one-fourth (1/4) cubic yard in volume, or solid ledge rock and masonry which, in the opinion of the Engineer, requires for its removal, drilling and blasting, wedging, sledging, barring, or breaking up with a power operated hand tool. Any material which can be excavated using a hand pick and shovel, power operated excavator, power operated backhoe or power operated shovel shall not be defined as rock.

PART TWO - PRODUCTS

2.01 PIPE BEDDING MATERIAL

- A. Gravel, crushed limestone, or crushed slag can be utilized as bedding material for all underground piping except in areas where metallic pipe is proposed for use. In such instances, crushed slag shall not be used as a bedding material for metallic pipe. The material shall be free from dirt and shall be of an aggregate size conforming to Number 56, 6, 67 or 68 specified in AASHTO M43 and as shown in ODOT Specifications Table 703-1.

2.02 BACKFILL MATERIAL

A. Paved Roadway, Driveway and Similar Structures

The sub-base material for construction, which crosses beneath, paved and unpaved state highways, state highway shoulders, local roadways, driveways and sidewalks, shall be backfilled with granular backfill as specified by Section 02225.

B. Unpaved Areas

1. The sub-base material for construction which occurs in areas other than those described in Subsection 2.02.A shall be:
 - a. From the top of pipe bedding to twenty-four (24) inches over the top of pipe material excavated from the trench if free of stones larger than two (2) inches in size and free of wet, frozen or organic materials.
 - b. From twenty-four (24) inches above the pipe to sub-grade elevation material excavated from the trench if

free of stones larger than eight (8) inches in size and free of wet, frozen or organic material.

c. Imported material approved by the Engineer.

C. Granular Backfill:

Granular backfill material shall conform to the requirements of ODOT 304.

D. Controlled Density Fill Material:

Controlled density fill material shall be a cement base fill material that can be deposited in a fluid state. It shall be composed of Portland cement and approved filler material. The mixture shall meet the following requirements:

Cement:	100	lb/cy
Fly Ash:	250	lb/cy
Sand (S.S.D.):	2,850	lb/cy
Water:	500	lb/cy
Compressive Strength:	Min: 100	psi
	Max: 500	psi

2.03 TOPSOIL

A. Where shown on the Drawings, specified, or required, provide topsoil consisting of loose, friable, loamy fertile soil, containing an amount of organic matter normal to the region, capable of sustaining healthy plant life, and reasonably free from subsoil, peat, muck, roots, heavy or stiff clay, stones larger than two (2) inches in greatest dimension, noxious weeds, sticks, brush, litter, and other deleterious matter.

B. Each load of topsoil shall be subject to approval by the Engineer.

PART THREE - EXECUTION

3.01 SURFACE CONDITIONS

A. Examine the areas and conditions under which the work of this Section will be performed. Correct conditions detrimental to the timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 FINISH LINES AND ELEVATIONS

A. Grade and shape the ground surface in accordance with the finish lines and elevations shown on the Drawings, specified or required by the Engineer. Comply with other applicable provisions of the Specifications.

3.03 PROCEDURES

A. Utilities

a. Not less than five (5) days in advance of commencing excavation, notify in writing all utility companies, such as gas, water, electric power, transmission, cable, and telephone, which have installations that could be disturbed by the Work; and make proper provisions for locating, removing, relocating, or otherwise protecting said installations. Make additional utility company contacts and provisions to locate and protect utility company installations, as necessary, as the Work progresses.

b. Unless shown on the Drawings or otherwise specified to be removed, protect or relocate all active utility installations or improvements encountered by the Work. Service interruptions should be avoided whenever possible but when unavoidable, interruptions should be kept to a minimum. In such cases, promptly notify all those affected

c. If a utility installation or improvement is damaged, promptly notify those affected, repair or replace to utility

standards. Restore service as soon as possible at no additional cost to Owner

- d. If existing utilities are found to interfere with the permanent facilities being constructed under this Section, immediately notify the Engineer and secure appropriate instructions.
- e. Do not proceed with the permanent relocation of utilities until written instructions are received from the Engineer.

3.04 MAINTENANCE AND PROTECTION OF TRAFFIC

- A. Coordinate the work to insure the least inconvenience to traffic and maintain traffic in one or more unobstructed lanes
- B. Maintain access to all streets and private drives.
- C. Provide and maintain signs, flashing warning lights, barricades, markers, and other protective devices as required to conform to construction operations and to keep traffic flowing with minimum restrictions.
- D. Comply with state and local codes, permits and regulations.

3.05 CUTTING PAVED SURFACES

- A. Where installation of pipelines, miscellaneous structures, and appurtenances necessitate breaking a paved surface, make cuts in a neat uniform fashion forming straight lines parallel with the centerline of the trench.
- B. Protect edges of cut pavement during excavation to prevent raveling or breaking; square edges prior to pavement replacement.
- C. The requirement for neat line cuts, in other than state highways, may be waived if the final paving restoration indicates overlay beyond the trench width.

3.06 BLASTING

- A. Blasting will not be permitted except at points at least fifty (50) feet distant from any existing structure, and, then, only under such regulations as may be established by the Owner.
- B. Explosives, where used, shall be moved, stored, and handled in a manner to comply with local Ordinances and State Codes, and other pertinent regulations, as specified under these specifications.
- C. The Contractor must use all possible precautions against accidents or damage on account of explosives or use and storage of explosives, and he must assume all risk and responsibility therefore, saving harmless the Owner from any and all claims occasioned thereby. An experienced man shall be employed to carry on the blasting work.
- D. Blasting shall be conducted so as not to endanger persons and property and shall always be covered with mats or otherwise satisfactorily confined.

3.07 SUPPORT OF EXCAVATION

- A. The Contractor shall be responsible for supporting and maintaining all excavations required hereunder utilizing a trench box and even to the extent of sheeting, shoring the sides and ends of excavations with timber or other satisfactory supports. If the sheeting, braces, shores, and stringers or walling timbers or other supports are not properly placed or are insufficient, the Contractor shall provide additional or stronger supports. The requirements of sheeting or shoring, or of the addition of supports, shall not relieve the Contractor of his responsibility for their sufficiency. All trench protection and sheeting and shoring must conform to the regulations of the Federal Occupational Safety and Health Act (OSHA) and will be subject to their respective inspections. All orders of the OSHA representatives must be complied with by the Contractor.
- B. All timbering shall be removed where and when required and, upon its removal, all voids carefully and compactly

filled. If any timber is ordered in writing to be left in place, it shall be cut-off as directed and will be paid for with a Change Order. No payment will be made for wasted ends or for timber left in place without specific written authorization by the Engineer.

3.08 REMOVAL OF WATER

- A. The Contractor shall pump out or otherwise remove and dispose of, as fast as it may collect any water, sewage, or any other liquids which may be found or may accumulate in the excavation, regardless of whether it be water or liquid wastes from his own contract or from existing conduits and works.
- B. Maintain pipe trenches dry until pipe has been jointed, inspected, and backfilled and concrete work has been completed. Preclude trench water from entering pipelines under construction.
- C. Intercept and divert surface drainage away from excavations. Design surface drainage systems so that they do not cause erosion on or off the site, or cause unwanted flow of water.
- D. There shall be, upon the work at all times during the construction, proper and approved pumps and machinery of sufficient capacity to meet the maximum requirements for the removal of water or other liquids and their disposal.
- E. Water discharged from the excavation shall be controlled in accordance with all State and Local regulations.

3.09 METHOD OF TRENCH EXCAVATION

- A. All excavation shall be in open cut, unless otherwise permitted by the Engineer. Loosening of material by blasting will not be permitted without written authorization by the Owner specifying both the extent and location of the blasting to be done.
- B. Excavation shall be made to undisturbed finish sub-grade six (6) inches below the bottom of the pipe, unless otherwise shown on the Drawings.
- C. Where unsuitable bearing material is encountered, the trench shall be excavated to an additional depth below the excavation for the bottom of the pipe barrel of six (6) inches for pipe of twenty four (24) inches diameter and smaller and of nine (9) inches for pipe greater than twenty four (24) inches in diameter. This additional excavation is to be refilled with suitable material in a satisfactory manner to provide the proper foundation for the conduit bed.
- D. Trenches must be excavated with vertical sides from the bottom of the trench to one (1) foot above the top of the pipe, from which point sides may slope to ground surface, except that, in streets or roadways, trenches must be excavated with vertical sides to the top of the trench. Width of trench in the vertical section shall be excavated only as wide as necessary to provide free working space on each side of the piping according to the size of the pipe and the character of the ground. In every case there shall be sufficient space between the pipe and the sides of the trench to make it possible to thoroughly compact the backfill around the pipe and to secure tight joints, but in no case less than one (1) foot on either side of pipe. In no case, however, shall the width of the trench at the top of the pipe exceed the dimensions as shown on the Contract Drawings. In no case will it be permitted to excavate pipe trenches with sides sloping to the bottom.
- E. Bottom of trenches must give a full, firm but slightly yielding support to the lower section of the pipe and so that the pipe barrel is firmly supported in the cradle throughout its entire length, in such manner as to prevent any subsequent settlement of the pipe. Boulders or loose rocks which might bear against the pipe will not be permitted in the trench bottom or sides below two (2) feet above the pipe. Bell holes must be excavated to assure full length bearing of the pipe barrel.
- F. Trenches must be kept free from water until the material in the joints has sufficiently set.
- G. At no time shall the Contractor advance trenching operations more than 200' feet ahead of completed pipeline except as approved by the Engineer.
- H. Where the Contractor, by error or intent, excavates beyond the minimum required depth, the trench shall be brought to the required pipeline grade with bedding material.

3.10 BEDDING

- A. Bedding material below the pipe and that under and around the pipe to spring line shall be well tamped. That above spring line shall be placed in six (6) inch layers and be well tamped to a minimum height of twelve (12) inches above the top of the pipe.
- B. Where foundation conditions are such that the above types of bedding cannot be provided, as in quicksand, etc., special provisions shall be made as called for by the Drawings or as directed by the Engineer by providing concrete cradle or lumber foundations.

3.11 UNAUTHORIZED EXCAVATIONS

- A. All excavations carried outside of the lines and grades given or specified, together with the disposal of such material, and all excavations and other work resulting from slides, cave-ins, swellings or upheavals shall be at the Contractor's own cost and expense. All spaces resulting from unauthorized excavations or from slides or cave-ins shall be refilled at the Contractor's expense with concrete or other suitable material.

3.12 ADDITIONAL EXCAVATION

- A. It is expected that satisfactory foundations will be found at the elevations shown on the drawings, but in case the materials encountered are not suitable, or in case it is found desirable or necessary to go to additional depth, the excavation shall be carried to an additional depth as ordered and refilled as directed by the Engineer.
 - 1. Payment for this work shall be by Change Order.

3.13 THRUST RESTRAINT

- A. Provide pressure and vacuum pipe with concrete thrust blocking at all bends, tees, valves, and changes in direction, in accordance with the Contract Drawings and as shown on the standard details.

3.14 BACKFILLING

- A. As the various pipelines, conduits, etc. or parts of same are completed and inspected, the Contractor shall refill the space under, around and over with material as specified herein. Unless otherwise directed, all forms, bracing and lumber shall be removed during backfilling and the cavities and voids resulting from the removal shall be thoroughly backfilled.
- B. The bedding material shall be as specified and placed in accordance with the standard details. The limits of bedding shall be as indicated on the Standard Details for the respective pipes. The Contractor must use special care in placing this portion of the backfill so as to avoid injuring or moving the pipe when compacting the backfill. When the backfill has progressed to the limits shown on the Standard Details for the respective pipe, the work of backfilling shall be stopped, and the backfill in place shall be tamped or puddled as directed. Care shall be taken to prevent floating of the pipe.
- C. No cinders, rubbish, rocks, boulders, shale or other objectionable material shall be used as backfill against the pipe or in any part of the trench when, in the opinion of the Engineer, it will be injurious to the work. No backfilling shall be done with frozen materials or upon frozen materials.
- D. Over sewers and other arched structures built in place and after the structure is completed and before the supports or centers are struck, the trenches shall be carefully filled by depositing without shock and by tamping suitable earth or other selected material at the sides and to a height not less than two (2) feet above the top of the pipe. This backfill shall be graded evenly across the trench. This backfilling must be done as the work progresses, and before any filling is deposited directly from a machine, bucket, cars, wagon, or other vehicles. The backfilling shall then be brought up evenly, and all eccentric loading shall be avoided. In no case shall material dumped from a bucket, truck or bulldozer be allowed to fall directly upon any conduit, pipe or other structure, and, in all cases, the bucket must be lowered so that the shock of the falling material will not injure the structure.
- E. The backfill shall be placed and compacted, using power driven mechanical tampers in layers of six (6) inch

compacted thickness unless otherwise approved by the Engineer. Final paving shall be as specified in Section 02500 and as shown on the Contract Drawings and Standard Details.

3.15 DISPOSAL OF MATERIALS

- A. A selected portion of the excavated materials will be used for backfilling or filling about the pipe as ordered. Excavated material in excess of that needed for backfilling and filling and unsuitable material shall be disposed of by the Contractor at his own expense, and the cost of such disposal shall be deemed as having been included in the unit or lump sum prices bid.
- B. Prior to disposal, the Contractor shall obtain and submit to the Engineer written permission from the owner of the property upon which the material and debris are to be placed.

3.16 COMPACTION REQUIREMENTS

- A. Control soil compaction during construction to provide the minimum percentage of density specified for each area as determined according to ASTM D698.
- B. Provide not less than the following maximum density of soil material compacted at optimum moisture content for the actual density of each layer of soil material in place, and as approved by the Engineer:
 - 1. Structures, Pavements, Walkways, Curbs and Steps:
 - a. Compact the sub-grade and each layer of fill material or backfill material at 95% of maximum density.
 - 2. Lawn and Unpaved Areas:
 - a. Compact each layer of fill material or backfill material at 90% of maximum density.
- C. Moisture Control:
 - 1. Where sub-grade or layer of soil material must be moisture-conditioned before compacting, uniformly apply water to surface of sub-grade or layer of soil material to prevent free water appearing on surface during or subsequent to compacting operations.
 - 2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compacting to the specified density.
 - 3. Soil material that has been removed because it is too wet to permit compacting may be stockpiled or spread and allowed to dry. Assist drying by disking, harrowing, or pulverizing until moisture content is reduced to a satisfactory value as determined by moisture-density relation tests approved by the test laboratory.
- D. Uncompacted Backfill:
 - 1. Where uncompacted backfill is indicated on the Contract Drawings, backfill the trench from one (1) foot above the pipe to the top of the trench with material excavated from the trench, crowned over the trench to a sufficient height to allow for settlement to grade after consolidation.
- E. Unsuitable Backfill Material:
 - 1. Where the Engineer deems backfill material to be unsuitable and rejects all or part thereof due to conditions prevailing at the time of construction, remove the unsuitable material and replace with select material stone backfill or suitable foreign backfill material.
- F. Compaction Tests
 - 1. A set of initial compaction tests on the various layers of trench backfill shall be performed immediately after compaction begins to prove that the method being used attains the required compaction results. If the required results are not attained, make needed adjustments in the method being used and repeat the

process until the specified requirements are met.

2. Once the method of compaction has been proven, Contractor shall not change the method without the approval of the Engineer.
3. Trench backfill compaction tests shall be performed to verify the specified consolidation. Unless otherwise directed, perform one test for every 2000 sq. ft. of layer area of backfill material used.
4. At paved areas, perform at least one field density test for every 2000 sq. ft. of paved area, but not less than three tests.
5. On other compacted sub-grade fill layers, perform at least one field density test for every 2000 sq. ft. of area, but not less than three tests.
6. If the above testing results are below that specified, provide additional compaction and testing as necessary to attain the specified compaction.

3.17 UTILITY MARKING TAPE

- A. Install detectable utility marking tape above all plastic pipelines, eighteen (18) inches below final grade as specified by Section 02663.

3.18 ROUGH GRADING

- A. Rough grade areas disturbed by construction to a uniform finish. Form the bases for terraces, banks, lawns and paved areas.
- B. Grade areas to be paved to depths required for placing sub-base and paving materials.
- C. Rough grade areas to be seeded three (3) inches below indicated finish contours.

3.19 RESTORATION OF UNPAVED SURFACES

- A. Restore unpaved surfaces disturbed by construction to equal the surface condition prior to construction.
- B. Restore grassed areas in accordance with Section 02470, Seeding, Sodding and Mulching.

3.20 MAINTENANCE

- A. Protection of newly graded areas:

1. Protect newly graded areas from traffic and erosion, and keep free from trash and weeds.
2. Repair and reestablish grades in settled, eroded, and rutted areas to the specified tolerances.

Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify the surface, reshape, and compact to the required density prior to further construction.

- B. Protection of people and property:

- a. Barricade open holes, depressions, and other hazards occurring as part of the Work, and post warning lights on property adjacent to or having public access.
- b. Operate warning lights during hours from dusk to dawn each day and as conditions require.
- c. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout, or other hazards created by the operations under this Section.
- d. Contractor shall be responsible for damage resulting from the construction activity.

- e. Use whatever means are necessary to prevent dust, dirt, and debris from becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.
- f. Maintain access to adjacent areas at all times.

PART FOUR – SPECIAL PROVISIONS

4.01 N/A (or state per each individual job)

END OF SECTION

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EXCAVATION FOR STRUCTURES, EMBANKMENT AND BACKFILL

PART ONE - GENERAL

1.01 DESCRIPTION

- A. Work included: Excavate, backfill, compact, and grade the site to the elevations shown on the Drawings, as specified herein, and as needed to meet the requirements of the construction shown in the Contract Documents.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

1.02 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Use equipment adequate in size, capacity, and numbers to accomplish the work of this Section in a timely manner.
- C. In addition to complying with requirements of governmental agencies having jurisdiction, comply with the directions of the soils engineer.

1.03 PRODUCT HANDLING

- A. Comply with pertinent provisions of Section 01640.

1.04 SUBMITTALS

- A. Certification attesting that the composition analysis of special material stone backfill materials meet specification requirement.

PART TWO - PRODUCTS

2.01 BACKFILL MATERIALS

- A. Non-structural fill and backfill:
 - 1. Provide granular backfill materials, free from organic matter and deleterious substances, with a top size of three (3) inches and a maximum of 25% passing the #100 sieve.
- B. Structural:
 - 1. Granular material used for structural backfill shall be run-of-bank sand and gravel free of organic and deleterious substances meeting the following gradations:

<u>Sieve Size</u>	<u>% Passing by Weight</u>
3"	100
3/8"	50-100
#4	40-85
#10	30-75
#40	15-45
#200	5-15

Liquid limit
25% maximum

Plasticity index
7 maximum

2. Porous fill under slabs: Provide twelve (12) inches unless otherwise shown on the Drawings. Porous fill shall be crushed coarse aggregate in the form of stone, gravel, or slag meeting the requirements of Ohio Department of Transportation. Size and grading requirements of coarse aggregate shall meet the requirements for AASHTO #57 coarse aggregate.

2.02 WEED KILLER

- A. Provide a dry, free-flowing, dust-free chemical compound, soluble in water, capable of inhibiting growth of vegetation, and approved for use on this Work by governmental agencies having jurisdiction.

2.03 TOPSOIL

- A. Where and if shown on the Drawings or otherwise required, provide topsoil consisting of friable, fertile soil of loamy character, containing an amount of organic matter normal to the region, capable of sustaining healthy plant life, and reasonably free from subsoil, roots, heavy or stiff clay, stones larger than two (2) inches in greatest dimension, noxious weeds, sticks, brush, litter, and other deleterious matter.
- B. Obtain topsoil from sources within the project limits, or provide imported topsoil obtained from sources outside the project limits, or from both sources.

2.04 OTHER MATERIALS

- A. Provide other materials, not specifically described but required, for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer.

PART THREE - EXECUTION

3.01 GENERAL EXCAVATION

- A. The Drawings show the horizontal and the lower limits of structures. The methods and equipment used by the Contractor when approaching the bottom limits of excavation to a smooth surface shall be selected to prevent disturbing the soil below the bottom limits of excavation. All soil loosened during excavation shall be removed from the footing bottom. For protection of footing bottoms during excavation refer to section on Mud Mats.
- B. Unless authorized in writing by the Engineer, excavation which is carried below the bottom limits of structures shall be classified as unauthorized excavation.
- C. Unauthorized excavation shall be filled with Class B concrete to the bottom limits of structures. Under circumstances where structural integrity is not a factor, the Engineer may authorize the filling of unauthorized excavation with special backfill material compacted to 100% density, as specified under Compaction Requirements. Such preparation shall be at the cost of the Contractor.

3.02 PROCEDURES

- A. Utilities
 1. Unless shown to be removed, protect active utility lines shown on the Drawings or otherwise made known to the Contractor prior to excavating. If damaged, repair or replace at no additional cost to the Owner.
 2. If active utility lines are encountered, and are not shown on the Drawings or otherwise made known to the Contractor, promptly take necessary steps to assure that service is not interrupted.
 3. If service is interrupted as a result of work under this Section, immediately restore service by repairing the damaged utility at no additional cost to the Owner.
 4. If existing utilities are found to interfere with the permanent facilities being constructed under this Section,

immediately notify the Engineer and secure his instructions.

5. Do not proceed with permanent relocation of utilities until written instructions are received from the Engineer.

B. Protection of persons and property:

1. Barricade open holes and depressions occurring as part of the Work, and post warning lights on property adjacent to or with public access.
2. Operate warning lights during hours from dusk to dawn each day and as otherwise required.
3. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout, and other hazards created by operations under this Section.

C. Dewatering:

1. Remove all water, including rain water, encountered during trench and sub-structure work to an approved location by pumps, drains, and other approved methods.
2. Keep excavations and site construction area free from water.

- D. Use necessary means to prevent dust from becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.

- E. Maintain access to adjacent areas at all times.

3.03 REMOVING AND STOCKPILING TOPSOIL

- A. The Contractor shall remove and stockpile for re-use, topsoil from the area of excavation. The work shall be done in accordance with applicable portions of ODOT Specification. Stockpile shall be located as shown on the Drawings or as agreed to by the Engineer.

3.04 EXCAVATION OF UNSUITABLE MATERIALS

- A. Unsuitable materials, such as peat, organic contaminated soil, existing below the Contract bottom limits for excavation shall be removed as directed by the Engineer. Such excavation shall be conducted at a time when the Engineer is present and shall not exceed the vertical and lateral limits as prescribed by the Engineer.
- B. The voids left by removal of unsuitable material shall be filled with material consisting of either; (1) special backfill; or (2) Class B concrete; whichever is ordered by the Engineer. Special backfill material shall be compacted to 100% density as specified under Compaction Requirements. Such preparation shall be at the cost of the Contractor.
- C. Payment for this work shall be by Change Order.

3.05 DISPOSAL OF UNSUITABLE AND SURPLUS MATERIAL

- A. All unsuitable and excess excavated materials shall be disposed of by the Contractor. Disposal shall be at an off-site location selected by the Contractor unless a disposal site is indicated on the Drawings.
- B. Off-site disposal shall be in accordance with applicable government regulations.
- C. On-site disposal shall be in accordance with applicable government regulations.

3.06 REMOVAL OF WATER

- A. The Contractor shall at all times during construction provide and maintain ample means and devices with which to remove promptly and dispose of properly all water entering the excavations or other parts of the work and shall keep said excavations dry until the structures to be built or pipelines to be placed therein are completed. No

water shall be allowed to rise over or come in contact with masonry until the concrete and mortar has attained a satisfactory set, except in cases where the concrete has been trimmed into place with the approval of the Engineer. In water bearing sand, well points and/or sheeting shall be supplied together with pumps and other appurtenances of ample capacity to keep the excavation dry as specified.

- B. The Contractor shall dispose of water from the work in accordance with the Specifications and the requirements of the applicable government regulations without damage to adjacent property or structures.

3.07 SHEETING, SHORING, AND BRACING

- A. The Contractor shall furnish and install adequate sheeting, shoring, and bracing to maintain safe working conditions, and to protect newly built work and all adjacent and neighboring structures from damage by settlement.
- B. Bracing shall be arranged so as not to place a strain on portions of completed work until the construction has proceeded far enough to provide ample strength. Sheeting and bracing may be withdrawn and removed at the time of backfilling, but the Contractor shall be responsible for all damage to newly built work and adjacent and neighboring structures.
- C. The Contractor shall furnish, install and leave in place, construction sheeting and bracing as designated on the Drawings.
- D. Construction sheeting and bracing, placed by the Contractor to protect adjacent and neighboring structures, may be left in place if desired by the Contractor, and agreed to by the Engineer.

3.08 BACKFILL

- A. Unless otherwise specified or directed, material excavated in connection with the work may be used for backfilling, other filling purposes, and as required for new grading contours insofar as it is of satisfactory character as determined by the laboratory. No material shall be used for backfilling that contains stones, rock, or pieces of masonry greater than 6 in., frozen earth, debris, earth with an exceptionally high void content, organic material, or marl. No large pieces of rock or masonry shall be deposited closer than twenty-four (24) inches from the completed outside surface or any structure.
- B. No backfill shall be placed against any structural elements until the strength level of the in-place concrete shall have attained the specified design strength. The Engineer may test in-place strength using non-destructive procedures of ASTM C803.
- C. Backfill shall be placed in uniform layers not exceeding six (6) inches in depth. Each layer shall be placed, then carefully and uniformly compacted to the specified density.
 - 1. Backfill shall be brought up evenly on all sides of the structure to avoid unbalanced lateral forces.
 - 2. The compaction equipment shall be capable of compacting the soil to the required density at the required moisture content and achieve a relatively uniform density from top to bottom of the lift.
- D. In no case will backfill material from a bucket be allowed to fall directly on a structure, and in all cases the bucket must be lowered so that the shock of the falling earth will not cause damage.
- E. Structures with intermediate floors or top slabs, which give lateral support to the walls, shall have these elements in place and shall have obtained the specified design strength prior to backfilling. In the case of structures with walls which are unsupported such as open topped tanks and retaining walls, the latest placed section of wall shall have obtained the specified design strength prior to backfilling.
- F. Where structural slabs or footings are to be placed on a backfilled area, a selected backfill or, where called for on the Drawings, special backfill material shall be used.
- G. Backfilling over the top of any structure will require the approval of the Engineer. The in-place strength of the concrete top slab shall be determined as discussed in Paragraph B for walls.

1. The backfill may be placed on the structure with a crawler tractor with an attached front blade having a maximum gross weight of 14,000 lbs. No heavier compaction equipment shall be permitted on the structure.
2. Two (2) feet of loose backfill shall be maintained between the top slab of the structure and the tracks of the crawler tractor at all times.

H. Placing and compacting:

1. Place backfill and fill materials in layers not more than eight (8) inches in loose depth.
2. Before compacting, moisten or aerate each layer as necessary to provide the optimum moisture content.
3. Compact each layer to required percentage of maximum density for area.
4. Do not place backfill or fill material on surfaces that are muddy, frozen, or containing frost or ice.
5. Place backfill and fill materials evenly adjacent to structures, to required elevations.
6. Take care to prevent wedging action of backfill against structures by carrying the material uniformly around the structure to approximately the same elevation in each lift.
7. Where the construction includes basement or other underground walls having structural floors over them, do not backfill such walls until the structural floors are in place and have attained sufficient strength to support the walls.

3.09 EMBANKMENT

- A. In making fill for embankment, the surface of the existing ground shall be cleared, grubbed, plowed and (if required) stepped so as to enable bond or firm bearing for the new fill and with any cross ditches filled and tamped to the prevailing grade. The materials for these fills shall be selected of approved materials free from organic matter and placed in horizontal layers not exceeding six (6) inches in thickness when loose, each layer being thoroughly compacted. Materials shall not be placed in the fills too wet to allow for proper solidification and rolling, or when fill or foundation is frozen. If fill material is too dry, it shall be moistened by sprinkling with water to optimum moisture content.
- B. As fills progress, the top shall be kept crowned or sloped for drainage. No roadway shall be laid upon the fill until it has fully settled.
- C. Fills which abut or contain concrete or masonry structures shall be placed with care to avoid undue or unbalanced loads on these structures.
- D. Following the completion of embankment, all berms and slopes shall be neatly and evenly dressed to proper elevation, grade and dimension.
- E. The Contractor will be held responsible for the stability of embankment and shall repair all damage thereto or failure therein within the period of guaranty, unless such damage or failure resulted definitely from the acts of others. Excavation or grading for forming benches and steps in original ground in order to place embankment shall be part of this work.
- F. Where fill is to be placed on undisturbed side slopes steeper than one (1) vertical to six (6) horizontal, benches shall be formed into the slope before any of the backfill is placed. These benches shall be cut at vertical intervals at no more than two (2) feet and shall have a horizontal dimension of not less than three (3) feet. The backfill material shall be placed in six (6) inch horizontal layers and each layer shall be thoroughly compacted to the specified density by approved methods before a succeeding layer is placed.

3.10 MUD MATS

- A. Excavation for structures with mud mats, as shown on the Drawings or a field directed by the Engineer, shall be excavated in two stages as follows or as field directed:

1. Excavation shall be to an elevation of one (1) foot above bottom of mud mat elevation.
2. Excavation of the one (1) foot for an area that can be mud matted that same day.

B. The Contractor shall provide means for removing dirt and water from the mud mat before pouring and placing the structural slab.

3.11 EXCAVATION OF ROCK

1. Where rocks, boulders, granite, or similar material is encountered, and where such material cannot be removed or excavated by conventional earth moving or ripping equipment, take required steps to proceed with the general grading operations of the Work, and remove or excavate such material by means which will neither cause additional cost to the Owner nor endanger buildings or structures whether on or off the site.
2. Do not use explosives without written permission from the Engineer.

3.12 GRADING

A. General:

1. Uniformly grade the areas within limits of grading under this Section, including adjacent transition areas.
2. Smooth the finished surfaces within specified tolerance.
3. Compact with uniform levels or slopes between points where elevations are shown on the Drawings, or between such points and existing grades.
4. Where a change of slope is indicated on the Drawings, construct a rolled transition section having a minimum radius of approximately 8'10", unless adjacent construction will not permit such a transition, or if such a transition defeats positive control of drainage.

B. Grading outside building lines:

1. Grade areas adjacent to buildings to achieve drainage away from the structures, and to prevent ponding.
2. Finish the surfaces to be free from irregular surface changes, and:
 - a. Shape the surface of areas scheduled to be under walks to line, grade and cross-section, with finished surface not more than 0.10 ft. above or below the required sub-grade elevation.
 - b. Shape the surface of areas scheduled to be under pavement to line, grade, and cross-section, with finished surface not more than 0.05 ft. above or below the required sub-grade elevation.

3.13 COMPACTING

A. Control soil compaction during construction to provide the minimum percentage of density specified for each area as determined according to ASTM D698.

B. Provide not less than the following maximum density of soil material compacted at optimum moisture content for the actual density of each layer of soil material in place, and as approved by the soils engineer:

1. Structures:
 - a. Compact the top eight (8) inches of sub-grade and each layer of fill material or backfill material at 95% of maximum density.
2. Lawn and unpaved areas:

- a. Compact the top eight (8) inches of sub-grade and each layer of fill material or backfill material at 90% of maximum density.
 - b. Compact the upper twelve (12) inches of filled areas, or natural soils exposed by excavating, at 85% of maximum density.
- 3. Walks:
 - a. Compact the top eight (8) inches of sub-grade and each layer of fill material or backfill material at 90% of maximum density.
- 4. Pavements:
 - a. Compact the top eight (8) inches of sub-grade and each layer of fill material or backfill material at 90% of maximum density.
- C. Moisture control:
 - 1. Where sub-grade or layer of soil material must be moisture-conditioned before compacting, uniformly apply water to surface of sub-grade or layer of soil material to prevent free water from appearing on surface during or subsequent to compacting operations.
 - 2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compacting to the specified density.
 - 3. Soil material that has been removed because it is too wet to permit compacting, may be stockpiled or spread and allowed to dry. Assist drying by disking, harrowing, or pulverizing until moisture content is reduced to a satisfactory value as determined by moisture-density relation tests approved by the soils engineer.

3.14 FIELD QUALITY CONTROL

- A. Secure the soils engineer's inspection and approval of sub-grades and fill layers before subsequent construction is permitted thereon.
- B. Provide at least the following tests to the approval of the soils engineer:
 - 1. At paved areas, at least one (1) field density test for every 2000 sq. ft. of paved area, but not less than three (3) tests;
 - 2. In each compacted fill layer, one (1) field density test for every 2000 sq. ft. of area, but not less than three (3) tests.
- C. If, in the soils engineer's opinion based on reports of the testing laboratory, sub-grade or fills which have been placed are below specified density, provide additional compacting and testing under the provisions of Section 01410 of these Specifications.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

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SODDING, SEEDING AND MULCHING

PART ONE - GENERAL

1.01 DESCRIPTION

- A. Work Included: Installation of topsoil, as necessary, supplying all seed, sod, soil conditioning materials, and mulching materials and the incorporation of these materials into the work as specified.
 - 1. The Contractor shall place stockpiled topsoil in those areas requiring seeding or sod. If the quantity of stockpiled topsoil is insufficient, the Contractor shall furnish and install additional topsoil as required to complete the work.
- B. Related Work:
 - 1. Including but not limited to the General Conditions, Supplementary Conditions or General Requirements.
 - 2. All relative sections within Division 2 of the Contract Specifications

1.02 QUALITY ASSURANCE

- A. State and local code requirements shall control the removal, stock piling and installation of all materials specified herein. Enforcement agencies include but are not limited to:
 - 1. Ohio Dept. of Transportation

1.03 SUBMITTALS

- A. Prior to the use or placement of materials or products specified herein and accordance with the General Requirement and supplements thereto, Contractor shall submit manufacturers materials specification, handling instructions, installation requirements and application rates for all materials and products specified herein.
- B. Certification of imported topsoils is required to ascertain compliance to the requirements specified herein.

1.04 JOB CONDITIONS

- A. Final restoration of the ground surface must be completed within twenty (20) days of the completion of the pipeline installation or temporary ground cover, as approved by the Engineer, must be provided by the Contractor.
 - 1. Temporary ground cover shall not permit the erosion of the ground surface during wet weather period nor create a dust environment during dry weather conditions.

PART TWO - PRODUCTS

2.01 LIME

- A. Agricultural ground limestone with a minimum total neutralizing power of ninety (90) and at least forty (40) percent passing a No. 100 sieve and at least ninety-five (95) percent passing a No. 8 sieve shall be used at the rate of thirty (30) pounds per 1000 square feet of area.

2.02 FERTILIZER

- A. Superphosphate shall be applied at the rate of thirty (30) pounds per 1000 square feet of area.
- B. 12-12-12 fertilizer shall be applied at the rate of twenty (20) pounds per 1000 square feet of area.

- C. The above fertilizers may be premixed in the proportion of sixty (60) pounds of superphosphate and forty (40) pounds of 12-12-12 fertilizer and applied at the rate of fifty (50) pounds per 1000 square feet of area.
- D. Fertilizer of analysis other than 12-12-12 (but in the same approximate ratio) may be used varying the rate of application to apply the specified ingredient quantities. Deviations are to be approved by the Engineer.
- E. If liquid fertilizer is used, the Contractor shall present to the Engineer for approval the control methods he proposes to employ to assure thorough mixing of the specified fertilizers and methods he proposes to employ to assure that specified amounts are uniformly applied.
- F. Fertilizer and liming materials shall be applied separately but can be tilled or otherwise incorporated into the soil in the same operation.

2.03 SEED

- A. Seed shall be vendor mixed, delivered in original bags and shall be proportioned as follows:

<u>Common Name</u>	<u>Proportion by Weight</u>
Kentucky Bluegrass	40%
Creeping Rye Grass	40%
Annual Rye Grass	20%

- B. Supplier's name and analysis of seed is to be submitted to the Engineer.

2.04 MULCH

- A. Mulching material shall be straw or other material approved by the Engineer and shall be free of weed seeds and foreign material that detract from their effectiveness as mulch or which may be injurious to growth of plants.

2.05 SOD

- A. Sod shall be well-rooted Kentucky Blue Grass (*POA pratensis*) grown on a mineral soil and obtained from a commercial sod nursery. Sod shall be free of all noxious weeds such as wild mustard, thistles, quack grass, etc. and reasonably free from dandelions, crabgrass, etc.
- B. Sod shall have been recently mowed to a height of not more than two (2) inches and shall be cut in strips not less than three (3) feet long nor more than six (6) feet long and shall be cut in a uniform width of not over eighteen (18) inches.
- C. Sod shall be delivered to the job within twenty-four (24) hours after being cut and shall be installed within thirty-six (36) hours after being cut.
- D. During wet weather the sod shall be allowed to dry sufficiently to prevent tearing during handling and placing and during dry weather have been watered before lifting to insure its vitality and to prevent dropping off of soil during handling.

2.06 TEMPORARY EROSION CONTROL

- A. Erosion control fabric shall consist of biodegradable or photodegradable materials of yard interwoven with strips of paper or extruded plastic mesh interwoven with curled wood fibers and shall be installed per manufacturer's instructions. Erosion control fabric shall be Hold/Gro as manufactured by Gulf States Paper Corporation, Curlex Blankets as manufactured by American Excelsior Company or approved equal.

2.07 PERMANENT EROSION CONTROL

A. Permanent erosion control fabric shall be a nylon reinforcement nylon flexible soil reinforcement matting resistant to ultraviolet light degradation.

B. Matting shall be 7020 Enkamat, as manufactured by American Enka Company, or equal.

C. Matting Characteristics

1. Material

- a. Nylon 6 \pm 0.5% by weight Carbon Black

2. Dimensional

- a. Weight (g/sq.m.) 405 \pm 7%
- b. Thickness (mm) (minimum) 18 (0.8 in.)
- c. Width (cm) 97 (38 in.)
- d. Roll Length (m) 100 (330 ft.)
- e. Filament Diameter (mm) (minimum) 0.40

3. Tensile Properties

- a. ASTM D1682

4. Strength (kg/m - minimum)

- a. Length Direction 140
- b. Width Direction 80

5. Elongation (% - minimum)

- a. Length Direction 50
- b. Width Direction 50

6. Resiliency

- a. Immediate recovery
3 cycles at 100 psi 80

7. Exposure Properties

- a. 80% Strength Retention
- b. Temperature Range ($^{\circ}$ F) -100 to 250
- c. pH Range 3 to 12

2.08 CROWN VETCH (CORONILLA VARIA)

A. Areas to be seeded with Crown Vetch shall be seeded with the following mixture:

33 percent Crown Vetch
67 percent Perennial Rye Grass (*Lolium perenne*)

B. The inoculant for treating Crown Vetch seed mixture shall be a pure culture nitrogen - fixing bacteria selected for maximum vitality, not more than one (1) year old. All cultures are subject to approval of the Engineer.

C. All seeds shall be inoculated or treated with the proper amount of the approved culture mixed with sufficient water to thoroughly wet the seed with the solution. When seed is sown hydraulically, four (4) times the amount of inoculant required above shall be placed in the slurry and thoroughly mixed immediately before

seeding. Seed shall be sown within twenty-four (24) hours after treatment with the inoculant.

- D. Crown Vetch is best planted in early spring but shall be planted before September 1st. Late planting losses shall be replaced by the Contractor at no cost to the project.

2.09 IMPORTED TOPSOIL

- A. Topsoil shall comply with ODOT Section 653.03 and shall not contain grass, roots, and debris harmful to plant growth and be free of pests, pest larvae and matter toxic to plant and animal life.

PART THREE - EXECUTION

3.01 PLACING TOPSOIL

- A. Topsoil shall be placed to a depth of four (4) inches for those seeded and sodded areas shown on the Drawings. The work shall be performed in accordance with applicable portions of ODOT Section 653.

3.02 APPLYING LIME AND FERTILIZER

- A. Before applying lime and fertilizer, areas to be seeded or sodded shall be inspected by the Contractor and all surface debris of sufficient size to interfere with the operation of spreaders or cause non-uniform application shall be removed. All tree roots of 3 inches in diameter and within 4 inches of finished grade shall be removed. All roots from living trees regardless of location with respect to finished grade shall be accepted as found and protected from further injury.
- B. Apply lime and fertilizer in the amounts specified under 2.01 and 2.02. Fertilizers shall be applied separately from liming material, but both can be incorporated into the soil by tilling or other method to a depth of four (4) inches in the same operation.

3.03 SOWING AND SODDING

- A. All areas to be seeded shall be free of rock and other foreign material one (1) inch or greater in any dimension. Hand raking will be required if machine cleaning does not produce results equivalent to hand raking. Around structures or in any other area where machine cleaning is impracticable hand raking shall be employed.
- B. If seedbed becomes compacted prior to seeding or sodding, it shall be re-cultivated to produce a friable condition before seeding and sodding. Rock or other debris turned up by re-cultivation shall be removed as specified under 3.03 A at no additional cost to the Owner.
- C. Seed shall be thoroughly mixed and uniformly sown over the prepared area at the rate of four (4) pounds per 1000 square feet. Seed shall be sown dry or hydraulically. Seed shall not be sown when the ground is frozen or muddy or when weather conditions would prevent proper soil preparation, interfere with sowing, or prevent proper incorporation of seed into the soil.
- D. Following seeding of grasses or legumes, the area shall be raked, dragged, or otherwise treated so as to cover the seed approximately 1/4 inch.
- E. Within forty-eight (48) hours after sowing seed, vegetative mulch shall be evenly distributed at the rate of approximately two (2) tons per acre. Mulching material shall be kept in place with asphalt emulsion applied at the rate of fifty (50) gallons per ton of mulch material specified, netting or by other methods approved and required to prevent mulch displacement. Asphalt emulsion shall conform to AASHTO M140 or ASSHTO M208, be non-toxic to plants and shall be so prepared that it will not change in storage or transport. Mulch which is displaced shall be restored at once but only after repair and restoration of seeding and preparatory work that preceded mulching and which suffered damage due to mulch displacement.
- F. Areas to be sodded shall be prepared as specified in 3.01 and 3.02. Before sod is placed, the sod bed shall be dressed so that sod, when laid, will meet proposed finished grades and grades of existing structures, walks, drives, and adjacent lawn areas.

- G. Sod shall not be laid when the temperature is below 32 degrees F. nor when sod itself or sod bed is frozen.
- H. Sod shall be lifted from trucks or storage piles and placed by hand with joints tightly butted and not overlapping. Transverse sod joints shall be staggered at least one (1) foot. Sodded surface shall be free of gaps, cracks, and openings. After laying, the sod shall be watered thoroughly and be tamped or lightly rolled to bring it into close contact with the sod bed and to insure tight joints between strips.
- I. Sod laid on slopes shall be laid with long edges of the strip parallel to the contour and laying shall start at the bottom of the slope.
- J. On slopes of two (2) to one (1) or steeper and six (6) feet or over in height measured on the slope each strip of sod shall be held in place by stakes two (2) feet apart. Stakes shall be wood not less than 1/2 x 3/4 x 12 inches and shall be driven flush with the sod with the flat side parallel to the contour and adjacent rows of stakes staggered.

3.04 WATERING OF AREA

- A. The Contractor shall provide whatever devices are required such as hoses and tank trucks to distribute water and sprinklers to apply it. Hydro-seeders or pressure tanks may be required with a nozzle that will produce a spray that will not dislodge mulch material.
- B. Sodded areas, including the sub-grade, shall be kept thoroughly moist for two (2) weeks after sodding.

3.05 MAINTENANCE

- A. In seeded lawn areas, where designated the Contractor shall provide law cutting for three successive mowings seven (7) days apart for acceptable lawns. Unacceptable lawns shall be maintained by the Contractor until accepted.
- B. Acceptance shall be based upon achieving a uniform stand of the specified grasses. If some areas are satisfactory and some are not, acceptance may be made in blocks, provided they are definable or bounded by readily identified permanent surfaces, structures, or other reference means. Partial acceptance decisions shall be made by the Engineer. Excessive fragmentation into accepted and unaccepted areas shall be avoided. Unaccepted areas shall be maintained by the Contractor until acceptable.
- C. Maintenance of sodded areas shall consist of watering for two (2) weeks following completion of sodding work and mowing during this two (2) week period as dictated by weather and rate of growth. Sodded areas shall be protected from traffic as necessary by erection of barriers.

3.06 SEEDING DATES

- A. Spring-sown lawns shall be completed by May 30th and fall-sown lawns shall be completed by October 15th.

3.07 PERMANENT EROSION CONTROL

- A. Permanent erosion control measures shall be taken in the areas designated on the construction drawings. In these areas, the erosion control netting (see 2.07) shall be replaced with a nylon flexible soil reinforcement matting resistant to ultraviolet light degradation.
- B. The matting shall be installed as per the manufacturers instructions. The matting shall be placed over the slopes, which shall be smooth and free of ruts and rocks. Material shall be installed with a two to three (2-3) inch overlap, pinned at three to five (3-5) foot intervals with the peaked side down. Material shall be placed in vertical strips from top to bottom. There shall be a twelve (12) inch upslope trench backfilled to bury the pinned upper edge of the matting.
- C. The seed shall then be distributed as per the requirement stated in 3.03.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

PART ONE - GENERAL

1.01 SCOPE

- A. The Contractor shall furnish all of the equipment, labor and materials necessary to install, replace, and/or restore existing pavement structures together with their respective appurtenances as shown on the plans and as specified herein. This work shall include all of the sub-grade preparation, sub-base, base, intermediate pavement course(s), and finish pavement courses together with curbing, guttering, tack and/or prime coating, sealing and other pertinent work as necessary to meet the conditions of this contract.
- B. Related Work:
 - 1. Including but not limited to the General Conditions, Supplementary Conditions or General Requirements.
 - 2. Section 02235: Trench Excavation

1.02 NEW WORK

- A. For all new pavement installations, the Contractor shall furnish all equipment, labor and materials as necessary to properly construct, at the locations shown on the drawings and as specified herein, all required pavement structures.

1.03 REPAIR OR REPLACEMENT WORK

- A. For the repair and/or replacement of all existing pavement structures and their respective appurtenances that are removed and destroyed or otherwise damaged by the Contractor in the course of his performance of the work required under this contract, the Contractor shall furnish all equipment, labor, and materials as necessary to properly restore to a condition equal to that at his entry, and to the satisfaction of the Engineer, the Ohio Department of Transportation, the County Engineer, City Engineer, all cinder, slag, gravel, water-bound macadam, bituminous macadam, asphalt and brick or concrete driveways, curbs, sidewalks and roadways in strict accordance with the drawings and as specified herein.
- B. In general, this item will include concrete, steel reinforcement, brick, stone, slag, cinders, gravel, asphalt and other bituminous materials and curbs, gutters, driveway culverts, road and curb drains and the demolition, excavation and removal of existing driveways, sidewalks and roadways.

1.04 REFERENCE TO OTHER SECTIONS

- A. Other sections of these specifications shall apply, as and where applicable to this Section and such sections will be the same as though they were included in this section.
- B. For all new work, all clearing and grubbing, removal and storage of topsoil, excavation and/or placing of completed fill as required for the roadways, parking areas, and walks that are to be built under this contract shall be accomplished by the Contractor. Special backfill, in addition to that which is specified for inclusion with other work under this contract (such as an underground conduit or piping installation), shall be provided and installed under these specifications when ordered by the Engineer.
- C. For all old work where pavement is being repaired and/or replaced as a result of damages occurring thereto during the course of the work of this contract, all clearing and grubbing, removal and storage of topsoil, excavation and/or placing of compacted fill and special backfill, shall be done as required under other parts of these specifications .

1.05 QUALITY ASSURANCE

- A. All pavement work shall be placed upon properly prepared sub-grade.
 - 1. Bearing capacity and/or other properties of the sub-grade, may be tested by the Owner at the Owner's direction.

- B. Each pavement base and pavement course shall be subject to testing for material quality, compaction, compressive strengths, thickness and/or other properties by the Owner and at the Owner's discretion.
- C. The testing procedures and practices set forth in respective ODOT Specifications will be followed.

PART TWO - PRODUCTS

2.01 MATERIAL

- A. All paving materials shall conform to the herein referenced ODOT Specification respective to each pavement type classification.

PART THREE - EXECUTION

3.01 ROADWAY SUB-GRADE

- A. The entire area to be occupied by the roadways and parking areas shall be cleared, topsoil removed and stored, and the excavation or compacted fill made as required and brought to the proper cross-sections. Pipe trenches and other excavations shall be backfilled as required, and thoroughly compacted within the limits of the roadways or parking areas.
- B. After the surface of the sub-grade has been properly shaped and before any stone or slag is placed, the entire sub-grade shall be thoroughly rolled and compacted to a depth of twelve (12) inches under this section. Rolling shall be done with an approved type of self-propelled roller, weighing not less than ten (10) tons. All hollows and depressions which develop during the rolling shall be filled with acceptable materials, and the sub-grade re-rolled. The process of filling and rolling shall be repeated until no depressions develop, and the entire sub-grade has been brought to a uniform condition of stability.
- C. All places which, in the opinion of the Engineer, cannot be properly rolled, shall be tamped with hand held mechanically or pneumatically powered tampers.
- D. In making the compacted fill and in doing the final sub-grade rolling, the Contractor shall see that the material to be compacted and/or rolled has the proper moisture content to secure maximum compaction. When, in the opinion of the Engineer, the material is too wet, the compacting shall be delayed until the material has dried sufficiently. When, in the opinion of the Engineer, the material is too dry, the material shall be sprinkled with water in an amount to secure the proper moisture content.

3.02 CONSTRUCTION

- A. Generally, for all repair and replacement work, all new materials shall match the existing and adjoining work in both composition and quality unless otherwise ordered, specified herein, and/or shown on the drawings. In any stone driveway or roadway, the material used for stone fill shall conform to the existing material.
- B. All pavements disturbed by the Contractor's operations shall be re-laid to the thickness of the adjoining pavement and, in all cases, the restoring of pavements, shall apply both to foundation courses and to the wearing surface.
- C. Should cracks or settlements appear in adjoining pavements, the paving shall be removed to the extent necessary to secure firm and undisturbed bearing and shall be replaced in a satisfactory manner.
- D. No permanent pavement shall be installed, repaired, and/or restored unless, or until, in the opinion of the Engineer, the condition of the backfill is such as to properly support the pavement.
- E. Where new or replacement concrete pavement or base is placed adjacent to existing concrete pavement or base, contraction joints shall be provided in the new or replacement pavement so as to form a continuous joint with that in the existing pavement.

3.03 PAVEMENT TYPES

- A. For all new and/or repair/replacement work where specific pavement types are shown or called for on the plans, the Contractor shall install according to the typical pavement details, cross-sections and types as shown.

- B. All pavement construction shall be performed in accordance with the Ohio Department of Transportation Manual of Construction and Material Specifications, latest revision and more specifically included, but not limited to the following:

ODOT Item 301 Asphalt Concrete Base

ODOT Item 302 Asphalt Concrete Base

ODOT Item 304 Aggregate Base

ODOT Item 305 Portland Cement Concrete Base

Section 02500: Pavement Construction, Repair and Replacement

PART FOUR – SPECIAL PROVISIONS

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SECTION 02505

AGGREGATE BASE

PART ONE - GENERAL

1.01 SCOPE

- A. This work shall consist of removal and repair of existing asphalt and sub-base to suitable depth as determined by the Engineer.

PART TWO - PRODUCTS

2.01 AGGREGATE BASE

PART THREE - EXECUTION

3.01 APPLICATION

- A. The contractor shall remove existing asphalt and sub-base in areas shown on the plans or as directed by the Engineer. After removal of the sub-base the contractor will construct Item 304 in 6" lifts and compacted as per ODOT construction and material specification Item 304. An intermediate course of asphalt per ODOT Item 448 shall be installed prior to the application of the surface.
- B. The intermediate course shall begin at the original sub-base - asphalt interface and end at the surface level of the existing asphalt pavement. Flush match all edges. Intermediate course shall be placed and compacted in lifts that are no greater than normal and usual for the ODOT 448 or a substituted asphalt material.
- C. Asphalt shall be cut or trimmed neatly along edges to abut patch.
- D. ODOT 301 may be substituted if approved by the Engineer.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

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WATERLINE CONSTRUCTION

PART ONE - GENERAL

1.01 DESCRIPTION

A. Work Included:

1. This work shall consist of the construction of a potable water pipeline in accordance with these specifications and in reasonably close conformity to the lines and grades indicated on the plans or as established by the Engineer.
2. This work shall include excavating for pipe, fittings, valves, thrust blocks and other appurtenances, clearing and grubbing and the removal of all materials necessary for placing the pipe, except removals listed separately; furnishing and placing granular or concrete bedding and granular backfill as required; constructing and subsequently removing all necessary cofferdams, cribs, and sheeting; pumping and dewatering; making all pipe joints, as required; installing all necessary pipe; joining to existing and proposed appurtenances as required; performing leakage tests as specified; disinfecting and restoration of disturbed facilities and surfaces.
3. Arrangements for and the performance of the adequate and satisfactory disposal of all test and disinfection waters shall be the Contractor's responsibility. The Contractor shall chlorinate the water main as often as necessary to achieve an approved portable water test.

B. Related Work:

1. Including but not limited to the General Conditions, Supplementary Conditions or General Requirements.
2. All applicable Divisions of the Technical Specifications.

PART TWO - PRODUCTS

2.01 MATERIALS

- A.** Pipe, fittings, specials, valves, joint materials, hydrants, thrust blocks, and other appurtenances shall be the size and kind specified in the proposal and shown on the plans.

PART THREE - EXECUTION

3.01 LAYING PIPE

- A.** The Contractor shall furnish all of the proper tools and equipment required for the safe, proper handling and laying of all pipe, fittings, and specials that are to be installed in this work. All storage, handling, laying, and backfill methods shall be performed so as to avoid damaging either the interior or the exterior surfaces of all pipe fittings, specials, joint materials, or other appurtenances, and any such damage shall be remedied at the Contractor's expense, as approved or directed by the Engineer.
- B.** Before any pipe is lowered into the trench, it shall be inspected for damage, and any unsatisfactory lengths shall be rejected. Cast metal pipe and fittings shall be inspected for cracks by ringing with a light hammer while suspended. The interior and exterior of each pipe length used shall be cleaned as necessary to remove all dirt or other foreign material before it is inspected. The interior of the pipe shall be kept clean until the work is accepted.
- C.** No pipe shall be laid in water, mud or when trench conditions or weather is unsuitable for such work, except by permission of the Engineer.

- D. If mud, surface water, leaves and/or other debris have been permitted to enter the strung-out pipe, the inside shall be cleaned with a strong hypochlorite solution as directed by the Engineer after all such foreign materials are completely cleaned from the pipe and before the pipe is lowered into the trench.
- E. Pipe shall not be pushed off the bank nor shall it be permitted to fall into the trench. Each type of pipe fitting, special or other appurtenances shall be handled in strict accordance with recommendations of its respective manufacturer.
- F. No rocks, stones, metal, concrete, bricks, pavement pieces, wood, soil lumps or other hard materials too big to pass through a six (6") inch screen shall be permitted within six (6") inches of the pipe after it is laid in the trench. Any pipe endangered by such debris shall be subject to removal and disposal at the Contractor's expense as and when directed by the Engineer.
- G. When pipe laying is not in progress, the open ends of installed pipe shall be closed by appropriate means to prevent the entrance of dirt and water. In the event ground water, sewage water or other potential contaminants enter any portion of the pipeline after it is laid, cleaning and preliminary disinfection with a strong hypochlorite solution shall be done as directed by the Engineer.
- H. Pipe lengths shall not be deflected at the joint to any greater degree than recommended by the manufacturer of the particular joint being used. Where deflections in excess of such recommendations are necessary, the appropriate specifications for the particular type of pipe being installed shall govern the mode of accomplishing such excessive deflections. All pipe deflections shall be performed only with the Engineer's approval.

3.02 JOINTING PROCEDURES

- A. The particular method of making up pipe joints shall be governed by the type of pipe material and type of joint in accordance with the drawings and/or specifications.

3.03 ANCHORAGE

- A. All hydrants, plugs, caps, tees and bends shall be thrust restrained, anchored, or blocked so as to prevent movement by using restrained joints, anchorage, and blocking shall be as shown on the drawings and/or as specified.
- B. Restrained joints on buried piping shall be Clow Superlock or equal for ductile (or cast) iron pipe and/or Price Bros. Snap Lock or equal for prestressed concrete steel cylinder pipe.
- C. Restrained joints on exposed piping in vaults shall be made by use of steel tie rods.
- D. Restrained joints on buried piping that cannot be made as specified in "B" (above) shall be by tie rods. Concrete anchor collars may be used when feasible, if allowed by the Engineer. Pipe clamps are not to be used unless they are allowed for each specific application by the Engineer. All tie rods and appurtenances shall be painted with three (3) coats of bituminous paint.
- E. Restrained (B above) or anchor type joints systems shall be used for all hydrant installations - main tee branch outlet through watch valve and including hydrant.

3.04 BACKFILLING

- A. Backfilling shall be accomplished in a two-step procedure-partial backfill before leakage tests and completion of backfill after tests. Departure from this procedure due to traffic or other conditions shall be approved by the Engineer.

3.05 LEAKAGE TESTS

- A. All pipeline construction shall be subjected to both low and high-pressure hydrostatic leakage testing of each valved section, as it is completed, unless otherwise directed by the Engineer. All pipes, valves, fittings, etc. shall be laid in such a manner as to leave all joints watertight.

- B. The low-pressure test shall precede the high-pressure test.
- C. Each section of pipe being tested shall be filled slowly with water, and, before applying the specified test pressures, all air shall be expelled from the pipe. The method of obtaining and placing test water(s) into the pipeline shall be approved by the Engineer.
- D. The tests shall be under the direction of the Engineer or his designate. The Engineer will furnish a pressure gauge for measuring the pressure on the water main. The Contractor shall furnish a suitable pump, pipes, bulkheads and all appliances, labor, fuel, and other appurtenances necessary to make these tests.
- E. The test pressures shall be maintained for sufficient length of time to allow for a thorough examination of joints and elimination of leakage where necessary. The pipeline shall be made absolutely tight under the test pressures.
- F. The Contractor shall drain each section of the waterline piping after it has been tested. If the drains are connected to valve or drain vaults, then, within a reasonable period of time after the test has been completed, the Contractor shall pump all water out of the vaults.
- G. In cold weather, immediately after testing a section of the waterline piping, the Contractor shall open all valves, air cocks, by-passes, and drains; shall drain that section of the pipeline, including the bonnets of all valves contained therein, and shall take all other precautions necessary to prevent injury due to freezing to the water main, piping and appurtenances.
- H. Every precaution must be taken to remove valve-off or otherwise protect delicate control equipment in or attached to pipelines to prevent damage or injury thereto.
- I. Leakage is defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof, as required to maintain the specified leakage test pressure after the pipe has been filled with water and the air expelled as herein required.
- J. In calculating leakage, the Engineer will not make allowance for any leakage at the valves, the removable bulkheads, etc.
- K. The evaluation of actual leakage to standard pressure leakage is calculated by the application of the ratio determined from the square root of respective pressures, other factors being equal.
- L. The test pressures shall be 10 psi and 250 psi unless otherwise specified elsewhere in these specifications or directed by the Engineer. Testing procedure shall be as specified herein for the particular pipe material contained in the section tested and shall be subject to modification as required by a particular pipeline material specification or part thereof, as contained elsewhere in these specifications.
- M. For asbestos cement pipe (ACP), AWWA C603 shall govern the leakage testing except for leakage rate. Generally, the pipeline shall be filled with water, allowed to stand twenty-four (24) hours and then subjected to the hydrostatic test for two (2) hours at the specified pressure. Allowable leakage, as set by AWWA standard, is based on 150-psi test pressure and a leakage rate of 20 gpd per mile of pipe per inch of pipe diameter.
- N. For cast iron pipe (CIP) or ductile iron pipe (DIP), AWWA C 600 shall govern the test, except that the allowable leakage rate shall be 12 gpd per mile of pipe per inch of diameter.
- O. All defective materials and construction found in the pipeline as a result of leakage tests shall be corrected by removal of the defective materials and reconstruction with sound materials and construction. The entire section shall then be retested in accordance with the foregoing.
- P. Any testing performed without the knowledge of the Engineer shall not be considered a test for the purpose of this specification.
- Q. The lack of hydrants, branch shutoff valves, or any other attachments to the line being tested shall not preclude the testing of each valved section as it is completed. In the event that hydrants, branch shutoff

valves or any other attached appurtenances are not available for installation prior to testing of each valved section, then plugs or other approved means of containing line pressure must be utilized so as to test each valved section of main line as it is completed. The Contractor shall provide air bleed taps as needed to vent high points where the plans do not call for automatic valves. Tap shall be left in place and closed off to exclude dirt and contaminants. A retest of each valved section will then be necessary after all appurtenances are installed. There will be no additional payment for any such retests.

- R. The Contractor shall provide all pressure test equipment. The Owner shall provide all test water required and shall provide test gauges.

3.06 DISINFECTION

- A. Prior to disinfection, all pipeline construction shall be flushed to remove any foreign material. Flushing shall be performed after completion and approval of the leakage tests. The minimum requirements for flushing are as follows:

<u>Pipe Size</u>	<u>Minimum GPM Required</u>
6"	220
8"	390
10"	610
12"	880
14"	1,200
16"	1,565
18"	1,980
20"	2,450
24"	3,500

- B. Flushing at these rates shall be continued for at least five (5) minutes. In the event the foregoing requirements cannot be met due to the Owner's facilities being inadequate, alternate rate(s) and duration(s) of flushing shall be as directed by the Engineer.
- C. Disinfecting water mains shall be in accordance with AWWA C 601 and as specified herein.
- D. The following disinfectants may be used: Chlorine or chlorine water; calcium hypochlorite (HTH, perchloron, pittchlor, etc.); sodium hypochlorite solution, or chlorinated lime-water mixture. Chlorine shall be applied at one extremity of a pipe section via a corporation stop (installed in the top of the pipe by the Contractor) and bled at the opposite extremity of a properly segregated section. Precautions shall be taken to prevent dosed water from flowing into the potable water supply. Contractor shall provided entry and exit taps as needed. Taps shall be left in place, capped or pinched so as to exclude dirt and contaminants. All high points on the section treated shall be properly vented for air escape.
- E. The rate of applying the disinfectant shall provide at least 25 ppm (mg per liter) chlorine dose at the outlet end of the line section being treated. The disinfecting period shall be twenty-four (24) hours, and, at the end of this period, a chlorine residual of at least 10 mg per liter shall exist at the outlet end of the line. In the event of unfavorable or unsanitary conditions of installation, poor packing, or high pH, the period of disinfection may be extended. For shorter periods of disinfection, higher dosages shall be required.
- F. Sterilizing water shall be disposed of in a satisfactory manner by the Contractor. If the foregoing disinfection procedure fails to provide thorough disinfection of the line, it shall be repeated as necessary in the pipeline for a period of twenty to thirty (20-30) days after it is placed into operation.
- G. Tests for efficacy of sterilization shall be made by the Owner, and repeated sterilization shall be carried out by the Contractor when required.
- H. Contractor shall provide all disinfectants and disinfection equipment. **Owner shall provide all test waters needed.**
- I. Testing wastes must be disposed of so as to avoid environmental damage.

3.07 DISINFECTION (ALTERNATE METHOD)

- A. Upon approval by the Engineer, application of disinfectant may be performed as follows:
- B. While installing the main, a powdered calcium hypochlorite compound (HTH, perchloron, monochlor, or equal, as approved by the Engineer) shall be placed in the main at intervals such that the minimum quantity of disinfectant per 100 feet of main is as follows:

4" pipe	1 oz.
6" pipe	2 oz.
8" pipe	3 oz.
10" pipe	5 oz.
12" pipe	8 oz.
16" pipe	12 oz.
20" pipe	18 oz.
24" pipe	25 oz.

- C. Although the foregoing alternate method of disinfection precludes the performance of leakage tests and flushing prior to disinfection, the requirements pertaining to the disinfection period, requisite chlorine residual, repeating the disinfection procedure, leakage tests and flushing shall be met.

3.08 MAINTENANCE OF EXISTING DITCHES

- A. The Contractor shall use the utmost care in maintaining ditches and other waterways, and, if either bottoms or banks of such ditches are disturbed, they shall be promptly restored and maintained for the life of the guaranty period. Similar care shall be used in preventing damage to existing paving by caving of trench walls and undermining such paving. If paving is damaged, the Contractor shall repair same at his own expense.

3.09 CLEARING SITE AND RESTORING DAMAGED SURFACES

- A. Upon completion of the backfill work, the Contractor shall immediately remove and dispose of all surplus materials including dirt and rubbish.
- B. Unless otherwise called for on the plans, the Contractor shall replace all pavements, sidewalks, sod, or other surfaces disturbed to a condition equal to that existing before the work was started, furnishing all materials, labor, equipment, etc., at no additional cost to the Owner.
- C. All restoration of lawns shall be performed in accordance with these specifications as a part of performing the work as specified herein.
- D. All restoration of driveways, sidewalks, roadways and shoulders (berms) shall be in accordance with these specifications as a part of performing the work as specified herein.
- E. Upon completion of the foregoing work, all tools and other property belonging to the Contractor shall be removed, and the site shall be left in good condition.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

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PART ONE – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes storm drainage outside the building.

1.03 DEFINITIONS

- A. **ABS**: Acrylonitrile-butadiene-styrene plastic
- B. **EPDM**: Ethylene-propylene-diene-monomer rubber
- C. **PE**: Polyethylene plastic
- D. **PVC**: Polyvinyl chloride plastic

1.04 PERFORMANCE REQUIREMENTS

- A. Gravity-Flow, Non-pressure-Piping Pressure Ratings: At least equal to system test pressure.
- B. Force-Main Pressure Ratings: At least equal to system operating pressure, but not less than 150 psig (1035 kPa).

1.05 SUBMITTALS

- A. Product Data: For the following:
 - 1. Polymer-concrete, channel drainage systems.
 - 2. Plastic, channel drainage systems.
 - 3. Stainless-steel drainage systems.
 - 4. Backwater valves, cleanouts, and drains.
 - 5. Plastic dry wells.
 - 6. Stormwater disposal systems.
- B. Shop Drawings: Include plans, elevations, details, and attachments for the following:
 - 1. Precast concrete manholes and other structures, including frames, covers, and grates.
 - 2. Cast-in-place concrete manholes and other structures, including frames, covers, and grates.
 - 3. Coordination Drawings: Show manholes and other structures, pipe sizes, locations, and elevations. Include details of underground structures and connections. Show other piping in same trench and clearances from sewerage system piping. Indicate interface and spatial relationship between piping and proximate structures.
 - 4. Coordination Profile Drawings: Show system piping in elevation. Draw profiles at horizontal scale of not less than 1 inch equals 50 feet (1:500) and vertical scale of not less than 1 inch equals 5 feet (1:50). Indicate underground structures and pipe. Show types, sizes, materials, and elevations of other utilities crossing system piping.
- C. Design Mix Reports and Calculations: For each class of cast-in-place concrete.
- D. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Do not store plastic structures, pipe, and fittings in direct sunlight.
- B. Protect pipe, pipe fittings, and seals from dirt and damage.
- C. Handle precast concrete manholes and other structures according to manufacturer's written rigging instructions.

1.07 PROJECT CONDITIONS

- A. Site Information: Perform site survey, research public utility records, and verify existing utility locations.
Locate existing structures and piping to be closed and abandoned.
Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Architect not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Architect's written permission.

PART TWO – PRODUCTS

2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- 1. Polymer-Concrete, Channel Drainage Systems:
 - a. ABT, Inc.
 - b. ACO Polymer Products, Inc.
 - c. Innovative Plastic Products, Inc.
 - d. Josam Co.; Mea-Josam Div.
 - e. Morrison Molded Fiber Glass Co.; Quazite Div.
- 2. Plastic, Channel Drainage Systems:
 - a. ACO Polymer Products, Inc.
 - b. MultiDrain Corp.
 - c. NDS, Inc.
 - d. Tuf-Tite, Inc.
 - e. Zurn Industries, Inc.; Hydromechanics Div.
- 3. Steel, Trench Drainage Systems:
 - a. Rockford Sanitary Systems, Inc.
- 4. Stainless-Steel Drainage Systems:
 - a. Josam Co.; Blucher-Josam Div.
- 5. Gray-Iron Backwater Valves, Cleanouts, and Drains:
 - a. Josam Co.
 - b. McWane, Inc.; Tyler Pipe; Wade Div.
 - c. MIFAB.
 - d. Smith: Jay R. Smith Mfg. Co.
 - e. Watts Industries, Inc.; Ancon Drain Div.
 - f. Watts Industries, Inc.; Enpoco, Inc. Div.
 - g. Zurn Industries, Inc.; Hydromechanics Div.
- 6. PVC Backwater Valves and Cleanouts:
 - a. Canplas, Inc.
 - b. IPS Corp.
 - c. NDS, Inc.
 - d. Plastic Oddities, Inc.
 - e. Sioux Chief Manufacturing Co., Inc.

7. Plastic Dry Wells:
 - a. Flo-Well Products, Ltd.
8. Stormwater Disposal Systems:
 - a. Advanced Drainage Systems, Inc.
 - b. Cultec, Inc.
 - c. Hancor, Inc.
 - d. Infiltrator Systems, Inc.
 - e. PSA, Inc.

2.02 PIPING MATERIALS

- A. Refer to Part 3 "Piping Applications" Article for applications of pipe and fitting materials.

2.03 PIPES AND FITTINGS

- A. Hub-and-Spigot, Cast-Iron Soil Pipe and Fittings: ASTM A 74, gray iron, for gasketed joints.
 1. Gaskets: ASTM C 564, rubber, compression type, thickness to match class of pipe.
- B. Hubless Cast-Iron Soil Pipe and Fittings: CISPI 301 or ASTM A 888, gray iron, for coupling joints.
 1. Stainless-Steel Shielded Couplings: ASTM C 1277 and CISPI 310, corrugated, stainless-steel shield and clamp assembly, with ASTM C 564 rubber sealing sleeve.
 2. Stainless-Steel, Heavy-Duty Couplings: ASTM C 1277; clamp assembly with housing fabricated from stainless steel complying with ASTM A 666, Type 304; and rubber sealing gasket complying with ASTM C 564. Include housings 3 inches (76 mm) wide in NPS 1-1/2 to NPS 4 (DN40 to DN100) and 4 inches (102 mm) wide in NPS 5 to NPS 10 (DN125 to DN250).
 3. Cast-Iron, Heavy-Duty Couplings: ASTM C 1277, assembly with housing of gray iron complying with ASTM A 48 (ASTM A 48M), stainless-steel bolts, and rubber sealing gasket complying with ASTM C 564.
- C. Ductile-Iron Sewer Pipe: ASTM A 746, for push-on joints.
 1. Standard-Pattern, Ductile-Iron Fittings: AWWA C110, ductile or gray iron, for push-on joints.
 2. Compact-Pattern, Ductile-Iron Fittings: AWWA C153, for push-on joints.
 3. Gaskets: AWWA C111, rubber.
- D. Ductile-Iron Culvert Pipe: ASTM A 716, for push-on joints.
 1. Standard-Pattern, Ductile-Iron Fittings: AWWA C110, ductile or gray iron, for push-on joints.
 2. Gaskets: AWWA C111, rubber.
- E. Stainless-Steel Drainage Pipe and Fittings: ASME A112.3.1; ASTM A 666, Type 304, stainless steel; with socket and spigot ends for gasketed joints.
 1. Gaskets for NPS 3 to NPS 6 (DN80 to DN150): Lip seals shaped to fit socket groove, and with plastic backup ring.
 - a. Seal Material for General Applications: EPDM, unless otherwise indicated.
 - b. Seal Material for Fluids Containing Gasoline or Oil: Nitrile-rubber compound, unless otherwise indicated.
 2. Couplings for NPS 8 to NPS 12 (DN200 to DN300): Stainless steel, mechanical type, with seal.
 - a. Seal Material for General Applications: EPDM, unless otherwise indicated.
 - b. Seal Material for Fluids Containing Gasoline or Oil: Nitrile-rubber compound, unless otherwise indicated.
- F. Corrugated-Steel Pipe: ASTM A 760/A 760M, Type I, made from ASTM A 929/A 929M, zinc-coated steel sheet for banded joints.
 1. Fittings: Fabricated to types indicated and according to same standards as pipe.
 2. Connecting Bands: Standard couplings made for corrugated-steel pipe to form soiltight joints.
- G. Corrugated-Aluminum Pipe: ASTM B 745/B 745M, Type I, made from ASTM B 744/B 744M, aluminum-alloy sheet for banded joints.

1. Fittings: Fabricated to types indicated and according to same standards as pipe.
 2. Connecting Bands: Standard couplings made for corrugated-aluminum pipe to form soiltight joints.
- H. ABS Sewer Pipe and Fittings: ASTM D 2751, for solvent-cemented or gasketed joints.
1. Wall Thickness for NPS 3 to NPS 6 (DN80 to DN150): SDR 35.
 2. Wall Thickness for NPS 8 to NPS 12 (DN200 to DN300): SDR 42.
 3. Gaskets: ASTM F 477, elastomeric seals.
- I. Corrugated PE Drainage Tubing and Fittings: AASHTO M 252, Type S, with smooth waterway for coupling joints.
- J. Soiltight Couplings: AASHTO M 252, corrugated, matching tube and fittings to form soiltight joints.
1. Silttight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with tube and fittings to form silttight joints.
- K. Corrugated PE Pipe and Fittings: AASHTO M 294, Type S, with smooth waterway for coupling joints.
1. Soiltight Couplings: AASHTO M 294, corrugated, matching pipe and fittings to form soiltight joints.
 2. Silttight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with pipe and fittings to form silttight joints.
- L. PVC Pressure Pipe: AWWA C900, Class 150, for gasketed joints.
1. PVC Pressure Fittings: AWWA C907, for gasketed joints.
 2. Gaskets for PVC Piping: ASTM F 477, elastomeric seals.
 3. Ductile-Iron, Compact Fittings: AWWA C153, for push-on joints.
 4. Gaskets for Ductile-Iron Fittings: AWWA C111, rubber.
 5. Cellular-Core PVC Pipe: ASTM F 891, Sewer and Drain Series, PS 50 minimum stiffness, for solvent-cemented joints.
 6. Fittings: ASTM D 2729 or ASTM D 3034, PVC sewer pipe fittings.
- M. PVC Sewer Pipe and Fittings: According to the following:
1. PVC Sewer Pipe and Fittings, NPS 15 (DN375) and Smaller: ASTM D 3034, SDR 35, for solvent-cemented or gasketed joints.
 - a. Gaskets: ASTM F 477, elastomeric seals.
 2. PVC Sewer Pipe and Fittings, NPS 18 (DN450) and Larger: ASTM F 679, T-1 wall thickness, bell and spigot for gasketed joints.
 - a. Gaskets: ASTM F 477, elastomeric seals.
- N. PVC, Ribbed Drain Pipe: AASHTO M 304M, bell and spigot, with smooth waterway for bell-gasketed joints.
1. Fittings: AASHTO M 304M or ASTM F 794 for bell-gasketed joints.
 2. Gaskets: ASTM F 477, elastomeric seals to form soiltight joints.
- O. Nonreinforced-Concrete Sewer Pipe and Fittings: ASTM C 14 (ASTM C 14M), Class 2, for gasketed joints.
1. Gaskets: ASTM C 443 (ASTM C 443M), rubber.
- P. Reinforced-Concrete Sewer Pipe and Fittings: ASTM C 76 (ASTM C 76M), Class III, Wall B, for gasketed joints.
1. Gaskets: ASTM C 443 (ASTM C 443M), rubber.
- Q. Reinforced-Concrete Arch Pipe: ASTM C 506 (ASTM C 506M), Class IV, for banded joints.
1. Sealing Bands: ASTM C 877 (ASTM C 877M), Type I.
- R. Reinforced-Concrete Elliptical Pipe: ASTM C 507 (ASTM C 507M), Class IV, for banded joints.
1. Pattern: Type HE, horizontal.

2. Pattern: Type VE, vertical.
3. Sealing Bands: ASTM C 877 (ASTM C 877M), Type I.

2.04 SPECIAL PIPE COUPLINGS AND FITTINGS

- A. Sleeve-Type Pipe Couplings: ASTM C 1173, rubber or elastomeric sleeve and band assembly fabricated to mate with OD of pipes to be joined, for nonpressure joints.
 1. Sleeve Material for Concrete Pipe: ASTM C 443 (ASTM C 443M), rubber.
 2. Sleeve Material for Cast-Iron Soil Pipe: ASTM C 564, rubber.
 3. Sleeve Material for Plastic Pipe: ASTM F 477, elastomeric seal.
 4. Sleeve Material for Dissimilar Pipe: Compatible with pipe materials being joined.
 5. Bands: Stainless steel, at least one at each pipe insert.
- B. Bushing-Type Pipe Couplings: ASTM C 1173, rubber or elastomeric bushing fabricated to mate with OD of smaller pipe and ID of adjoining larger pipe, for nonpressure joints.
 1. Material for Concrete Pipe: ASTM C 443 (ASTM C 443M), rubber.
 2. Material for Cast-Iron Soil Pipe: ASTM C 564, rubber.
 3. Material for Plastic Pipe: ASTM F 477, elastomeric seal.
 4. Material for Dissimilar Pipe: Compatible with pipe materials being joined.
- C. Pressure-Type Pipe Couplings: AWWA C219, iron-body sleeve assembly matching OD of pipes to be joined, with AWWA C111 rubber gaskets, bolts, and nuts. Include PE film, pipe encasement.
- D. Ductile-Iron, Flexible Expansion Joints: Compound fitting with combination of flanged and mechanical-joint ends complying with AWWA C110 or AWWA C153. Include two gasketed ball-joint sections and one or more gasketed sleeve sections, rated for 250-psig (1725-kPa) minimum working pressure and for offset and expansion indicated. Include PE film, pipe encasement.
- E. Ductile-Iron Deflection Fittings: Compound coupling fitting with ball joint, flexing section, gaskets, and restrained-joint ends complying with AWWA C110 or AWWA C153. Include rating for 250-psig (1725-kPa) minimum working pressure and for up to 15 degrees deflection. Include PE film, pipe encasement.
- F. Ductile-Iron Expansion Joints: Three-piece assembly of telescoping sleeve with gaskets and restrained-type, ductile-iron, bell-and-spigot end sections complying with AWWA C110 or AWWA C153. Include rating for 250-psig (1725-kPa) minimum working pressure and for expansion indicated. Include PE film, pipe encasement.

2.05 PE FILM, PIPE ENCASEMENT

- A. ASTM A 674 or AWWA C105; PE film, tube, or sheet; 8-mil (0.2-mm) thickness.

2.06 MANHOLES

- A. Normal-Traffic Precast Concrete Manholes: ASTM C 478 (ASTM C 478M), precast, reinforced concrete, of depth indicated, with provision for rubber gasketed joints.
 1. Diameter: 48 inches (1200 mm) minimum, unless otherwise indicated.
 2. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
 3. Base Section: 6-inch (150-mm) minimum thickness for floor slab and 4-inch (100-mm) minimum thickness for walls and base riser section, and having separate base slab or base section with integral floor.
 4. Riser Sections: 4-inch (100-mm) minimum thickness, and lengths to provide depth indicated.
 5. Top Section: Eccentric-cone type, unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
 6. Gaskets: ASTM C 443 (ASTM C 443M), rubber.
 7. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch (150- to 229-mm) total thickness, that match 24-inch- (610-mm-) diameter frame and cover.
 8. Steps: Fiberglass, individual steps or ladder. Include width that allows worker to place both feet on one step and is designed to prevent lateral slippage off step. Cast or anchor into base, riser, and top section sidewalls with steps at 12- to 16-inch (300- to 400-mm) intervals. Omit steps for manholes less than 60 inches (1500 mm) deep.

9. Steps: ASTM C 478 (ASTM C 478M), individual steps or ladder. Omit steps for manholes less than 60 inches (1500 mm) deep.
 10. Pipe Connectors: ASTM C 923 (ASTM C 923M), resilient, of size required, for each pipe connecting to base section.
- B. Heavy-Traffic Precast Concrete Manholes: ASTM C 913; designed according to ASTM C 890 for A-16, heavy-traffic, structural loading; of depth, shape, and dimensions indicated, with provision for rubber gasketed joints.
1. Ballast: Increase thickness of one or more precast concrete sections or add concrete to structure, as required to prevent flotation.
 2. Gaskets: Rubber.
 3. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch (150- to 229-mm) total thickness, that match 24-inch- (610-mm-) diameter frame and cover.
 4. Steps: Fiberglass, individual steps or ladder. Include width that allows worker to place both feet on one step and is designed to prevent lateral slippage off step. Cast or anchor into base, riser, and top section sidewalls with steps at 12- to 16-inch (300- to 400-mm) intervals. Omit steps for manholes less than 60 inches (1500 mm) deep.
 5. Steps: Manufactured from deformed, 1/2-inch (13-mm) steel reinforcement rod complying with ASTM A 615/A 615M and encased in polypropylene complying with ASTM D 4101. Include pattern designed to prevent lateral slippage off step. Cast or anchor into sidewalls with steps at 12- to 16-inch (300- to 400-mm) intervals. Omit steps for manholes less than 60 inches (1500 mm) deep.
 6. Pipe Connectors: ASTM C 923 (ASTM C 923M), resilient, of size required, for each pipe connecting to base section.
- C. Cast-in-Place Concrete Manholes: Construct of reinforced-concrete bottom, walls, and top; designed according to ASTM C 890 for A-16, heavy-traffic, structural loading; of depth, shape, dimensions, and appurtenances indicated.
1. Ballast: Increase thickness of concrete, as required to prevent flotation.
 2. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch (150- to 229-mm) total thickness, that match 24-inch- (610-mm-) diameter frame and cover.
 3. Steps: Fiberglass, individual steps or ladder. Include width that allows worker to place both feet on one step and is designed to prevent lateral slippage off step. Cast or anchor into sidewalls with steps at 12- to 16-inch (300- to 400-mm) intervals. Omit steps for manholes less than 60 inches (1500 mm) deep.
 4. Steps: Manufactured from deformed, 1/2-inch (13-mm) steel reinforcement rod complying with ASTM A 615/A 615M and encased in polypropylene complying with ASTM D 4101. Include pattern designed to prevent lateral slippage off step. Cast or anchor into sidewalls with steps at 12- to 16-inch (300- to 400-mm) intervals. Omit steps for manholes less than 60 inches (1500 mm) deep.
- D. Fiberglass Manholes: ASTM D 3753, fabricated, glass-fiber-reinforced polyester.
1. Diameter: 48 inches (1200 mm) minimum, unless otherwise indicated.
 2. Ballast: Increase thickness of concrete to base section, as required to prevent flotation.
 3. Base Section: Concrete, 6-inch (150-mm) minimum thickness.
 4. Steps: Fiberglass, individual steps or ladder. Include width that allows worker to place both feet on one step and is designed to prevent lateral slippage off step. Cast or anchor into base, riser, and top section sidewalls with steps at 12- to 16-inch (300- to 400-mm) intervals. Omit steps for manholes less than 60 inches (1500 mm) deep.
 5. Pipe Connectors: ASTM C 923 (ASTM C 923M), resilient, of size required, for each pipe connecting to base section.
- E. Manhole Frames and Covers: ASTM A 536, Grade 60-40-18, ductile-iron castings designed for heavy-duty service. Include 24-inch (610-mm) ID by 7- to 9-inch (178- to 229-mm) riser with 4-inch (100-mm) minimum width flange, and 26-inch- (660-mm-) diameter cover. Include indented top design with lettering "STORM SEWER" cast into cover.

2.07 CATCH BASINS

- A. Normal-Traffic, Precast Concrete Catch Basins: ASTM C 478 (ASTM C 478M), precast, reinforced concrete, of depth indicated, with provision for rubber gasketed joints.

1. Base Section: 6-inch (150-mm) minimum thickness for floor slab and 4-inch (100-mm) minimum thickness for walls and base riser section, and having separate base slab or base section with integral floor.
 2. Riser Sections: 4-inch (100-mm) minimum thickness, 48-inch (1220-mm) diameter, and lengths to provide depth indicated.
 3. Top Section: Eccentric-cone type, unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
 4. Gaskets: ASTM C 443 (ASTM C 443M), rubber.
 5. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch (150- to 229-mm) total thickness, that match 24-inch- (610-mm-) diameter frame and grate.
 6. Steps: Fiberglass, individual steps or ladder. Include width that allows worker to place both feet on one step and is designed to prevent lateral slippage off step. Cast steps or anchor ladder into base, riser, and top section sidewalls at 12- to 16-inch (300- to 400-mm) intervals. Omit steps for catch basins less than 60 inches (1500 mm) deep.
 7. Steps: ASTM C 478 (ASTM C 478M), individual steps or ladder. Omit steps for catch basins less than 60 inches (1500 mm) deep.
 8. Pipe Connectors: ASTM C 923 (ASTM C 923M), resilient, of size required, for each pipe connecting to base section.
- B. Heavy-Traffic, Precast Concrete Catch Basins: ASTM C 913, precast, reinforced concrete; designed according to ASTM C 890 for A-16, heavy-traffic, structural loading; of depth, shape, and dimensions indicated, with provision for rubber gasketed joints.
1. Gaskets: Rubber.
 2. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch (150- to 229-mm) total thickness, that match 24-inch- (610-mm-) diameter frame and grate.
 3. Steps: Fiberglass, individual steps or ladder. Include width that allows worker to place both feet on one step and is designed to prevent lateral slippage off step. Cast steps or anchor ladder into base, riser, and top section sidewalls at 12- to 16-inch (300- to 400-mm) intervals. Omit steps for catch basins less than 60 inches (1500 mm) deep.
 4. Steps: Manufactured from deformed, 1/2-inch (13-mm) steel reinforcement rod complying with ASTM A 615/A 615M and encased in polypropylene complying with ASTM D 4101. Include pattern designed to prevent lateral slippage off step. Cast or anchor into sidewalls with steps at 12- to 16-inch (300- to 400-mm) intervals. Omit steps for manholes less than 60 inches (1500 mm) deep.
 5. Pipe Connectors: ASTM C 923 (ASTM C 923M), resilient, of size required, for each pipe connecting to base section.
- C. Cast-in-Place Concrete, Catch Basins: Construct of reinforced concrete; designed according to ASTM C 890 for structural loading; of depth, shape, dimensions, and appurtenances indicated.
1. Bottom, Walls, and Top: Reinforced concrete.
 2. Channels and Benches: Concrete.
 3. Steps: Fiberglass, individual steps or ladder. Include width that allows worker to place both feet on one step and is designed to prevent lateral slippage off step. Cast steps or anchor ladder into sidewalls at 12- to 16-inch (300- to 400-mm) intervals. Omit steps for catch basins less than 60 inches (1500 mm) deep.
 4. Steps: Manufactured from deformed, 1/2-inch (13-mm) steel reinforcement rod complying with ASTM A 615/A 615M and encased in polypropylene complying with ASTM D 4101. Include pattern designed to prevent lateral slippage off step. Cast or anchor into sidewalls with steps at 12- to 16-inch (300- to 400-mm) intervals. Omit steps for manholes less than 60 inches (1500 mm) deep.
- D. Frames and Grates: ASTM A 536, Grade 60-40-18, ductile iron designed for heavy-duty service. Include flat grate with small square or short-slotted drainage openings.
1. Size: 24 by 24 inches (610 by 610 mm) minimum, unless otherwise indicated.
 2. Grate Free Area: Approximately 50 percent, unless otherwise indicated.
- E. Frames and Grates: ASTM A 536, Grade 60-40-18, ductile iron designed for heavy-duty service. Include 24-inch (610-mm) ID by 7- to 9-inch (178- to 229-mm) riser with 4-inch (100-mm) minimum width flange, and 26-inch- (660-mm-) diameter flat grate with small square or short-slotted drainage openings.
1. Grate Free Area: Approximately 50 percent, unless otherwise indicated.

2.08 STORMWATER INLETS

- A. Curb Inlets: Made with vertical curb opening, of materials and dimensions according to utility standards.
- B. Gutter Inlets: Made with horizontal gutter opening, of materials and dimensions according to utility standards. Include heavy-duty frames and grates.
- C. Combination Inlets: Made with vertical curb and horizontal gutter openings, of materials and dimensions according to utility standards. Include heavy-duty frames and grates.
- D. Frames and Grates: Heavy-duty frames and grates according to utility standards.
- E. Curb Inlets: Vertical curb opening, of materials and dimensions indicated.
- F. Gutter Inlets: Horizontal gutter opening, of materials and dimensions indicated. Include heavy-duty frames and grates.
- G. Combination Inlets: Vertical curb and horizontal gutter openings, of materials and dimensions indicated. Include heavy-duty frames and grates.
- H. Frames and Grates: Dimensions, opening pattern, free area, and other attributes indicated.
- I. Material: ASTM A 536, Grade 60-40-18 minimum, ductile-iron casting.
- J. Material: ASTM A 48, Class 30 (ASTM A 48M, Class No. 200A) minimum, gray-iron casting.
- K. Grate Free Area: Approximately 50 percent, unless otherwise indicated.

2.09 STORMWATER DETENTION STRUCTURES

- A. Cast-in-Place Concrete, Stormwater Detention Structures: Construct of reinforced-concrete bottom, walls, and top; designed according to ASTM C 890 for A-16, heavy-traffic, structural loading; of depth, shape, dimensions, and appurtenances indicated.
 - 1. Ballast: Increase thickness of concrete, as required to prevent flotation.
 - 2. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch (150- to 229-mm) total thickness, that match 24-inch- (610-mm-) diameter frame and cover.
 - 3. Steps: Fiberglass, individual steps or ladder. Include width that allows worker to place both feet on one step and is designed to prevent lateral slippage off step. Cast or anchor into sidewalls with steps at 12- to 16-inch (300- to 400-mm) intervals. Omit steps for structures less than 60 inches (1500 mm) deep.
 - 4. Steps: Manufactured from deformed, 1/2-inch (13-mm) steel reinforcement rod complying with ASTM A 615/A 615M and encased in polypropylene complying with ASTM D 4101. Include pattern designed to prevent lateral slippage off step. Cast or anchor into sidewalls with steps at 12- to 16-inch (300- to 400-mm) intervals. Omit steps for structures less than 60 inches (1500 mm) deep.
- B. Manhole Frames and Covers: ASTM A 536, Grade 60-40-18, ductile-iron castings designed for heavy-duty service. Include 24-inch (610-mm) ID by 7- to 9-inch (178- to 229-mm) riser with 4-inch (100-mm) minimum width flange, and 26-inch- (660-mm-) diameter cover. Include indented top design with lettering "STORM SEWER" cast into cover.

2.10 CONCRETE

- A. General: Cast-in-place concrete according to ACI 318, ACI 350R, and the following:
 - 1. Cement: ASTM C 150, Type II.
 - 2. Fine Aggregate: ASTM C 33, sand.
 - 3. Coarse Aggregate: ASTM C 33, crushed gravel.
 - 4. Water: Potable.
- B. Portland Cement Design Mix: 4000 psi (27.6 MPa) minimum, with 0.45 maximum water-cementitious ratio.
 - 1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
 - 2. Reinforcement Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed steel.

- C. Structure Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi (27.6 MPa) minimum, with 0.45 maximum water-cementitious ratio.
1. Include channels and benches in manholes.
 - a. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
 - 1) Invert Slope: 1 percent through manhole.
 - 2) Invert Slope: 2 percent through manhole.
 - 3) Invert Slope: None.
 - b. Benches: Concrete, sloped to drain into channel.
 - 1) Slope: 8 percent.
 - 2) Slope: 4 percent.
 2. Include channels in catch basins.
 - a. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
 - 1) Invert Slope: 1 percent through catch basin.
 - 2) Invert Slope: 2 percent through catch basin.
 - 3) Invert Slope: None.
- D. Ballast and Pipe Supports: Portland cement design mix, 3000 psi (20.7 MPa) minimum, with 0.58 maximum water-cementitious ratio.
1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
 2. Reinforcement Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed steel.

2.11 PROTECTIVE COATINGS

- A. Description: One- or two-coat, coal-tar epoxy; 15-mil (0.38-mm) minimum thickness, unless otherwise indicated; factory or field applied to the following surfaces:
1. Concrete Manholes: On interior surface.
 2. Concrete Manholes: On exterior surface.
 3. Concrete Manholes: On exterior and interior surfaces.
 4. Manhole Frames and Covers: On entire surfaces.
 5. Catch Basins: On interior surface.
 6. Catch Basins: On exterior surface.
 7. Catch Basins: On exterior and interior surfaces.
 8. Catch Basin Frames and Grates: On entire surfaces.
 9. Stormwater Inlets: On interior surface.
 10. Stormwater Inlets: On exterior surface.
 11. Stormwater Inlets: On exterior and interior surfaces.
 12. Stormwater Inlet Frames and Grates: On entire surfaces.
 13. Stormwater Detention Structures: On interior surface.
 14. Stormwater Detention Structures: On exterior surface.
 15. Stormwater Detention Structures: On exterior and interior surfaces.
 16. Stormwater Detention-Structure Manhole Frames and Covers: On entire surfaces.

2.12 POLYMER-CONCRETE, CHANNEL DRAINAGE SYSTEMS

- A. General: Modular system of precast, polymer-concrete channel sections, grates, and appurtenances; designed so grates fit into channel recesses without rocking or rattling. Include number of units required to form total lengths indicated.
- B. Sloped-Invert, Polymer-Concrete Systems: Include the following components:
1. Channel Sections: Interlocking-joint, precast, modular units with end caps. Include 4-inch (100-mm) inside width and deep, rounded bottom, with built-in invert slope of 0.6 percent and with outlets in number, sizes, and locations indicated. Include extension sections necessary for required depth.
 2. Frame: Include gray-iron or steel frame for grate.
 3. Grates with manufacturer's designation "Medium Duty," with slots or perforations that fit recesses in channels.
 - a. Material: Stainless steel.

- b. Material: Galvanized steel.
 - c. Material: Gray iron.
 - d. Material: Fiberglass.
 - 4. Grates with manufacturer's designation "Heavy Duty," with slots that fit recesses in channels.
 - a. Material: Stainless steel.
 - b. Material: Galvanized steel.
 - c. Material: Gray iron.
 - d. Material: Ductile iron.
 - 5. Covers: Solid gray iron, if indicated.
 - 6. Locking Mechanism: Manufacturer's standard device for securing grates to channel sections.
- C. Narrow-Width, Level-Invert, Polymer-Concrete Systems: Include the following components:
- 1. Channel Sections: Interlocking-joint, precast, modular units with end caps. Include 5-inch (127-mm) inside width and 9-3/4-inch (248-mm) deep, rounded bottom, with level invert and with NPS 4 (DN100) outlets in number and locations indicated.
 - 2. Grates with slots or perforations that fit recesses in channels.
 - a. Material: Stainless steel.
 - b. Material: Galvanized steel.
 - c. Material: Gray iron.
 - d. Material: Fiberglass.
 - 3. Covers: Solid gray iron, if indicated.
 - 4. Locking Mechanism: Manufacturer's standard device for securing grates to channel sections.
- D. Wide-Width, Level-Invert, Polymer-Concrete Systems: Include the following components:
- 1. Channel Sections: Interlocking-joint, precast, modular units with end caps. Include 8-inch (203-mm) inside width and 13-3/4-inch (350-mm) deep, rounded bottom, with level invert and with outlets in number, sizes, and locations indicated.
 - 2. Grates with slots or other openings that fit recesses in channels.
 - a. Material: Gray iron.
 - b. Material: Fiberglass.
 - 3. Covers: Solid gray iron, if indicated.
 - 4. Locking Mechanism: Manufacturer's standard device for securing grates to channel sections.
- E. Drainage Specialties: Precast, polymer-concrete units.
- 1. Large Catch Basins: 24-by-12-inch (610-by-305-mm) polymer-concrete body, with outlets in number and sizes indicated. Include gray-iron slotted grate.
 - 2. Frame: Include gray-iron or steel frame for grate.
 - 3. Small Catch Basins: 19- to 24-inch by approximately 6- inch (483- to 610-mm by approximately 150-mm) polymer-concrete body, with outlets in number and sizes indicated. Include gray-iron slotted grate.
 - 4. Frame: Include gray-iron or steel frame for grate.
 - 5. Oil Interceptors: Polymer-concrete body with interior baffle and four steel support channels and two 1/4-inch- (6.4-mm-) thick, steel-plate covers.
 - a. Capacity: 140 gal. (530 L).
 - b. Capacity: 200 gal. (757 L).
 - c. Capacity: 260 gal. (984 L).
 - d. Inlet and Outlet: NPS 4 (DN100).
 - e. Inlet and Outlet: NPS 6 (DN150).
 - 6. Sediment Interceptors: 27-inch- (686-mm-) square polymer-concrete body, with outlets in number and sizes indicated. Include 24-inch- (610-mm-) square, gray-iron frame and slotted grate.
- F. Supports, Anchors, and Setting Devices: Manufacturer's standard, unless otherwise indicated.
- G. Channel-Section Joining and Fastening Materials: As recommended by system manufacturer.
- 2.13 PLASTIC, CHANNEL DRAINAGE SYSTEMS
- A. General: Modular system of plastic channel sections, grates, and appurtenances; designed so grates fit into frames without rocking or rattling. Include number of units required to form total lengths indicated.

B. Fiberglass Systems: Include the following components:

1. Channel Sections: Interlocking-joint, fiberglass modular units, with built-in invert slope of approximately 1 percent and with end caps. Include rounded or inclined inside bottom surface, with outlets in number, sizes, and locations indicated.
 - a. Width: 6 or 8 inches (150 or 203 mm).
 - b. Width: 6 inches (150 mm).
 - c. Width: 8 inches (203 mm).
2. Factory- or field-attached frames that fit channel sections and grates.
 - a. Material: Manufacturer's standard metal.
 - b. Material: Stainless steel.
 - c. Material: Galvanized steel.
3. Grates with slots or perforations that fit frames.
 - a. Material: Stainless steel.
 - b. Material: Galvanized steel.
 - c. Material: Gray iron.
 - d. Material: Fiberglass.
4. Covers: Solid gray iron, if indicated.
5. Drainage Specialties: Include the following plastic components:
 - a. Large Catch Basins: 24-inch- (610-mm-) square plastic body, with outlets in number and sizes indicated. Include gray-iron frame and slotted grate.
 - b. Small Catch Basins: 12-by-24-inch (305-by-610-mm) plastic body, with outlets in number and sizes indicated. Include gray-iron frame and slotted grate.

C. PE Systems: Include the following components:

1. Channel Sections: Interlocking-joint, PE modular units, 4 inches (102 mm) wide, with end caps. Include rounded bottom, with level invert and with outlets in number, sizes, and locations indicated.
2. Grates: PE, ladder shaped; with stainless-steel screws.
3. Color: Gray, unless otherwise indicated.
4. Drainage Specialties: Include the following PE components:
 - a. Drains: 4-inch- (102-mm-) diameter, round, slotted top; with NPS 4 (DN100) bottom outlet.
 - b. Drains: 8-inch- (203-mm-) diameter, round, slotted top; with NPS 6 (DN150) bottom outlet.
 - c. Drains: 4-inch- (102-mm-) square, slotted top; with NPS 3 (DN80) bottom outlet.
 - d. Drains: 8-inch- (203-mm-) square, slotted top; with NPS 6 (DN150) bottom outlet.
 - e. Catch Basins: 12-inch- (305-mm-) square plastic body, with outlets in number and sizes indicated. Include PE slotted grate 11-3/4 inches (298 mm) square by 1-1/8 inches (28.6 mm) thick.

D. Supports, Anchors, and Setting Devices: Manufacturer's standard, unless otherwise indicated.

E. Channel-Section Joining and Fastening Materials: As recommended by system manufacturer.

2.14 STAINLESS-STEEL DRAINAGE SYSTEMS

A. General: ASME A112.3.1; ASTM A 666, Type 304, stainless-steel, modular system of trench sections, grates, and specialties; designed so grates fit into trench recesses without rocking or rattling. Include number of units required to form total lengths indicated. Include stainless-steel drainage piping between components.

B. Refer to "Pipes and Fittings" Article in Part 2 for stainless-steel drainage piping.

C. Narrow-Width Trench Systems: Include the following stainless-steel components:

1. Trench Sections: Modular units, approximately 5 inches (125 mm) wide, with flanged ends, gaskets, bolts, nuts, and end pieces. Include level invert, with outlets in number, sizes, and locations indicated.
2. Grates: 5.9 by 1 inch (150 by 25 mm), with square perforations and polished finish.
3. Grates: 5.9 by 1 inch (150 by 25 mm), slotted.
4. Grates: 5.9 by 1 inch (150 by 25 mm), ladder shaped.
5. Grates: 5.9-by-1-inch (150-by-25-mm) frame; with deep-pattern, heavy-duty, ladder-shaped-bar, cross members.
6. Vandal-Proof Fasteners: Attachments to secure grates to trench sections.

D. Wide-Width Trench Systems: Include the following stainless-steel components:

1. Trench Sections: Modular units, approximately 11 inches (279 mm) wide, with flanged ends, gaskets, bolts, nuts, and end pieces. Include level invert, with outlets in number, sizes, and locations indicated.
2. Grates: 11.8 by 1 inch (300 by 25 mm), slotted.
3. Grates: 11.8 by 1 inch (300 by 25 mm), ladder shaped.
4. Grates: 11.8-by-1-inch (300-by-25-mm) frame; with deep-pattern, heavy-duty, ladder-shaped-bar, cross members.
5. Vandal-Proof Fasteners: Attachments to secure grates to trench sections.

E. Drainage Specialties: Include the following stainless-steel components:

1. Light-Duty Floor Drains: Adjustable type, with membrane flashing flange and ring, bottom outlet of size indicated, and grate with square perforations.
2. Heavy-Duty Floor Drains: 8.5 by 8.5 inches (216 by 216 mm), with membrane flange and water trap.
 - a. Grate: 8.15 by 8.15 by 0.4 inch (207 by 207 by 10 mm), with round perforations.
 - b. Grate: 8.15 by 8.15 by 1.0 inch (207 by 207 by 25 mm); with heavy-duty, ladder-shaped-bar, cross members.
3. Cleanouts: Square floor plate and EPDM sealing ring.
4. Vandal-Proof Fasteners: Screws or other attachments to secure grates to specialties.

F. Supports, Anchors, and Setting Devices: Manufacturer's standard, unless otherwise indicated.

2.15 BACKWATER VALVES

A. Gray-Iron Backwater Valves: ASME A112.14.1, gray-iron body and bolted cover, with bronze seat.

1. Horizontal Type: With swing check valve and hub-and-spigot ends.
2. Combination Horizontal and Manual Gate-Valve Type: With swing check valve, integral gate valve, and hub-and-spigot ends.
3. Terminal Type: With bronze seat, swing check valve, and hub inlet.

B. PVC Backwater Valves: Similar to ASME A112.14.1, horizontal type; with PVC body, PVC removable cover, and PVC swing check valve.

2.16 CLEANOUTS

A. Gray-Iron Cleanouts: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug. Use units with top-loading classifications according to the following applications:

1. Light Duty: In earth or grass foot-traffic areas.
2. Medium Duty: In paved foot-traffic areas.
3. Heavy Duty: In vehicle-traffic service areas.
4. Extra-Heavy Duty: In roads.
5. Sewer Pipe Fitting and Riser to Cleanout: ASTM A 74, Service class, cast-iron soil pipe and fittings.

B. PVC Cleanouts: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

2.17 DRAINS

A. Gray-Iron Area Drains: ASME A112.21.1M, round, gray-iron body with anchor flange and round, secured, gray-iron grate. Include bottom outlet with inside calk or spigot connection, of sizes indicated. Use units with top-loading classifications according to the following applications:

1. Medium Duty: In paved foot-traffic areas.

2. Heavy Duty: In vehicle-traffic service areas.
- B. Gray-Iron Trench Drains: ASME A112.21.1M, 6-inch- (150-mm-) wide top surface, rectangular body with anchor flange or other anchoring device, and rectangular, secured grate. Include units of total lengths indicated and number of bottom outlets with inside calk or spigot connections, of sizes indicated. Use units with top-loading classifications according to the following applications:
1. Medium Duty: In paved foot-traffic areas.
 2. Heavy Duty: In vehicle-traffic service areas.
 3. Extra-Heavy Duty: In roads.
- C. Steel Trench Drains: Fabricated from ASTM A 242/A 242M steel plate, to form rectangular body with uniform bottom slope of 2 percent down toward outlet, anchor flange, and grate. Include units of total lengths indicated, bottom outlet of size indicated, outlet strainer, and acid-resistant enamel coating on inside and outside surfaces. Include grate openings with total free area at least two times outlet cross-sectional area and with the following features:
1. Plate Thickness: 1/4 inch (6.4 mm).
 2. Plate Thickness: 1/8 inch (3.2 mm).
 3. Overall Width: 7-3/4 inches (197 mm).
 4. Overall Width: 12-1/2 inches (318 mm).
 5. Grate: 3-by-3/8-inch (76-by-9.5-mm) slots.
 6. Grate: 3/8-inch- (9.5-mm-) diameter openings.
 7. Grate: 1/4-inch- (6.4-mm-) diameter openings.
 8. Cover: Solid with diamond pattern, if indicated.
 9. Weep holes in body and flashing clamping ring for units used with waterproof membrane.
- D. Stainless-Steel Trench Drains: Fabricated from ASTM A 666, Type 304, stainless-steel plate; to form rectangular body with uniform bottom slope of 2 percent down toward outlet, anchor flange, and grate. Include units of total lengths indicated, bottom outlet of size indicated, and outlet strainer. Include grate openings with total free area at least two times outlet cross-sectional area and with the following features:
1. Plate Thickness: 1/4 inch (6.4 mm).
 2. Plate Thickness: 1/8 inch (3.2 mm).
 3. Overall Width: 7-3/4 inches (197 mm).
 4. Overall Width: 12-1/2 inches (318 mm).
 5. Grate: 3-by-3/8-inch (76-by-9.5-mm) slots.
 6. Grate: 3/8-inch- (9.5-mm-) diameter openings.
 7. Grate: 1/4-inch- (6.4-mm-) diameter openings.
 8. Cover: Solid with diamond pattern, if indicated.
 9. Weep holes in body and flashing clamping ring for units used with waterproof membrane.

2.18 PIPE OUTLETS

- A. Head Walls: Cast-in-place reinforced concrete, with apron and tapered sides.
- B. Riprap Basins: Broken, irregular size and shape, graded stone.
1. Average Size: NSA No. R-3, screen opening 2 inches (51 mm).
 2. Average Size: NSA No. R-4, screen opening 3 inches (76 mm).
 3. Average Size: NSA No. R-5, screen opening 5 inches (127 mm).
- C. Filter Stone: NSA No. FS-2, No. 4 screen opening, average-size, graded stone.
- D. Energy Dissipators: NSA No. A-1, 3-ton (2700-kg) average weight armor stone, unless otherwise indicated.

2.19 DRY WELLS

- A. Description: ASTM C 913, precast, reinforced, perforated concrete rings. Include the following:
1. Floor: Cast-in-place concrete.
 2. Cover: Liftoff-type concrete cover with cast-in lift rings.

3. Wall Thickness: 4 inches (100 mm) minimum with 1-inch (25-mm) diameter or 1-by-3-inch (25-by-75-mm) maximum slotted perforations arranged in rows parallel to axis of ring.
 - a. Total Free Area of Perforations: Approximately 15 percent of ring interior surface.
 - b. Ring Construction: Designed to be self-aligning.
 4. Filtering Material: ASTM D 448, Size No. 24, 3/4- to 2-1/2-inch (19- to 63-mm) washed, crushed stone or gravel.
- B. Description: Manufactured PE side panels and top cover that assemble into 50-gal. (190-L) storage capacity units. Include the following:
1. Side Panels: With knockout ports for piping and seepage holes.
 2. Top Cover: With knockout port for drain.
 3. Filter Fabric: As recommended by unit manufacturer.
 4. Filtering Material: ASTM D 448, Size No. 24, 3/4- to 2-1/2-inch (19- to 63-mm) washed, crushed stone or gravel.
- C. Description: Constructed-in-place aggregate type. Include the following:
1. Lining: Clay or concrete bricks.
 2. Lining: Concrete blocks or precast concrete rings with notches or weep holes.
 3. Filtering Material: ASTM D 448, Size No. 24, 3/4- to 2-1/2-inch (19- to 63-mm) washed, crushed stone or gravel.
 4. Cover: Precast, reinforced-concrete slab, designed for structural loading according to ASTM C 890 and made according to ASTM C 913. Include slab dimensions that will extend 12 inches (300 mm) minimum beyond edge of excavation, with bituminous coating over entire surface. Cast cover with opening for manhole in center.
 5. Manhole: 24-inch- (610-mm-) diameter, reinforced-concrete access lid with steel lift rings. Include bituminous coating over entire surface.
 6. Film: PE sheet with at least 8-mil (0.2-mm) thickness or other equivalent, impervious material.

2.20 STORMWATER DISPOSAL SYSTEMS

- A. Storage and Leaching Chambers: Molded PE with perforated sides and open bottom. Include number of chambers, distribution piping, end plates, and other standard components as required for system total capacity.
- B. Filtering Material: ASTM D 448, Size No. 24, 3/4- to 2-1/2-inch (19- to 63-mm) washed, crushed stone or gravel.
- C. Filter Mat: Geotextile woven or spun filter fabric, in one or more layers, for minimum total unit weight of 4 oz./sq. yd. (135 g/sq. m).

PART THREE – EXECUTION

3.01 EARTHWORK

- A. Excavating, trenching, and backfilling are specified in Division 2 Section "Earthwork."

3.02 IDENTIFICATION

- A. Materials and their installation are specified in Division 2 Section "Earthwork." Arrange for installing green warning tapes directly over piping and at outside edges of underground structures.
 1. Use warning tape or detectable warning tape over ferrous piping.
 2. Use detectable warning tape over nonferrous piping and over edges of underground structures.

3.03 PIPING APPLICATIONS

- A. General: Include watertight, silttight, or soiltight joints, unless watertight or silttight joints are indicated.
- B. Refer to Part 2 of this Section for detailed specifications for pipe and fitting products listed below. Use pipe, fittings, and joining methods according to applications indicated.

C. Gravity-Flow Piping: Use the following:

1. NPS 3 (DN80): Hub-and-spigot, Extra-Heavy class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. NPS 3 (DN80): Hub-and-spigot, Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
3. NPS 3 (DN80): Hubless cast-iron soil pipe and fittings, couplings, and coupled joints.
4. NPS 3 (DN80): Ductile-iron sewer pipe; standard-pattern, ductile-iron fittings; gaskets; and gasketed joints.
5. NPS 3 (DN80): Stainless-steel drainage pipe and fittings, gaskets, and gasketed joints. Use EPDM-compound gaskets, unless otherwise indicated. Use nitrile-rubber-compound gaskets for wastes containing gasoline or oil.
6. NPS 3 (DN80): ABS, SDR 35, sewer pipe and fittings; solvent-cemented joints; or gaskets and gasketed joints.
7. NPS 4 to NPS 6 (DN100 to DN150): Hub-and-spigot, Extra-Heavy class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
8. NPS 4 to NPS 6 (DN100 to DN150): Hub-and-spigot, Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
9. NPS 4 to NPS 6 (DN100 to DN150): Hubless cast-iron soil pipe and fittings, couplings, and coupled joints.
10. NPS 4 and NPS 6 (DN100 and DN150): Stainless-steel drainage pipe and fittings, gaskets, and gasketed joints. Use EPDM-compound gaskets, unless otherwise indicated. Use nitrile-rubber-compound gaskets for wastes containing gasoline or oil.
11. NPS 4 and NPS 6 (DN100 and DN150): Corrugated-steel pipe and fittings, connecting bands, and banded joints.
12. NPS 4 and NPS 6 (DN100 and DN150): Corrugated-aluminum pipe and fittings, connecting bands, and banded joints.
13. NPS 4 and NPS 6 (DN100 and DN150): ABS, SDR 35, sewer pipe and fittings; solvent-cemented joints; or gaskets and gasketed joints.
14. NPS 4 and NPS 6 (DN100 and DN150): Corrugated PE drainage tubing and fittings, soiltight couplings, and coupled joints.
15. NPS 4 and NPS 6 (DN100 and DN150): Corrugated PE drainage tubing and fittings, silttight couplings, and coupled joints.
16. NPS 4 and NPS 6 (DN100 and DN150): Cellular-core PVC pipe, PVC sewer pipe fittings, and solvent-cemented joints.
17. NPS 4 and NPS 6 (DN100 and DN150): PVC sewer pipe and fittings, solvent-cemented joints, or gaskets and gasketed joints.
18. NPS 4 and NPS 6 (DN100 and DN150): Nonreinforced-concrete sewer pipe and fittings, gaskets, and gasketed joints.
19. NPS 8 to NPS 15 (DN200 to DN375): Hub-and-spigot, Extra-Heavy class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
20. NPS 8 to NPS 15 (DN200 to DN375): Hub-and-spigot, Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
21. NPS 8 to NPS 15 (DN200 to DN375): Hubless cast-iron soil pipe and fittings, couplings, and coupled joints in NPS 8 and NPS 10 (DN200 and DN250). Use hub-and-spigot, Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints in NPS 12 and NPS 15 (DN300 and DN375).
22. NPS 8 to NPS 15 (DN200 to DN375): Ductile-iron sewer pipe; standard-pattern, ductile-iron fittings; gaskets; and gasketed joints in NPS 8 to NPS 12 (DN200 to DN300). Use ductile-iron culvert pipe; standard-pattern, ductile-iron fittings; gaskets; and gasketed joints in NPS 14 to NPS 16 (DN350 to DN400).
23. NPS 8 to NPS 15 (DN200 to DN375): Stainless-steel drainage pipe and fittings, mechanical couplings, and coupled joints in NPS 8 to NPS 12 (DN200 to DN300). Use EPDM-compound seal, unless otherwise indicated. Use nitrile-rubber-compound seal for wastes containing gasoline or oil. Use hub-and-spigot, Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints in NPS 15 (DN375).
24. NPS 8 to NPS 15 (DN200 to DN375): Corrugated-steel pipe and fittings, connecting bands, and banded joints.
25. NPS 8 to NPS 15 (DN200 to DN375): Corrugated-aluminum pipe and fittings, connecting bands, and banded joints.
26. NPS 8 to NPS 15 (DN200 to DN375): ABS, SDR 42, sewer pipe and fittings; solvent-cemented joints; or gaskets and gasketed joints in NPS 8 to NPS 12 (DN200 to DN300). Use PVC sewer pipe and fittings, solvent-cemented joints, or gaskets and gasketed joints in NPS 15 (DN375).
27. NPS 8 to NPS 15 (DN200 to DN375): Corrugated PE drainage tubing and fittings, soiltight couplings, and coupled joints in NPS 8 and NPS 10 (DN200 and DN250). Use corrugated PE pipe and fittings, soiltight couplings, and coupled joints in NPS 12 and NPS 15 (DN300 and DN375).

28. NPS 8 to NPS 15 (DN200 to DN375): Corrugated PE drainage tubing and fittings, silttight couplings, and coupled joints in NPS 8 and NPS 10 (DN200 and DN250). Use corrugated PE pipe and fittings, silttight couplings, and coupled joints in NPS 12 and NPS 15 (DN300 and DN375).
29. NPS 8 to NPS 15 (DN200 to DN375): PVC sewer pipe and fittings, solvent-cemented joints, or gaskets and gasketed joints.
30. NPS 8 to NPS 15 (DN200 to DN375): Nonreinforced-concrete sewer pipe and fittings, gaskets, and gasketed joints.
31. NPS 8 to NPS 15 (DN200 to DN375): NPS 12 and NPS 15 (DN300 and DN375) reinforced-concrete sewer pipe and fittings, gaskets, and gasketed joints. Do not use nonreinforced pipe instead of reinforced concrete pipe in NPS 8 and NPS 10 (DN200 and DN250).
32. NPS 18 to NPS 36 (DN450 to DN900): Ductile-iron culvert pipe; standard-pattern, cast-iron or ductile-iron fittings; gaskets; and gasketed joints.
33. NPS 18 to NPS 36 (DN450 to DN900): Corrugated-steel pipe and fittings, connecting bands, and banded joints.
34. NPS 18 to NPS 36 (DN450 to DN900): Corrugated-aluminum pipe and fittings, connecting bands, and banded joints.
35. NPS 18 to NPS 36 (DN450 to DN900): Corrugated PE pipe and fittings; corrugated, silttight couplings; and coupled joints.
36. NPS 18 to NPS 36 (DN450 to DN900): Corrugated PE pipe and fittings; PE sleeve, silttight couplings; and coupled joints.
37. NPS 18 to NPS 36 (DN450 to DN900): PVC, ribbed drain pipe and fittings; gaskets; and gasketed joints.
38. NPS 18 to NPS 36 (DN450 to DN900): PVC sewer pipe and fittings, gaskets, and gasketed joints.
39. NPS 18 to NPS 36 (DN450 to DN900): Reinforced-concrete sewer pipe and fittings, gaskets, and gasketed joints.
40. NPS 18 to NPS 36 (DN450 to DN900): Nonreinforced-concrete sewer pipe and fittings, gaskets, and gasketed joints.
41. NPS 18 to NPS 36 (DN450 to DN900): Reinforced-concrete arch pipe, sealing bands, and banded joints.
42. NPS 18 to NPS 36 (DN450 to DN900): Reinforced-concrete, elliptical pipe, Type HE, horizontal; sealing bands; and banded joints.
43. NPS 18 to NPS 36 (DN450 to DN900): Reinforced-concrete, elliptical pipe, Type VE, vertical; sealing bands; and banded joints.
44. NPS 42 to NPS 64 (DN1050 to DN1600): Ductile-iron culvert pipe; standard-pattern, ductile-iron fittings; gaskets; and gasketed joints.
45. NPS 42 to NPS 120 (DN1050 to DN3000): Corrugated-steel pipe and fittings, connecting bands, and banded joints.
46. NPS 42 to NPS 120 (DN1050 to DN3000): Corrugated-aluminum pipe and fittings; connecting bands; and banded joints.
47. NPS 42 and NPS 48 (DN1050 and DN1200): Similar pattern to corrugated PE pipe and fittings; corrugated, silttight couplings; and coupled joints.
48. NPS 42 and NPS 48 (DN1050 and DN1200): Similar pattern to corrugated PE pipe and fittings; corrugated, silttight couplings; and coupled joints.
49. NPS 42 to NPS 144 (DN1050 to DN3600): Reinforced-concrete sewer pipe and fittings, gaskets, and gasketed joints.
50. NPS 42 to NPS 132 (DN1050 to DN3300): Reinforced-concrete arch pipe, sealing bands, and banded joints.
51. NPS 39 to NPS 144 (DN975 to DN3600): Reinforced-concrete, Type HE, horizontal, elliptical pipe; sealing bands; and banded joints.
52. NPS 39 to NPS 144 (DN975 to DN3600): Reinforced-concrete, Type VE, vertical, elliptical pipe; sealing bands; and banded joints.

D. Force-Main Piping: Use the following:

1. NPS 3 (DN80): Ductile-iron sewer pipe; standard- or compact-pattern, ductile-iron fittings; gaskets; and gasketed joints.
2. NPS 4 to NPS 8 (DN100 to DN200): Ductile-iron sewer pipe; standard- or compact-pattern, ductile-iron fittings; gaskets; and gasketed joints.
3. NPS 4 to NPS 8 (DN100 to DN200): PVC pressure pipe, PVC pressure fittings, gaskets, and gasketed joints.
4. NPS 10 and NPS 12 (DN250 and DN300): Ductile-iron pipe; standard- or compact-pattern, ductile-iron fittings; gaskets; and gasketed joints.
5. NPS 10 and NPS 12 (DN250 and DN300): PVC pressure pipe; compact-pattern, ductile-iron fittings; gaskets; and gasketed joints.

3.04 SPECIAL PIPE COUPLING AND FITTING APPLICATIONS

- A. Special Pipe Couplings: Use where required to join piping and no other appropriate method is specified. Do not use instead of specified joining methods.
 - 1. Use the following pipe couplings for nonpressure applications:
 - a. Sleeve type to join piping, of same size, or with small difference in OD.
 - b. Increaser/reducer-pattern, sleeve type to join piping of different sizes.
 - c. Bushing type to join piping of different sizes where annular space between smaller piping's OD and larger piping's ID permits installation.
 - 2. Use pressure-type pipe couplings for force-main joints. Include PE film, pipe encasement.
- B. Special Pipe Fittings: Use where indicated. Include PE film, pipe encasement.

3.05 INSTALLATION, GENERAL

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab or drag in line, and pull past each joint as it is completed.
- C. Use manholes for changes in direction, unless fittings are indicated. Use fittings for branch connections, unless direct tap into existing sewer is indicated.
- D. Use proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. Install gravity-flow piping and connect to building's storm drains, of sizes and in locations indicated. Terminate piping as indicated.
 - 1. Install piping pitched down in direction of flow, at minimum slope of 1 percent, unless otherwise indicated.
 - 2. Install piping with 36-inch (1000-mm) minimum cover.
- F. Install force-main piping between and connect to building's storm-drainage force main and termination point indicated.
 - 1. Install piping with restrained joints at horizontal and vertical changes in direction. Use cast-in-place concrete supports and anchors or corrosion-resistant rods and clamps.
 - 2. Install piping with 36-inch (1000-mm) minimum cover.
- G. Extend storm drainage piping and connect to building's storm drains, of sizes and in locations indicated. Terminate piping as indicated.
- H. Install ductile-iron, force-main piping according to AWWA C600.
- I. Install PVC force-main piping according to AWWA M23.
- J. Install force-main piping between and connect to building's force main and termination point indicated.
- K. Install force-main piping with 36-inch (1000-mm) minimum cover.
- L. Tunneling: Install pipe under streets or other obstructions that cannot be disturbed by tunneling, jacking, or a combination of both.

3.06 PIPE JOINT CONSTRUCTION AND INSTALLATION

- A. General: Join and install pipe and fittings according to installations indicated.

- B. Refer to Division 2 Section "Utility Materials" for basic piping joint construction and installation.
- C. Hub-and-Spigot, Cast-Iron Soil Pipe and Fittings: With rubber gaskets according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook." Use gaskets that match class of pipe and fittings.
 - 1. Install PE film, pipe encasement over hub-and-spigot, cast-iron soil pipe and fittings according to ASTM A 674 or AWWA C105.
- D. Hubless Cast-Iron Soil Pipe and Fittings: With CISPI-type couplings according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook."
 - 1. Install PE film, pipe encasement over hubless cast-iron soil pipe and fittings according to ASTM A 674 or AWWA C105.
- E. Hubless Cast-Iron Soil Pipe and Fittings: With heavy-duty-type couplings according to CISPI 310, CISPI's "Cast Iron Soil Pipe and Fittings Handbook," and coupling manufacturer's written instructions.
 - 1. Install PE film, pipe encasement over hubless cast-iron soil pipe and fittings according to ASTM A 674 or AWWA C105.
- F. Ductile-Iron Sewer Pipe with Ductile-Iron Fittings: According to AWWA C600.
 - 1. Install PE film, pipe encasement over ductile-iron sewer pipe and ductile-iron fittings according to ASTM A 674 or AWWA C105.
- G. Stainless-Steel Drainage Piping: According to ASME A112.3.1 and manufacturer's written instructions.
- H. Install with top surfaces of components, except piping, flush with finished surface.
- I. Corrugated-Steel Pipe: Join and install according to ASTM A 798. Use standard joints made with coupling bands, unless otherwise indicated.
- J. Corrugated-Steel Pipe: Join and install according to ASTM A 798. Use soiltight joints made with coupling bands and gaskets, unless otherwise indicated.
- K. Corrugated-Aluminum Pipe: Join and install according to ASTM B 788. Use standard joints made with coupling bands, unless otherwise indicated.
- L. Corrugated-Aluminum Pipe: Join and install according to ASTM B 788. Use soiltight joints made with coupling bands and gaskets, unless otherwise indicated.
- M. ABS Pipe and Fittings: As follows:
 - 1. Join pipe and gasketed fittings with gaskets according to ASTM D 2321.
 - 2. Install according to ASTM D 2321.
- N. PE Pipe and Fittings: As follows:
 - 1. Join pipe, tubing, and fittings with couplings for soiltight joints according to manufacturer's written instructions.
 - 2. Install according to ASTM D 2321 and manufacturer's written instructions.
 - 3. Install corrugated piping according to the Corrugated Polyethylene Pipe Association's "Recommended Installation Practices for Corrugated Polyethylene Pipe and Fittings."
 - 4. Installation Practices for Corrugated Polyethylene Pipe and Fittings."
- O. PVC Pressure Pipe and Fittings: Join and install according to AWWA M23.
- P. PVC Sewer Pipe and Fittings: As follows:
 - 1. Join pipe and gasketed fittings with gaskets according to ASTM D 2321.
 - 2. Install according to ASTM D 2321.

Q. Concrete Pipe and Fittings: Install according to ACPA's "Concrete Pipe Installation Manual." Use the following seals:

1. Round Pipe and Fittings: ASTM C 443 (ASTM C 443M), rubber gaskets.
2. Elliptical Pipe: ASTM C 877 (ASTM C 877M), Type I, sealing bands.
3. Arch Pipe: ASTM C 877 (ASTM C 877M), Type I, sealing bands.

R. System Piping Joints: Make joints using system manufacturer's couplings, unless otherwise indicated.

S. Join piping made of different materials or dimensions with couplings made for this application. Use couplings that are compatible with and that fit both systems' materials and dimensions.

3.07 MANHOLE INSTALLATION

A. General: Install manholes, complete with appurtenances and accessories indicated.

B. Form continuous concrete channels and benches between inlets and outlet.

C. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops 3 inches (76 mm) above finished surface elsewhere, unless otherwise indicated.

D. Install precast concrete manhole sections with gaskets according to ASTM C 891.

E. Construct cast-in-place manholes as indicated.

F. Install fiberglass manholes according to manufacturer's written instructions.

3.08 CATCH-BASIN INSTALLATION

A. Construct catch basins to sizes and shapes indicated.

B. Set frames and grates to elevations indicated.

3.09 STORM DRAINAGE INLET AND OUTLET INSTALLATION

A. Construct inlet head walls, aprons, and sides of reinforced concrete, as indicated.

B. Construct riprap of broken stone, as indicated.

C. Install outlets that spill onto grade, anchored with concrete, where indicated.

D. Install outlets that spill onto grade, with flared end sections that match pipe, where indicated.

E. Construct energy dissipators at outlets, as indicated.

3.10 CONCRETE PLACEMENT

A. Place cast-in-place concrete according to ACI 318 and ACI 350R.

3.11 DRY-WELL INSTALLATION

A. Excavate hole to diameter of at least 6 inches (150 mm) greater than outside of dry well. Do not extend excavation into ground-water table.

B. Install precast, concrete-ring dry wells according to the following:

1. Assemble rings to depth indicated.
2. Extend rings to height where top of cover will be approximately 8 inches (200 mm) below finished grade.
3. Backfill bottom of inside of rings with filtering material to level at least 12 inches (300 mm) above bottom.
4. Extend effluent inlet pipe 12 inches (300 mm) into rings and terminate into side of tee fitting.
5. Backfill around outside of rings with filtering material to top level of rings.
6. Install cover over top of rings.

C. Install manufactured, PE dry wells according to manufacturer's written instructions and the following:

1. Assemble and install panels and cover.
2. Backfill bottom of inside of unit with filtering material to level at least 12 inches (300 mm) above bottom.
3. Extend effluent inlet pipe 12 inches (300 mm) into unit and terminate into side of tee fitting.
4. Install filter fabric around outside of unit.
5. Install filtering material around outside of unit.

D. Install constructed-in-place dry wells according to the following:

1. Install brick lining material dry and laid flat, with staggered joints for seepage. Build to diameter and depth indicated.
2. Install block lining material dry, with staggered joints and 20 percent minimum of blocks on side for seepage. Install precast concrete rings with notches or weep holes for seepage. Build to diameter and depth indicated.
3. Extend lining material to height where top of manhole will be approximately 8 inches (200 mm) below finished grade.
4. Backfill bottom of inside of lining with filtering material to level at least 12 inches (300 mm) above bottom.
5. Extend effluent inlet pipe 12 inches (300 mm) into lining and terminate into side of tee fitting.
6. Backfill around outside of lining with filtering material to top level of lining.
7. Install manhole over top of dry well. Support cover on undisturbed soil. Do not support cover on lining.

3.12 DRAINAGE SYSTEM INSTALLATION

- A. Assemble and install components according to manufacturer's written instructions.
- B. Assemble and install stainless-steel drainage systems according to ASME A112.3.1 and manufacturer's written instructions.
- C. Install with top surfaces of components, except piping, flush with finished surface.
- D. Assemble channel sections to form slope down toward drain outlets. Use sealants, adhesives, fasteners, and other materials recommended by system manufacturer.
- E. Embed channel sections and drainage specialties in 4-inch (100-mm) minimum concrete around bottom and sides.
- F. Fasten grates to channel sections if indicated.
- G. Assemble trench sections with flanged joints.
- H. Embed trench sections and drainage specialties in 4-inch (100-mm) minimum concrete around bottom and sides.
- I. Make piping connections and install stainless-steel piping with gasketed joints between system components.

3.13 BACKWATER VALVE INSTALLATION

- A. Install horizontal units in piping where indicated.
- B. Install combination units in piping and in structures where indicated.
- C. Install terminal units on end of piping and in structures where indicated. Secure units to structure walls.

3.14 CLEANOUT INSTALLATION

- A. Install cleanouts and riser extension from sewer pipe to cleanout at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts and cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.
- B. Set cleanout frames and covers in earth in cast-in-place concrete block, 18 by 18 by 12 inches (450 by 450 by 300 mm) deep. Set with tops 1 inch (25 mm) above surrounding earth grade.

- C. Set cleanout frames and covers in concrete pavement with tops flush with pavement surface.

3.15 DRAIN INSTALLATION

- A. Install type of drains in locations indicated.
- B. Embed drains in 4-inch (100-mm) minimum depth of concrete around bottom and sides.
- C. Fasten grates to drains if indicated.
- D. Set drain frames and covers with tops flush with pavement surface.

3.16 STORMWATER DISPOSAL SYSTEM INSTALLATION

- A. Excavate trenches of width and depth, and install system and backfill according to chamber manufacturer's written instructions. Include storage and leaching chambers, filtering material, and filter mat.

3.17 TAP CONNECTIONS

- A. Make connections to existing piping and underground structures so finished Work complies as nearly as practical with requirements specified for new Work.
- B. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch (150-mm) overlap, with not less than 6 inches (150 mm) of concrete with 28-day compressive strength of 3000 psi (20.7 MPa).
- C. Make branch connections from side into existing piping, NPS 4 to NPS 20 (DN100 to DN500). Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye with not less than 6 inches (150 mm) of concrete with 28-day compressive strength of 3000 psi (20.7 MPa).
- D. Make branch connections from side into existing piping, NPS 21 (DN525) or larger, or to underground structures by cutting opening into existing unit large enough to allow 3 inches (76 mm) of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall, unless otherwise indicated. On outside of pipe or structure wall, encase entering connection in 6 inches (150 mm) of concrete for minimum length of 12 inches (300 mm) to provide additional support of collar from connection to undisturbed ground.
 - 1. Use concrete that will attain minimum 28-day compressive strength of 3000 psi (20.7 MPa), unless otherwise indicated.
 - 2. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.
- E. Protect existing piping and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

3.18 CLOSING ABANDONED STORM DRAINAGE SYSTEMS

- A. Abandoned Piping: Close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed. Use either procedure below:
 - 1. Close open ends of piping with at least 8-inch- (200-mm-) thick, brick masonry bulkheads.
 - 2. Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood plugs.
- B. Abandoned Structures: Excavate around structure as required and use one procedure below:
 - 1. Remove structure and close open ends of remaining piping.
 - 2. Remove top of structure down to at least 36 inches (1000 mm) below final grade. Fill to within 12 inches (300 mm) of top with stone, rubble, gravel, or compacted dirt. Fill to top with concrete.
 - 3. Backfill to grade according to Division 2 Section "Earthwork."

3.19 FIELD QUALITY CONTROL

- A. Clear interior of piping and structures of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed.
 - 1. In large, accessible piping, brushes and brooms may be used for cleaning.
 - 2. Place plug in end of incomplete piping at end of day and when work stops.
 - 3. Flush piping between manholes and other structures to remove collected debris, if required by authorities having jurisdiction.
- B. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches (600 mm) of backfill is in place, and again at completion of Project.
 - 1. Submit separate reports for each system inspection.
 - 2. Defects requiring correction include the following:
 - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
 - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
 - c. Crushed, broken, cracked, or otherwise damaged piping.
 - d. Infiltration: Water leakage into piping.
 - e. Exfiltration: Water leakage from or around piping.
 - 3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
 - 4. Reinspect and repeat procedure until results are satisfactory.
- C. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
 - 1. Do not enclose, cover, or put into service before inspection and approval.
 - 2. Test completed piping systems according to authorities having jurisdiction.
 - 3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
 - 4. Submit separate reports for each test.
 - 5. Where authorities having jurisdiction do not have published procedures, perform tests as follows:
 - a. Force Main: Perform hydrostatic test after thrust blocks, supports, and anchors have hardened. Test at pressure not less than one and one-half times maximum system operating pressure, but not less than 150 psig (1035 kPa).
 - 1) Ductile-Iron Piping: Test according to AWWA C600, Section "Hydraulic Testing."
 - 2) PVC Piping: Test according to AWWA M23, "Testing and Maintenance" Chapter.
 - 6. Leaks and loss in test pressure constitute defects that must be repaired.
 - 7. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

PART ONE - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. The following equipment and related work is specified and furnished under other items:
 - 1. 02610 Waterline Construction
 - 2. 11900 Process Piping Systems

1.02 DESCRIPTION OF WORK

- A. The Contractor shall furnish all the materials for and shall properly set in place, all post hydrants, gravel drain pits, copper pipe and anchors, together with wrenches and keys for the proper completion of the work included under this contract.
- B. In general, this work includes the connecting up to the water main, installing gravel drain pit, necessary copper pipe and post hydrant as herein specified plus concrete anchor or other thrust restraint as directed by the Engineer.
- C. It is the intent of this contract that the final installation shall be complete in all respects and the Contractor shall be responsible for minor details and any necessary special construction not specifically included in the Drawings or Specifications.

1.03 QUALITY ASSURANCE

- A. In addition to requirements of these specifications, comply with manufacturer's instructions and recommendations for work.

1.04 WORKMANSHIP

- A. All work shall be installed in strict accordance with the requirements, codes and ordinances of the Owner and shall meet the inspection of same. Workmanship shall be first class in every respect and all work shall be carried out by persons who are thoroughly experienced in this line of work.

1.05 SUBMITTALS

- A. The Contractor shall submit detail drawings, drawn to scale, catalog data, three (3) copies of head loss charts and cuts of all equipment he proposes to furnish.

PART TWO - PRODUCTS

2.01 GENERAL

- A. Post hydrants shall have a bury depth of not less than 4'-0".
- B. Post hydrants shall be of the anti-freezing type with operating valves buried below the frost line which are easily removable without digging up the hydrant.
- C. The post hydrant casing shall be bronze or aluminum.
- D. The post hydrant shall be supplied with a wheel handle, T-handle or cast steel lever handle. No pedal-operated or self-closing hydrant will be permitted.
- E. Outlet and inlet connections shall be of the same size as the post hydrant supplied.

- F. Each post hydrant shall be stenciled with the words "Unsafe Water - Do Not Drink". The size of the stenciled letters shall be 1 inch. Stencil on the hydrants is to be on the nozzle section.
- G. Post hydrants connected to potable water service mains shall be of the anti-freezing, non-pollutable type.
- H. The hydrant shall be supplied with a vacuum breaker on the outlet.
- I. Piping shall be ASTM B88 Type K copper tubing and fittings shall be as per ASTM B16,18 or B16,22.

2.02 MANUFACTURERS

- A. Post hydrants connected to potable water sources shall be one and one-half inch (1-1/2") anti-freezing, non-pollutable series, M-150 as manufactured by Murdock, Inc. or approved equivalent.

PART THREE - EXECUTION

3.01 INSTALLING HYDRANTS

- A. Post hydrants shall be installed where shown on the plans or as directed by the Engineer. The completed installation shall be completely accessible and shall be such that the possibility of damage from vehicles or injury to pedestrians will be minimized.
- B. All post hydrants shall be installed plumb. Post hydrants shall be set according to the contract drawings.
- C. Each post hydrant shall be connected to the main with a branch connection of the same size as the post hydrant inlet.
- D. A drainage pit shall be excavated at each post hydrant and filled with coarse gravel or crushed stone, mixed with coarse sand, compacted in place under and around the elbow of the post hydrant as illustrated on the drawings. No drainage pit shall be connected to a sewer.

3.02 CLEANING AND PAINTING

- A. The post hydrant shall be painted in accordance with Section 09900.
- B. Post hydrants shall be painted dark blue.

3.03 HYDROSTATIC TEST

- A. Each post hydrant shall be tested at the shop by hydraulic pressure.
- B. The criteria for testing the approved post hydrants shall conform to the requirements of the Owner with regards to pressures and length of tests.
- C. Any post hydrant found defective shall be rejected.

3.04 OPERATION MAINTENANCE MANUALS

- A. Prior to or with the delivery of equipment, the manufacturer shall provide copies of an operation and maintenance manual including storage, installation, start-up, operating and maintenance instructions, and a complete parts list and recommended spare parts list. The O & M manuals shall be in compliance with the General Requirements.

PART FOUR – SPECIAL PROVISIONS

- A. N/A

END OF SECTION

PART ONE - GENERAL

1.01 DESCRIPTION

A. Work Included:

1. A detectable tracer tape shall be installed in the same trench with every non-metallic potable water line or service, natural gas line or service, wastewater collection/transport sewers.
2. The Contractor shall supply all labor, materials, tools, and equipment required to furnish and install in good workmanlike manner the magnetic locating tape as specified herein.

B. Related Work:

1. Including but not limited to the General Conditions, Supplementary Conditions or General Requirements.
2. All applicable Divisions of the Technical Specifications.

1.02 SUBMITTALS

- A. The Contractor shall submit one (1) sample section five (5) feet in length for each color tape to be installed, the manufacturer's descriptive literature, and manufacturer's installation instructions.

PART TWO - PRODUCTS

2.01 MATERIAL

All detector tape shall be at least three (3) inches wide, shall be detectable with conventional pipe location equipment, and shall be color coded on both sides in accordance with the following schedule:

<u>Type of Service</u>	<u>Color</u>	<u>Legend (if required)</u>
Natural Gas	Orange	Buried
Potable Water	Blue	Gas Line Below
Non-Potable Water	Red	Buried Water Line Below
Wastewater Sewers	Green	Not Required
		Buried Sewer Line Below

2.02 MANUFACTURER

Detector tape shall be Alarm Tape, Terra Tape, or equal.

PART THREE - EXECUTION

3.01 INSTALLATION

- A. The detector tape shall be continuous and installed in the trench approximately eighteen (18) inches above the top of the pipe.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

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SEWER FLOW CONTROL**PART ONE - GENERAL**

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications apply to work of this Section.

1.02 DESCRIPTION OF WORK

- A. The intent of this work is to control the flow in the sewer to enable the successful inspection, rehabilitation or replacement of the pipe.
- B. Depth of flow shall not exceed that shown below for the respective pipe sizes when performing television inspection, joint testing and/or sealing.

Pipe Diameter Maximum Depth of Flow	
6" – 10" pipe	25% of pipe diameter
12" – 24" pipe	33% of pipe diameter
27" & up pipe	40% of pipe diameter

- C. Flow shall be controlled or bypassed from sewer sections being lined or replaced. The methods used shall be in accordance with the work being performed.

1.03 QUALITY ASSURANCE

- A. When a flow in a sewer line is plugged, blocked, or bypassed, sufficient precautions must be taken to protect the sewer lines from damage that might result from sewer surcharging. Further, precautions must be taken to insure that sewer flow control operations do not cause flooding or damage to public or private property being served by the sewers involved.

1.04 SUBMITTALS

- A. The Contractor shall submit a written request for Sewer Flow Control, specify the method and equipment to be used, and receive approval from the Owner prior to performing the work.
- B. For bypass pumping, submit shop drawings in accordance with the General Requirements showing pumps, piping layout plan and dimensions, schedule of pipe fittings and specials, materials and class for each size and type of pipe, joint details, and any special provisions required for assembly. Provide a wet weather operation plan which describes what procedures will be followed when flow exceeds pumping capacity.

PART TWO - PRODUCTS

2.01 EQUIPMENT

- A. Sewer plugs shall be so designed that all or any portion of the sewage can be quickly released.
- B. Pumps, bypass pipe, fittings, and joining methods shall be suitable and of a type normally used for raw sanitary sewage.
 - 1. The bypass system shall be of sufficient capacity to handle existing peak dry weather flow plus additional flow that may occur during a rainstorm unless otherwise provided for by an approved wet weather operation plan.

2. If pumping is required on a 24-hour basis, engines shall be equipped in a manner to keep noise to a minimum.
 3. Bypass piping to be furnished and installed shall include, but not be limited to all pipe, fittings, specials, bends, beveled pipe, adapters, bulkheads, stoppers, plugs, joint restraints, joints and jointing materials, and pipe supports. Bypass piping shall be rated to twice the system operating pressure.
- C. Hydrocleaning equipment shall be equipped with high-velocity nozzles capable of pulling flow away from the pipe section being televised. The equipment shall carry its own water tank, auxiliary engines, pumps and hydraulically driven hose reel.

PART THREE – EXECUTION

3.01 FIELD QUALITY CONTROL

- A. The Contractor shall continuously supervise the level of water in the upstream and downstream sewers to ensure that harmful surcharging does not occur. The Contractor shall be responsible for any damage to the system and/or to public or private property resulting from improper execution of flow control measures.

3.02 PLUGGING OR BLOCKING

- A. A sewer line plug shall be inserted into the line upstream of the section being worked. During TV inspection, testing and sealing operations, flow shall be reduced to within the limits specified above. After the work has been completed, flow shall be restored to normal.

3.03 PUMPING AND BYPASSING

- A. When pumping and bypassing is required, the Contractor shall supply and install the pumps, conduits, and other equipment to divert the flow around the section in which work is to be performed. Under no circumstances will the discharge of raw sewage to other than sanitary sewers be allowed.
- B. The Contractor shall be responsible for furnishing the necessary labor and supervision to set up and operate the pumping and bypassing system.
- C. The proposed bypassing system shall be set up to allow traffic flow to local residents and businesses.
- D. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- E. Make connections to all existing force mains being bypassed.
- F. Install temporary bypass piping with restrained joints at horizontal and vertical changes in direction.
- G. Provide granular material for bedding and encasement of temporary piping when buried below pavement.
- H. Field test bypass piping and obtain approval from the Engineer prior to placing bypass system in service.
- I. Do not remove pumping and bypass system until it is no longer needed and can be replaced by authorized use of completed permanent facilities.

3.04 HYDRAULIC FLOW CONTROL

- A. This method shall be used for sewer televising only. The Contractor shall position the high-velocity nozzle no less than five (5) feet ahead of the television camera. Pressures shall be just sufficient to reduce the flow level in front of the camera to the specified depth. The jet nozzle shall be reeled in at the same rate as the forward movement of the television camera to maintain the separation distance.

PART FOUR – SPECIAL PROVISIONS

SANITARY AND/OR STORM SEWER CONSTRUCTION

PART ONE - GENERAL

1.01 SCOPE

- A. This work shall consist of the construction of a sanitary and/or storm sewer in accordance with these specifications and in reasonably close conformity to the lines and grades indicated on the plans or as established by the Engineer.
- B. This work shall include excavating for pipe, fittings, thrust blocks and other appurtenances, clearing and grubbing and the removal of all materials necessary for placing the pipe, except removals listed separately; furnishing and placing granular or concrete bedding and granular backfill as required, constructing and subsequently removing all necessary cofferdams, cribs, and sheeting, pumping and dewatering, making all pipe joints as required, installing all necessary pipe, joining to existing and proposed appurtenances as required, performing leakage tests as specified and restoration of disturbed facilities and surfaces.
- C. Arrangements for and the performance of all tests shall be the Contractor's responsibility. Additional information is in Section 2235, Trench Excavation.
- D. Related work:
 - 1. Including but not limited to the General Conditions, Supplementary Conditions or General Requirements.

PART TWO - PRODUCTS

2.01 MATERIALS

- A. Pipe, fittings, specials, manholes, joint materials, thrust blocks, and other appurtenances shall be the size and kind specified in the proposal and shown on the plans.
- B. Concrete sanitary sewer main shall be coal tar coated upon its interior surface with two (2) applications of Bitumaster Super Service Block as manufactured by Tar Products Division of the Kop-Coat, Inc., Pittsburgh, PA, or approved equal.

PART THREE – EXECUTION

3.01 EXCAVATION

- A. Sewer trenches must be excavated with vertical sides from the bottom of the trench to one (1) foot above the top of the sewer, from which point sides may slope to ground surface, except that in streets or roadway, trenches must be excavated with vertical sides to the top of the trench. Width of trench in the vertical section shall be excavated only as wide as necessary to provide free working space on each side of the sewer according to the size of the sewer and the character of the ground; but in every case there shall be sufficient space between the sewer and the sides of the trench to make it possible to thoroughly ram the backfilling around the sewer and to secure tight joints, but in no case less than nine (9) inches on either side of pipe. In no case, however, shall the width of the trench at the top of the sewer exceed the dimensions as shown on the Contract Drawings. In no case will it be permitted to excavate sewer trenches with sides sloping to the bottom.

3.02 LAYING PIPE

- A. The Contractor shall furnish all of the proper tools and equipment required for the safe, proper handling and laying of all pipe, fittings, and specials that are to be installed in this work. All storage, handling, laying, and backfill methods shall be performed so as to avoid damaging either the interior or the exterior surfaces of all pipe fittings, specials, joint materials, or other appurtenances, and any such damage shall be remedied at the

Contractor's expense, as approved or directed by the Engineer.

- B. Before any pipe is lowered into the trench, it shall be inspected for damage, and any unsatisfactory lengths shall be rejected. Cast metal pipe and fittings shall be inspected for cracks by ringing with a light hammer while suspended. The interior and exterior of each pipe length used shall be cleaned as necessary to remove all dirt or other foreign material before it is inspected. The interior of the pipe shall be kept clean until the work is accepted.
- C. No pipe shall be laid in water, mud or when trench conditions or weather is unsuitable for such work, except by permission of the Engineer.
- D. If mud, surface water, leaves and/or other debris have been permitted to enter the strung-out pipe, the inside shall be cleaned as directed by the Engineer and before the pipe is lowered into the trench.
- E. Pipe shall not be pushed off the bank nor shall it be permitted to fall into the trench. Each type of pipe, fitting, special or other appurtenances shall be handled in strict accordance with recommendations of its respective manufacturer.
- F. No rocks, stones, metal, concrete, bricks, pavement pieces, wood, soil lumps or other hard materials too big to pass through a six (6") inch screen shall be permitted within six (6") inches of the pipe after it is laid in the trench. Any pipe endangered by such debris shall be subject to removal and disposal at the Contractor's expense as and when directed by the Engineer.
- G. When pipe laying is not in progress, the open ends of installed pipe shall be closed by appropriate means to prevent the entrance of dirt and water.
- H. Pipe lengths shall not be deflected at the joint to any greater degree than recommended by the manufacturer of the particular joint being used. Where deflections in excess of such recommendations are necessary, the appropriate specifications for the particular type of pipe being installed shall govern the mode of accomplishing such excessive deflections. All pipe deflections shall be performed only with the Engineer's approval.

3.03 JOINTING PROCEDURES

- A. The particular method of making up pipe joints shall be governed by the type of pipe material and type of joint in accordance with the Drawings and/or specifications.

3.04 ANCHORAGE

- A. All force mains, and sewers where shown on the Drawings shall be provided with a reaction backing or shall be restrained by attaching suitable metal rods, clamps, anchored fittings or harnessed joints, as shown on the plans or as specified so as to prevent movement.
- B. Reaction backing shall be of concrete, with steel reinforcement as required, unless otherwise shown on the Drawings. Backing shall be placed between solid ground and the fitting or other part of the pipeline to be anchored; the area of bearing on the pipe and on the ground in each instance shall be that as indicated on the plans. The backing shall be so placed, unless otherwise directed, that the pipe and fitting joints will be accessible for repair.
- C. Steel tie rods or clamps of adequate strength to prevent movement may be used instead of concrete backing. Steel rods or clamps shall be painted with three (3) coats of an approved bituminous paint or coal tar enamel.

3.05 BACKFILLING

- A. Backfilling shall be accomplished in a two-step procedure as follows: 1) Partial backfill before leakage tests and 2) Completion of backfill after tests. Departure from this procedure due to traffic or other conditions shall be approved by the Engineer.
- B. All backfill in trenches under street pavements shall be thoroughly compacted as specified, using approved

mechanical tampers or jetting equipment before replacing any pavements, either permanent or temporary. Backfill may be sprinkled, if necessary, at the time of backfilling to maintain the optimum moisture content at the time of compaction.

3.06 TESTING OF BACKFILL COMPACTION

- A. Testing of the quality of the backfill compaction shall include either of the herein specified methods depending upon which backfill method was used by the Contractor. The following specified field tests shall be completed by an independent laboratory and testing firm approved by the Engineer.
 - 1. If the backfill was compacted using mechanical tamping equipment, the following compaction testing method will be used. A nuclear densometer shall be on site for the compaction testing of the eight (8) inch loose lift layers as they are compacted. The time of testing and location shall be as selected by the Engineer.
 - 2. Or, a "dutch cone" soil compaction testing procedure with a minimum of one (1) test hole per three-hundred (300) feet of trench backfilled. The location of the test hole shall be selected by the Engineer.
 - 3. Pavement replacement shall not occur until one of the above tests have been completed and the results have been certified by the testing firm and received and reviewed by the Engineer.

3.07 LINE AND GRADE

- A. The Contractor will be required to set up and use batter boards located at every established grade and line point. A line shall be set on these batter boards at an elevation such that it is parallel to the invert grade line and on the proper centerline of the pipe. Not less than three (3) batter boards shall be set before any pipe is placed. A grade stick provided with a bracket on the bottom shall be used to locate the pipe at the proper elevation and a plumb bob shall be used to locate it on line.
- B. In lieu of the above method the Contractor may, if he has suitable equipment and a capable operator, use a laser beam for establishing line and grade. The method used shall be as recommended by the manufacturer of the laser equipment and must be satisfactory to the Engineer. The laser beam shall be of no greater power than 2.5 milliwatts (0.0025 watts). A continual visual check shall be provided by the laser equipment. The Engineer will provide reference points for line and grade in sufficient numbers to make possible the efficient use of the laser beam equipment.
- C. No sewer pipe shall be laid until a sufficient length of trench has been properly prepared to permit laying at least twelve (12) feet of pipe at one time. No pipes shall be laid except in the presence of the Engineer and no pipes shall be covered or backfilled until they have been examined and directions given to cover the same.

3.08 SERVICE CONNECTIONS

- A. In general, and as called for on the Drawings, as required or as ordered, provision shall be made in the sewers for service connections by inserting a tilted-up "Tee" branch for each service connection with a branch of size called for by the Contract Drawings but never less than six (6) inches, in the sewer at the location shown, where required or ordered. The Contractor shall construct a riser, where so required, as per detail, in such a manner that the top of the riser shall be not less than seven (7) feet below grade or at such elevation as to properly receive the required service connection with full regard to elevation of service sewer and slope from building or structure to the sewer which shall be not less than one percent (1%). Risers are to be encased in brick or concrete as shown on the Contract Drawings.
- B. Reconnecting of existing service shall each consist of the furnishing and installing of the Tee-branch and all curbed and straight pipe as required, the removal of such existing service laterals as is necessary, and the furnishing and placing of all materials to securely plug the discontinued service to the old sewer and make proper connection to the new sewer. All excavation required to complete the reconnections shall be included.
- C. The Owner may increase the number of connections or delete some connections as the sewer is being built, or increase the size of connections when it deems such advisable. Concrete for encasement of risers and of

supporting pipe shall be placed in a manner to preserve alignment and avoid disturbance of joints.

3.09 PROTECTION OF SEWER

- A. After the sewer or drain is completed and trench backfilled, the Contractor shall maintain barricades and keep traffic off freshly backfilled trenches until the backfill has consolidated, but in no event shall traffic be permitted on backfill in less than seventy-two (72) hours after the trench has been properly backfilled and compacted.

3.10 SANITARY AND STORM SEWER TESTING

- A. Prior to final payment for and acceptance of the sanitary sewer installation, visual inspection of all sanitary sewers shall be as specified.
- B. After the completion of any sanitary sewer or any portion thereof, a leakage test shall be made by the Contractor under the supervision of the Engineer. Testing is to be conducted over the entire length of the sewer pipe installation.
- C. All pipes which do not meet the testing requirements must be repaired or replaced and then retested, all at the Contractor's expense, until it meets the requirements.

3.11 INFILTRATION AND EXFILTRATION TESTS FOR SEWER PIPE

A. Preparation

- 1. Before sections of sewers may be tested for infiltration or exfiltration, all house leads from it must be constructed to limits called for and plugged or capped and all trenches backfilled and compacted.
- 2. Sewers to be tested shall be clean and free from construction debris. Sand, dirt, concrete, or other materials shall be completely removed in a manner that will not damage the sewer pipe.
- 3. Pipe joints shall be watertight. The Contractor shall repair manholes and pipe joints as required to stop all visible leaks. Seepage permitted through walls or patched joints shall be at the discretion of the Engineer, but in no instance will the specified allowable infiltration be exceeded.
- 4. Where sewers are above the ground water table, the Contractor may flood the trench or air test the sewer to find and repair leaks prior to exfiltration tests.
- 5. The materials and methods for repairing leaks shall be submitted to the Engineer for approval before beginning work.

B. Inspection

- 1. After a sewer has been cleaned and all repairs made as specified, the sewer shall be inspected and approved by the Engineer before conducting infiltration or exfiltration tests.
- 2. Sewers thirty-six (36) inch diameter and larger shall be inspected from the inside. Inspection of sewers smaller than thirty-six (36) inch diameter from the inside shall be at the discretion of the Engineer.
- 3. Smaller sewers shall be inspected using closed circuit television.
- 4. Where called for on the Drawings or specified, smaller sewers may be inspected by lamping between manholes in lieu of closed circuit television.
- 5. The Contractor shall furnish all lights, carts, television, and other equipment and labor required to assist the Engineer in the inspection.

C. Test sections

1. The maximum length of a sewer test section shall be 900 linear feet. Every manhole shall be included in one (minimum) test section.
2. The Contractor shall furnish and install bulkheads, sewer plugs, weirs, water level tubes, lighting, and other equipment required to conduct the tests in locations and as directed by the Engineer.
3. Infiltration
 - a. Where the ground water level is above the top of the pipe, the sewer shall be tested for infiltration.
 - b. The Contractor shall plug or bulkhead the sewer to isolate the test section and install a weir in the pipe at the outlet manhole. The weir shall be direct reading, of an approved design, calibrated to read gallons per day.
 - c. Where the ground water level is below the top of the sewer pipe, and if the trench can be flooded and the level maintained above the pipe for the test period, the Contractor may test the pipe for infiltration.
4. Exfiltration
 - a. Where the ground water level is below the top of the pipe, the sewer shall be tested for exfiltration.
 - b. The Contractor shall bulkhead or plug each end of the designated test section and fill with water to the elevation directed by the Project Engineer. The test shall be performed with a minimum positive head of 2 feet. Exfiltration will be computed from the loss of water as measured in the manholes.
5. Allowable leakage
 - a. The test in each section shall be continued for at least twenty-four (24) hours and, if its measured leakage during that period exceeds 100 gallons per inch of diameter per mile of pipe, the Contractor shall locate the points of leakage and make necessary repairs, continuing the work until leakage is reduced to the permissible maximum as specified.
 - b. The amount of infiltration allowed for storm sewers shall be limited to reasonable seepage, except that, if specified, the total in any section shall not exceed the amounts allowed for sanitary sewers as herein specified.
6. Air tests: In lieu of testing exfiltration by water means, pipe twenty-four (24) inches in diameter or smaller may be tested by means of low pressure air, but only after a request has been submitted to the Engineer for review and the Contractor receives written approval from the Engineer to air test.

3.12 AIR TESTING (ASTM F-1417)

- A. Air testing will be conducted as the project is being installed. At no time will more than 900 feet of pipe be installed before air testing is performed.
- B. After backfilling a manhole-to-manhole reach of sanitary sewer line, the contractor shall, at his expense, conduct the Line Acceptance Test. The test shall be performed according to the stated procedures and under the supervision of the Owner and/or the Engineer.
- C. Equipment used shall meet the following minimum requirements and be approved by the Engineer:
 1. Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe to be inspected.
 2. Pneumatic plugs shall resist internal test pressures without requiring external bracing or blocking.
 3. All air used shall pass through a single control panel.

4. Three (3) individual hoses shall be used for the following connections:
 - a. From control panel to pneumatic plugs for inflation.
 - b. From control panel to sealed line for introducing the low-pressure air.
 - c. From sealed line to control panel for continually monitoring the air pressure rise in the sealed line.
- D. Testing procedures will be as follows: All pneumatic plugs shall be seal tested before being used in the actual test installation. One length of pipe shall be laid on the ground and sealed at both ends with the pneumatic plugs to be checked. The sealed pipe shall be pressurized to 5 psig. The plugs must hold against this pressure without having to be braced.
- E. After a manhole-to-manhole reach of pipe has been backfilled and cleaned, and the pneumatic plugs are checked by the above procedure, the plugs shall be placed in the line at each manhole. Low-pressure air shall be slowly introduced into this sealed line until the internal air pressure reaches approximately 4 psig.
- F. At least two minutes shall be allowed for the air pressure to stabilize. When the pressure has stabilized and is at or above 3.5 psig, the air hose from the control panel to the air supply shall be disconnected. The portion of the line being tested shall be termed "acceptable" if the time required in minutes for the pressure to decrease from 3.5 to 2.5 psig (greater than the average back pressure of any ground water that may be over the pipe) shall not be less than the time shown for the given diameters in the following table:

TABLE 1 Minimum Specified Time Required for a 1.0 psig Pressure Drop for Size and Length of Pipe Indicated for Q= 0.0015

NOTE 1—See Practice UNI-B-6-90.

NOTE 2—Consult with pipe and appurtenance manufacturer for maximum test pressure for pipe size greater than 30 in. in diameter.

Pipe Diameter, in.	Minimum Time, min:s	Length for Minimum Time, ft	Time for Longer Length, s	Specification Time for Length (L) Shown, min:s							
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
4	3:46	597	0.380 L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	0.854 L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520 L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	239	2.374 L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	199	3.418 L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	159	5.342 L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	133	7.692 L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	114	10.470 L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:40	99	13.674 L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33
27	25:30	88	17.306 L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48
30	28:20	80	21.366 L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15
33	31:10	72	25.852 L	43:05	64:38	86:10	107:43	129:16	150:43	172:21	193:53
36	34:00	66	30.768 L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46

- G. In areas where ground water is known to exist, the Contractor shall install a 1/2-inch diameter capped pipe nipple, approximately ten (10) inches long, through the manhole wall on top of one of the sanitary sewer lines entering the manhole. This shall be done at the time the sanitary sewer line is installed. Immediately prior to the performance of the Line Acceptability Test, the ground water shall be determined by removing the pipe cap, blowing air through the pipe nipple into the ground so as to clear it, and then connecting a clear plastic tube to the nipple. The plastic tube shall be vertical and a measurement of the height, in feet of water over the invert of the pipe shall be taken after the water has stopped rising in this plastic tube. Air test pressure is to be increased by 0.433 psi for each foot the ground water is above the invert of the sewer line being tested. The allowable drop of one (1) pound and the timing of the test remain the same.
- H. If a Line Acceptability Test is being conducted on more than one (1) manhole reach of pipe, the entire section

being tested shall meet the Line Acceptability requirements as if only one (1) of the manholes reach in the section were being tested.

3.13 MAINTENANCE OF EXISTING DITCHES

- A. The Contractor shall use the utmost care in maintaining ditches and other waterways, and, if either bottoms or banks of such ditches are disturbed, they shall be promptly restored and maintained for the life of the guaranty period. Similar care shall be used in preventing damage to existing paving by caving of trench walls and undermining such paving. If paving is damaged, the Contractor shall repair same at his own expense.

3.14 CLEARING SITE AND RESTORING DAMAGED SURFACES

- A. Upon completion of the backfill work, the Contractor shall immediately remove and dispose of all surplus materials including dirt and rubbish.
- B. Unless otherwise called for on the plans, the Contractor shall replace all pavement, sidewalks, sod, or other surfaces disturbed to a condition equal to that existing before the work was started, furnishing all materials, labor, equipment, etc., at no additional cost to the Owner.
- C. All restoration of lawns shall be performed in accordance with these specifications as a part of performing the work as specified herein.
- D. All restoration of driveways, sidewalks, roadways and shoulders (berms) shall be in accordance with these specifications as a part of performing the work as specified herein.
- E. Upon completion of the foregoing work, all tools and other property belonging to the contractor shall be removed, and the site shall be left in good condition.

PART FOUR – SPECIAL PROVISIONS

4.01 N/A

END OF SECTION

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PRECAST CONCRETE CATCH BASINS/CURB INLETS

PART ONE - GENERAL

1.01 SCOPE

- A. Under this Section, the Contractor shall furnish and construct precast concrete catch basins, including drops and manhole stacks of types and at locations shown on the Drawings and/or scheduled.
- B. This Section includes additional excavation to widen and deepen sewer trenches for catch basin construction, furnishing and installing concrete of classes called for, brick, Portland cement mortar, reinforcing steel, precast concrete pipe, integral base sections, bottom riser sections, transition sections, riser sections, eccentric cones, flat slab tops and adjusting rings, flexible manhole connections, pipe for drop connections, plugging lifting holes, pointing joints, forming channels through manhole bottoms, making watertight connections to new and existing sewers, and other work incidental to catch basin construction.
- C. Related Work:
 - 1. Including but not limited to the General Conditions, Supplementary Conditions or General Requirements.
 - 2. Section 02100 Clearing and Grubbing
Section 02235 Trench Excavations
Section 02500 Pavement Construction Repair and Replacement
Section 02620 Pipe Joints
Section 02635 PVC Pipe (ASTM D2241)
Section 02733 Reinforced Concrete Pipe

1.02 DEFINITIONS

- A. The various types of catch basins are as shown on the Drawings or in the Standard Details.

1.03 SUBMITTALS FOR ENGINEER'S APPROVAL

- A. Manufacturer's Shop Drawings and Certificates:
 - 1. Precast Concrete Catch Basins
 - 2. Flexible Joints
- B. Supplier's Certificates: Brick.

PART TWO - PRODUCTS

2.01 MATERIALS

- A. Precast Concrete Catch Basins Sections:
 - 1. Precast concrete catch basin sections, transition sections, eccentric cones, flat slab tops, and adjusting rings shall conform to ASTM Specification C478. Reinforcing in transition sections shall be equal to that specified for wall sections of the larger diameter.
 - 2. Joints shall be O-ring type conforming to ASTM Specification C443.
 - 3. The standard length of riser sections shall be forty-eight (48) inches in length of thirty-two (32) inch or sixteen (16) inch to meet required dimensions and as specified.

4. Openings for connecting pipes in riser sections bottom riser sections, and integral base sections, and for access in flat slabs shall be preformed or cored by the manufacturer. Cutout openings shall be made immediately after the pipe is removed from the casting form. All cored openings for sewer pipe connections shall have flexible joints.
 5. Precast integral base sections shall be of monolithic construction. The bottom of the section shall be six (6) inch thick minimum and contain 0.32 sq. in. minimum of steel reinforcing each way in top of the slab. Walls shall meet ASTM Specification C478.
 6. Specified catch basin steps shall be factory installed to provide a continuous ladder of sixteen (16) inch O/C rung spacing. Steps shall be placed in the forms and cast in pipe wall or placed immediately after the pipe is removed from casting and carefully mortared in place with non-shrink mortar to insure a watertight joint. If the outer surface of the pipe wall is pierced, the patch shall be completely covered with a bituminous sealer.
 7. Where pressure tight catch basin frames and covers are called for, threaded inserts shall be cast in eccentric cones or flat slab tops and holes formed or cored in adjusting rings to match bolt size and spacing specified for catch basin casting.
- B. Catch Basin Steps:
1. Catch basin steps shall be of polypropylene plastic reinforced with a 3/8-inch No. 60 grade reinforcing rod as detailed on the Drawings or in the Standard Details. Steps of similar cross section and dimensions may be submitted for approval.
 2. Cast iron or aluminum catch basin steps will not be permitted.
- C. Catch Basin Frames and Covers:
1. Catch basin frames and covers shall be as shown on the Drawings or in the Standard Details or as indicated in the Special Provisions.
 2. Where pressure tight catch basin covers are called for, lid seals shall be a continuous round rubber gasket supplied by the manufacturer.
- D. Mortar:
1. Mortar used for the structures herein specified shall conform to Specifications for Mortar for unit Masonry, ASTM Designation C 270 Type S, containing no masonry cement. The mortar shall be composed of one (1) part Portland cement to two (2) parts sand by volume.
 2. Materials for non-shrinking mortar shall be Sauereisen F-100 Grout as manufactured by Sauereisen Cement Co., Pittsburgh, Pennsylvania; Five-Star Grout as manufactured by U.S. Grout Corp., Old Greenwich, Connecticut; or equal.
- E. All cast-in-place concrete used for forming channels in catch basin bottoms shall be Class B as specified in Section 03120.
- F. Reinforcing steel used in cast-in-place concrete shall meet the requirements of Section 03200, "Concrete Reinforcement".
- G. Joints for precast pipe openings shall be "Reseal" type as manufactured by Price Brothers Company, "Lock-Joint Flexible Manhole Sleeves" as manufactured by National Pollution Control Systems, Inc., or equal.
- H. Pipe for catch basin drops shall conform to type and specifications of the connecting main line pipe for the required size.
- I. Brick used for catch basin and manhole construction shall conform to Specifications for Sewer and Manhole Brick (made from clay or shale), ASTM Designation C 32, and shall be Grade "MS" unless otherwise specified.

PART THREE - EXECUTION

3.01 LOCATION AND CONSTRUCTION

- A. Location and type of catch basin installed shall be as shown on the Drawings or directed.
- B. Construction shall be in conformance with details shown on the Drawings and as specified.

3.02 EXCAVATION

- A. Excavation for catch basin construction shall be prepared as directed in applicable paragraphs of Section 02222 and 02731.

3.03 INSTALLATION OF INTEGRAL BASE SECTIONS

- A. Class B concrete shall be poured so as to provide a minimum of four (4) inch pad under the entire area of the catch basin base. Place the catch basin on the pad before the concrete is completely set so that final leveling adjustment can be made.
- B. Six (6) inch granular backfill bedding can be used in lieu of Class B concrete at the direction of the Engineer.

3.04 INSTALLATION OF BOTTOM RISER SECTIONS

- A. Unless otherwise called for on the Drawings or directed, bottom riser sections shall be placed with cast-in-place concrete bases.
- B. The base shall be of Class A concrete nine (9) inch thick minimum placed on undisturbed earth.
- C. The cut-out riser section shall be blocked in place above the pipe and the concrete base poured in place. Concrete shall be extended above the lower rim of the riser wall as required to provide a watertight seal around the entire circumferences of the riser section. The sewer pipe shall be bedded in concrete monolithic with the base to the first joint each way from the catch basins.
- D. On straight runs the Contractor may carry the sewer pipe through the catch basin and break out the top half after the fill concrete has set. In all cases the sewer pipe shall extend through the manhole wall to the inside face.

3.05 CHANNELING CATCH BASIN BOTTOMS

- A. The bottoms of all catch basins shall be channeled to conduct flow in the planned direction. Channels shall be the true shape of the lower half of the sewer pipe and shall match inverts of connecting pipe at the catch basin wall.
- B. In integral base sections (only) channels may be constructed using brick and Portland cement mortar. Mortar shall be 3/4-inch thick minimum between bricks and between bricks and concrete and one (1) inch thick minimum on all exposed surfaces.

3.06 PRECAST CONCRETE RISER SECTIONS

- A. The shortest length of riser section to be incorporated into the catch basin shall be installed immediately below the flat slab top.
- B. Pipe section joints shall be pointed and lifting holes filled with non-shrinking mortar.

3.07 INSTALLATION OF CATCH BASIN FRAMES

- A. Catch basin frames and covers shall be installed to grades shown on the Drawings or as directed.

- B. Adjustment of catch basin castings shall be made using specified brick or precasting adjusting rings and Portland cement mortar joints. The entire outer surface of adjusting rings and manhole castings shall be plastered with one (1) inch minimum Portland cement mortar unless otherwise detailed on the Drawings or directed.
- C. The maximum depth of adjustment below any manhole casting shall be sixteen (16) inches.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

PRE-CAST CONCRETE MANHOLES

PART ONE - GENERAL

1.01 SCOPE

- A. Under this Section, the Contractor shall furnish and construct pre-cast concrete manholes, including drops and manhole stacks of types and at locations shown on the Drawings.
- B. This Section includes additional excavation for manhole furnishing and installing concrete of classes called for, brick, Portland cement mortar, reinforcing steel, pre-cast concrete pipe, integral base sections, bottom riser sections, transition sections, riser sections, eccentric cones, flat slab tops and adjusting rings, flexible manhole connections, pipe for drop connections, plugging lifting holes, pointing joints, forming channels through manhole bottoms, making watertight connections to new and existing sewers, and other work incidental to manhole construction.
- C. Related Work:
 - 1. Including but not limited to the General Conditions, Supplementary Conditions or General Requirements.
 - 2. All applicable Divisions of the Technical Specifications.

1.02 DEFINITIONS

- A. The various types of manholes are as shown on the Drawings or in the Standard Details.

1.03 SUBMITTALS FOR ENGINEER'S APPROVAL

- A. Manufacturer's Shop Drawings and Certificates:
 - 1. Pre-cast Concrete Manhole Sections and Specials
 - 2. Flexible Joints
 - 3. Manhole Frame and Covers
- B. Supplier's Certificates:
 - 1. Reinforced Concrete Pipe Manhole Sections.

PART TWO - PRODUCTS

2.01 MATERIALS

- A. Pre-cast Concrete Pipe Manhole Sections:
 - 1. Pre-cast concrete pipe manhole sections, transition sections, eccentric cones, flat slab tops, and adjusting rings shall conform to ASTM Specification C478. Reinforcing in transition sections shall be equal to that specified for wall sections of the larger diameter.
 - 2. Joints shall be O-ring type conforming to ASTM Specification C443.
 - 3. The standard length of riser sections shall be forty-eight (48) inches in length of thirty-two (32) inch or sixteen (16) inch to meet required dimensions and as specified.
 - 4. Openings for connecting pipes in riser sections bottom riser sections, and integral base sections, and for access in flat slabs shall be preformed or cored by the manufacturer. Cutout openings shall be made immediately after the pipe is removed from the casting form. All cored openings for sewer pipe connections shall have flexible joints.

5. Pre-cast integral base sections shall be of monolithic construction. The bottom of the section shall be six (6) inch thick minimum and contain a minimum steel reinforcing of No. 5 Rebar at 12 in c-c each way in top of the slab. Walls shall meet ASTM Specification C478.
 6. Specified manhole steps shall be factory installed to provide a continuous ladder of sixteen (16) inch C/C rung spacing. Steps shall be placed in the forms and cast in pipe wall or placed immediately after the pipe is removed from casting and carefully mortared in place with non-shrink mortar to insure a watertight joint. If the outer surface of the pipe wall is pierced, the patch shall be completely covered with a bituminous sealer.
 7. Where pressure tight manhole frames and covers are called for, threaded inserts shall be cast in eccentric cones or flat slab tops and holes formed or cored in adjusting rings to match bolt size and spacing specified for manhole casting.
- B. Manhole Steps:
1. Manhole steps shall be specified in Section 02739 and installed as shown on the Drawings.
- C. Manhole Frames and Covers:
1. Manhole frames and covers shall be as shown on the Drawings or in the Standard Details or as indicated in the Special Provisions.
 2. Where pressure tight manhole covers are called for, lid seals shall be a continuous round rubber gasket supplied by the manufacturer.
- D. Mortar:
1. Mortar used for the structures herein specified shall conform to Specifications for Mortar for unit Masonry, ASTM Designation C 270 Type S, containing no masonry cement. The mortar shall be composed of one (1) part Portland cement to two (2) parts sand by volume.
 2. Materials for non-shrinking mortar shall be Sauereisen F-100 Grout as manufactured by Sauereisen Cement Co., Pittsburgh, Pennsylvania; Five-Star Grout as manufactured by U.S. Grout Corp., Old Greenwich, Connecticut; or equal.
- E. All cast-in-place concrete used for forming channels in manhole bottoms shall be Class B as specified in Section 03120.
- F. Reinforcing steel used in cast-in-place concrete shall meet the requirements of Section 03200.
- G. Joints for pre-cast pipe openings shall be "Reseal" type as manufactured by Price Brothers Company, "Lock-Joint Flexible Manhole Sleeves" as manufactured by National Pollution Control Systems, Inc., or equal.
- H. Brick used for catch basin and manhole construction shall conform to Specifications for Sewer and Manhole Brick (made from clay or shale), ASTM Designation C 32, and shall be Grade "MS" unless otherwise specified.

PART THREE - EXECUTION

3.01 LOCATION AND CONSTRUCTION

- A. Location and type of manhole installed shall be as shown on the Drawings or directed.
- B. Construction shall be in conformance with details shown on the Drawings and as specified.

3.02 EXCAVATION

- A. Excavation for manhole construction shall be prepared as directed in applicable paragraphs of Section 02222.

3.03 INSTALLATION OF INTEGRAL BASE SECTIONS

- A. Class B concrete shall be poured so as to provide a minimum of four (4) inch thick pad under the entire area of the manhole base. Place the manhole on the pad before the concrete is completely set so that final leveling adjustment can be made.

- B. Six (6) inch granular backfill bedding can be used in lieu of Class B concrete at the direction of the Engineer.

3.04 CHANNELING MANHOLE BOTTOMS

- A. The bottoms of all manholes shall be channeled to conduct flow in the planned direction.

3.05 PRE-CAST CONCRETE RISER SECTIONS

- A. The shortest length of riser section to be incorporated into the manhole shall be installed immediately below the flat slab top.
- B. Pipe section joints shall be pointed and lifting holes filled with non-shrinking mortar.

3.06 INSTALLATION OF MANHOLE FRAMES

- A. Manhole frames and covers shall be installed to grades shown on the Drawings or as directed.
- B. Adjustment of manhole castings shall be made using specified brick or pre-casting adjusting rings and Portland cement mortar joints. The entire outer surface of adjusting rings and manhole castings shall be plastered with one (1) inch minimum Portland cement mortar unless otherwise detailed on the Drawings or directed.
- C. Each pressure tight manhole casting shall be anchored in place using four (4) 5/8-inch stainless steel bolts with nuts as detailed on the Drawings or as directed.
- D. The maximum depth of adjustment below any manhole casting shall be eighteen (18) inches

3.07 STANDARD TEST METHOD FOR CONCRETE SEWER MANHOLES BY THE NEGATIVE AIR PRESSURE (VACUUM) TEST PRIOR TO BACKFILL 1 (ASTM C 1244-02)

A. Scope

1. This test method covers procedures for testing precast concrete manhole sections when using the vacuum test Method to demonstrate the integrity of the installed materials and the construction procedures. This test method is used for testing concrete manhole sections utilizing mortar, mastic, or gasketed joints.
2. This test method is intended to be used as a preliminary test to enable the installer to demonstrate the condition of the concrete manholes prior to backfill.
3. This standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

4. This test method is the companion to metric Test Method C 1244M; therefore, no SI equivalents are shown in this test method.

NOTE 1—Vacuum test criteria presented in this test method are similar to those in general use. The test and criteria have been widely and successfully used in testing manholes.

NOTE 2—It should be understood that no correlation has been found between vacuum (air) and hydrostatic tests.

B. Referenced Documents

1. **ASTM** Standards:

- a. C 822 Terminology Relating to Concrete Pipe and Related Products.
- b. C 924 Practice for Testing Concrete Pipe Sewer Lines by Low-Pressure Air Test Method.
- c. C 969 Practice for Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines.

C. Summary of Practice

1. All lift holes and any pipes entering the manhole are to be plugged. A vacuum will be drawn and the vacuum drop over a specified time period is used to determine the acceptability of the manhole.

D. Significance and Use

1. This is not a routine test. The values recorded are applicable only to the manhole being tested and at the time of testing.

E. Preparation of the Manhole

1. All lift holes shall be plugged.
2. All pipes entering the manhole shall be temporarily plugged, taking care to securely brace the pipes and plugs to prevent them from being drawn into the manhole.

F. Procedure

- 1 The test head shall be placed at the top of the manhole in accordance with the manufacturer's recommendations.
- 2 A vacuum of 10 in. Hg shall be drawn on the manhole, the valve on the vacuum line of the test head closed, and the vacuum pump shut off. The time shall be measured for the vacuum to drop to 9 in. Hg.
- 3 The manhole shall pass if the time for the vacuum reading to drop from 10 in. Hg to 9 in. Hg meets or exceeds the values indicated in Table 1.
- 4 If the manhole fails the initial test, necessary repairs shall be made by an approved method. The manhole shall then be retested until a satisfactory test is obtained.
- 5 Use or failure of this vacuum test shall not preclude acceptance by appropriate water infiltration or exfiltration testing, (see Practice C 969), or other means.

TABLE 1 Minimum Test Times for Various Manhole Diameters in Seconds

Depth (ft)									
	30	33	36	42	48	54	60	66	72
	Time, in seconds								
8	11	12	14	17	20	23	26	29	33
10	14	15	18	21	25	29	33	36	41
12	17	18	21	25	30	35	39	43	49
14	20	21	25	30	35	41	46	51	57
16	22	24	39	34	40	46	52	58	67
18	25	27	32	38	45	52	59	65	73
20	28	30	35	42	50	53	65	72	81
22	31	33	39	46	55	64	72	79	89
24	33	36	42	51	59	64	78	87	97
26	36	39	46	55	64	75	85	94	105
28	39	42	49	59	69	81	91	101	113
30	42	45	53	63	74	87	98	108	121

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

SECTION 02744

PVC SEWER PIPE (ASTM D3034)

PART ONE - GENERAL

1.01 SCOPE

- A. The Contractor shall, under Section 02744 shall furnish all the materials for and shall properly install at the location shown on the contract drawings or as directed by the Engineer all polyvinyl chloride pipe (PVC) and fittings necessary for the proper completion of the work included under this contract.
- B. All sewer pipe shall conform to American Society of Testing Materials Specifications, as set forth for the various classifications of pipe shown on the plans and/or in the proposal of these specifications. No old pipe or specials that have previously been used will be allowed in the herein specified work.
- C. Related Work:
 - 1. Including but not limited to the General Conditions, Supplementary Conditions or General Requirements.

1.02 SUBMITTALS

- A. The Contractor shall furnish catalog data and specifications for approval describing in detail all pipe and specials proposed to be furnished under this Contract and a letter certifying that all such materials will be made to meet the applicable ASTM Specifications for the various classifications of pipe shown on the plans and/or in the proposal of these specifications.

PART TWO - PRODUCTS

2.01 MATERIALS

- A. All PVC pipe used, as covered under Section 02744, shall conform to ASTM D3034, with end being designated for the type of joint as specified herein. PVC compounds shall conform to ASTM D 1784.
- B. The minimum class for PVC pipe under Section 02744 shall be SDR 35.
- C. Materials of construction, including joints and fittings, shall be suitable for exposure to raw sewage, and shall also be UV stabilized with either 2% carbon black or titanium dioxide.

2.02 JOINTS AND FITTINGS

- A. Bell and spigot type joints, including their respective appurtenances shall conform to ASTM D3212. Gaskets shall be in accordance with ASTM F477.
- B. All spigots shall have a "home" mark in order to facilitate joint closure.

2.03 DIMENSIONS

- A. The minimum class for PVC pipe under this item shall be SDR 35, unless otherwise noted on the plans.
- B. Pipe intended to be straight shall have a maximum deviation from straightness of 1/16 inch per lineal foot when measured in accordance with ASTM D 2122.

2.04 INSPECTION

- A. All pipe and fittings will be inspected by the Engineer or his authorized representative immediately prior to installation. A manufacturers certificate that the PVC material and pipe were manufactured and tested in accordance with AWWA 900 shall be furnished to the Engineer prior to installation of the pipe.

PART THREE - EXECUTION

3.01 STORAGE

- A. All plastic fixtures and pipe, if stored outside, shall be covered with an opaque material to protect it from the sun's rays.

3.02 INSTALLATION

- A. Cutting of all pipe shall be done with sharp tools. The ends of each pipe shall be reamed until all burrs or fins are removed. Full tapered threads shall be used throughout and threaded joints shall turn up perfectly tight without the use of filling substances. A standard pipe joint paste shall be used on the male threads only, and none shall be allowed to accumulate on the inside of the pipes. All connections between pipe shall be made with an approved dielectric insulating material.
- B. Pipe joints shall conform to respective industry standards.
- C. Exterior pipelines shall be installed and graded in accordance with state and/or local plumbing codes.
- D. Pipe shall be firmly bedded throughout the full length with the exception of where bell holes are required. Where unstable soil conditions occur under buildings, support shall be made from the underside of the structural slab by an approved type hanging device embedded in the concrete.
- E. Where PVC piping is laid in a trench, the bottom of the trench shall be well graded and compacted to insure even bearing for the full length of the pipe and the pipe shall be snaked at approximately fifty (50) feet intervals to provide for expansion or contraction. Prior to testing the pipe, the pipe shall be center loaded with backfill between joints to prevent the pipe from arching or whipping under pressure. During backfill the line shall be pressurized to 25 psi. to minimize impact damage.

3.03 TESTING

- A. Special testings for deflection of PVC sewer pipe
 - 1. Before final acceptance of sewer lines constructed of these materials, all sections of sewer pipe six (6) inch and larger specified diameter shall be measured for vertical ring deflection by the Contractor and witnessed by the Engineer. Maximum deflection under full load shall not exceed 5% of the average inside diameter as determined by the laboratory for the specified piping.
 - 2. Should any pipe exceed the allowable deflection, the Contractor shall replace those pipes and retest the section as directed by the Engineer.
 - 3. Equipment used in testing shall be "go-no go" pull through gauges of a type approved by the Engineer. Each gauge must be checked and approved by the laboratory before using.
 - 4. Testing equipment and personnel to perform the required tests shall be provided by the Contractor. Tests must be witnessed by the Engineer.
 - 5. Use of mechanical pulling devices will not be permitted.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

DIVISION 3
CONCRETE

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PART ONE - GENERAL

1.01 DESCRIPTION

- A. Under this Section, the Contractor shall design, provide, and install all concrete formwork needed to place the cast-in-place concrete as required by the Project Specifications and Drawings.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not limited to the General Conditions, Supplementary Conditions, and the other Sections of these Specifications. See specifically Section 02220 Excavating, Backfill and Compaction; Section 03200 Concrete Reinforcement; and Section 03120 Cast-in-Place Concrete.

1.02 QUALITY ASSURANCE

- A. Products used in the work of this Section shall be produced by suppliers regularly engaged in the manufacture of similar items and with a history of satisfactory production acceptable to the Engineer.
- B. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods needed for proper installation of the work in this Section.
- C. Contractor shall be responsible for the design of all formwork used on the project.
- D. In addition to complying with pertinent regulations of governmental agencies having jurisdiction, comply with pertinent provisions of ACI 347.

1.03 SUBMITTALS AND SUBSTITUTIONS

- A. Comply with pertinent provisions of Section 01300 Submittals.
- B. The following product data shall be submitted for record purposes only and not for approval.
 - 1. Suppliers' data and installation instructions for proprietary materials including form coatings, ties, accessories, and manufactured form systems.
 - 2. Suppliers' recommended installation procedures, which the Contractor shall follow on the project Work.

1.04 PRODUCT HANDLING

- A. Comply with pertinent provisions of Section 01350 Product Requirements and Handling.

PART TWO - PRODUCTS

2.01 FORM MATERIALS

- A. Use new or like-new forms and form materials that will produce a high quality concrete surface at the locations shown on the Drawings. Materials may be reused during the progress of the Work provided they are completely cleaned and reconditioned, recoated for each use, and capable of producing the required finished concrete quality. All parts of removed forms set aside for reuse shall be inspected, cleaned, and repaired as necessary. Any part or panel that has been dented, deformed or otherwise rendered unsafe or unfit for reuse shall be discarded.
- B. For footings and foundations, use Douglas Fir boards or planks secured to wood or steel stakes, constructed to shape indicated and to support the required loads.
- C. For studs, wales, and supports, use standard grade or better Douglas Fir, dimensions as required to support the loads but not less than 2" X 4". Support spacings for the various thicknesses shall be in accordance with American Plywood Association recommendations, with deflection, flexural stress and shear stress being limited to

1/270 of the span, 1500 psi and 70 psi respectively.

D. Wall forms:

1. Exposed concrete surfaces:

- a. Use 3/4" minimum thickness Douglas Fir plywood, grade B/B, class I or II, exterior, sanded both sides, comply with PS-1.
- b. Seal edges and coat both faces with colorless coating which will not affect application of applied finishes.

2. Unexposed concrete surfaces:

- a. Use 1" X 6" shiplap Douglas Fir boards, surface one side and two edges, or 3/4" minimum thickness Douglas Fir plywood, grade B/B plyform class I or II, sanded both sides, mill-oiled.

E. Column forms, if required:

1. For square or rectangular columns, use two (2) inch thick Douglas Fir planks or joists, surfaced one side and two edges, or use plywood or metal forms.
2. For rounded columns, use metal forms or patented paper tube forms approved by the Engineer.
3. Construct column forms with tight joints and securely clamped together with steel clamps.

2.02 FORM TIES

A. Hold inner and outer forms for vertical concrete together with steel ties and spreaders approved by the Engineer.

1. Space ties symmetrically in tiers and rows, each tier plumb from top to bottom and each row level.
2. At horizontal pour lines, locate ties not more than 6" below the pour lines. Tighten after concrete has set and before the next pour is made.

B. Ties shall be adjusted in length to permit tightening of forms, and of a type leaving no metal closer than one (1) inch from the surface. Ties shall not be fitted with any lugs, cones, or other devices, to act as a spreader within the forms, or for any purpose, which will leave a hole larger than 7/8 inch in diameter or which will leave a void back of the exposed face of the concrete.

C. Form ties for walls of tanks, sheets or other liquid-retaining structures shall be provided with a fixed water stop, centered in the form.

D. For exposed concrete surfaces, provide form ties of removable type with she-bolts equipped with permanent plugs and a system approved by the Engineer for fixing the plugs in place.

2.03 DESIGN OF FORMWORK

A. General:

1. Design, erect, support, brace, and maintain formwork so it will safely support vertical and lateral loads without harmful deflection or distortion that might be applied, until such loads can be supported by the concrete structure.
2. Carry vertical and lateral loads to ground by formwork system and in-place construction that has attained adequate strength for that purpose.
3. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position.
4. Design forms and false-work to include assumed values of live formwork, dead load, weight of moving equipment operated on the formwork, concrete mix, height of concrete drop, vibrator frequency, ambient temperature, foundation pressures, stresses, lateral stability, and other factors pertinent to safety of the structure during construction.

5. Provide shores and struts with positive means of adjustment capable of taking up formwork settlement during concrete placing operations, using wedges or jacks or a combination thereof.
6. Provide truss supports when adequate foundations for shores and struts cannot be secured.
7. Support form materials by structural member spaced sufficiently close to prevent objectionable deflection.
8. Fit forms placed in successive units for continuous surfaces to accurate alignment, free from irregularities, and within the allowable tolerances.
9. Provide formwork sufficiently tight to prevent leakage of cement paste during backup material at joints as required to prevent leakage and prevent fins.
10. Provide camber in formwork as required for anticipated deflection due to weight and pressures of fresh concrete and construction loads.
11. Any weep hole forming required shall be stainless steel or nonmetallic material.

2.04 EARTH FORMS

- A. Side forms for footing may be omitted, and concrete may be placed directly against excavation, only when requested by the Contractor and approved by the Engineer.
- B. When omission of forms is accepted, provide additional concrete one (1) foot on each side of the minimum design profile and dimensions shown on the Drawings.

PART THREE - EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 COORDINATION

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

3.03 INSTALLATION

- A. Install the work of this Section in strict accordance with the suppliers' recommendations and shop drawings as approved by the Engineer.
- B. Upon completion of the installation, carefully inspect each component and verify that all items have been installed in their proper location, adequately anchored, and adjusted to achieve optimum operation.

3.04 FORM CONSTRUCTION

- A. General:
 1. Construct forms complying with ACI 347 to the exact sizes, shapes, lines, and dimensions shown, and as required to obtain accurate alignment, location, grades, and level and plumb work in the finished structure.
 2. Provide for openings, offsets, keyways, recesses, moldings, reglets, chamfers, blocking, screeds, bulkheads, anchorages, inserts, and other features as required.
 3. Temporary openings shall be provided, where required, to facilitate cleaning and inspection, prior to placing concrete. This is particularly required at the bottom of wall forms. Shavings, chips, and all refuse shall be removed and the forms shall be broom cleaned before any concrete is placed.
- B. Fabrication:

1. Fabricate forms for easy removal without hammering or prying against concrete surfaces.
2. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces.
3. Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and assure ease of removal.
4. Provide top forms for inclined surface where so directed by the Engineer.

C. Forms for exposed concrete:

1. Drill forms to suit ties being used, and to prevent leakage of cement paste around tie holes. Do not splinter forms by driving ties through improperly prepared holes.
2. Provide sharp, clean corners at intersecting planes, without visible edges or offsets. Back the joints with extra studs or girts to maintain true, square intersections.
3. Use extra studs, wales, and bracing to prevent objectionable bowing of forms between studs, and to avoid bowed appearance in concrete. Do not use narrow strips of form material that will produce bow.

D. Corner treatment:

1. Unless shown otherwise, form chamfers with 3/4" X 3/4" strips, accurately formed and surfaced to produce uniformly straight lines and tight edges.
2. Extend terminal edges to required limit, and miter the chamfer strips at changes in direction.

E. Locate control joints as indicated on the Drawings and, where required but not shown on the Drawings, as approved by the Engineer.

F. Provisions for other trades:

1. Provide openings in concrete formwork to accommodate work of other trades.
2. Verify size and location of openings, recesses, and chases with the trade requiring such items.
3. Accurately place and securely support items to be built into the concrete.

3.05 FORM COATINGS

A. Coat form contact surface with form coating compound before reinforcement is placed.

1. Do not allow excess form coating material to accumulate in the forms or to come in contact with surfaces that are supposed to bond to fresh concrete.
2. Apply the form coating material in strict accordance with its manufacturer's recommendations.

3.06 REMOVAL OF FORMS

A. General:

1. Forms shall be removed in accordance with ACI 318-77. Upon removal of forms, the Owner's Representative shall be notified by the Contractor in order that an inspection of the newly stripped surfaces may be made prior to patching.
2. Do not disturb or remove forms until the concrete has hardened sufficiently to permit form removal with complete safety.
3. Do not remove shoring until the member has acquired sufficient strength to support its own weight, the load upon it, and the added load of construction.
4. In determination of the items for the removal of false-work, forms and housing, and discontinuance of heating,

consideration shall be given to the location and character of the structure, the weather conditions and other conditions influencing the setting of the concrete, and the materials used in the mix. The following periods, exclusive of days when the temperature is below 40°F, may be used as a guide in determining the minimum time after placing concrete when forms may be removed unless instructed otherwise by the Owner's Representative. Contractor shall assume all risk relative to removing the forms from the concrete structures.

Footings - 12 to 24 hours
Center under beams or flat slab - 14 days
Other floor slabs - 7 to 14 days
Walls - 1 to 2 days
Columns - 1 to 7 days
Sides of beams and all other parts - 1 day

B. Finished surfaces:

1. Exercise care in removing forms from finished concrete surfaces so that surfaces are not marred or gouged, and that corners are true, sharp, and unbroken.
2. Release sleeve nuts or clamps, and pull the form ties neatly.
3. Do not permit steel spreaders, form ties, or other metal to project from, or be visible on, any concrete surface except where so shown on the Drawings.
4. Solidly pack form tie holes, rod holes, and similar holes in the concrete. For packing, use the cement grout specified in Section 03120 of these Specifications, flushing the holes with water before packing, screeding off flush, and grinding to match adjacent surfaces.

PART FOUR – SPECIAL PROVISIONS

N/A

END OF SECTION

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PART ONE - GENERAL

1.01 DESCRIPTION

- A. Under this Section, the Contractor shall provide, transport, and place all concrete required to construct conduits, pavements, curbing, foundations, slabs, walls, floors, columns, beams, tanks, roads, highways, drives and other concrete structures; and for special uses as required by the Project Specifications or as shown on the Drawings.
- B. Related Work:
 - 1. Related work includes, but is not limited to, the General Conditions, Supplementary Conditions, Section 01300 Submittals, Section 03200 Concrete Reinforcement, Section 03100 Concrete Formwork, Section 01410 Testing Laboratory Services, and all other applicable Sections of the Project Technical Specifications.

1.02 QUALITY ASSURANCES

- A. Where applicable State and local codes exist and conflict with this Section, the State and local code requirements shall control.
 - 1. Ohio Department of Transportation requirements shall apply to all road and highway work.
- B. American Society for Testing and Materials, (ASTM) and American Concrete Institute (ACI) standards as specified herein shall apply.
- C. Laboratory Services and Control
 - 1. The laboratory providing the services specified in Section 01410 shall make sample tests as required to assure that the concrete provided is of the specified quality and composition.
 - 2. Laboratory technicians shall have free access to the job and concrete production facilities at all times and receive the full cooperation of the Contractor for the preparation, storage, and transportation of concrete sample test cylinders and/or test beams.
 - 3. The laboratory shall provide the forms for testing cylinders and beams.
 - 4. The Contractor shall provide to the Owner, design mixes that include the weight in pounds of fine aggregate, coarse aggregate, cement, and water per cubic yard of concrete; the number of 94 pound sacks of cement per cubic yard of concrete; the pounds of water per sack of cement; gross weight and yield per cubic yard of concrete; weight in ounces or pounds of admixture per sack of cement; slump; air content; and compressive strength of test cylinders at seven (7) days and twenty-eight (28) days. Weight of fine and coarse aggregate shall be determined in saturated, surface dry condition. Material samples shall be provided, as required, to the Owner for verification of the design mix.
 - a. The laboratory shall, as directed by the Engineer, test and produce reports of mix designs for all concrete incorporated in the work.
 - b. Only the laboratory shall adjust concrete mixes, as required, to obtain a product in conformance with the specified limiting requirements.
 - 5. It shall be the responsibility of the Contractor to obtain mix designs for each specified class of concrete used. The Engineer shall approve the mix designs before the Contractor starts concrete production.
 - a. The mix design for pumped concrete shall conform to concrete industry standard ANSI/ACI 304.2R.
 - 6. The laboratory shall make scheduled quality control tests consisting of the following:
 - a. Test specimens (compressive strength)
 - b. Slump

c. Air Entrainment

7. When concrete is procured from a central batching plant or transit mixers are used, the Owner may provide a representative at such plant to check the proportioning of aggregates and water, and mixing time.

D. Schedule of Tests

1. Quality control tests for concrete each mix shall be performed as determined necessary by the Engineer.
2. Three (3) test cylinders shall be made for each 20 cu. yds. or part thereof of concrete poured each day.
3. Two (2) test beams shall be made for each 250 sq. yds. of concrete pavement placed.
4. When cylinders and/or beam samples are made, the slump and air tests shall be made using concrete from the same batch.
5. Samples of concrete tested for determining air content and slump and for test cylinders and beams shall be taken at the point of discharge into the structure unless otherwise directed by the Engineer.

E. Standard Testing Specifications

1. Test specimens shall be made in accordance with "Standard Method of Making and Curing Concrete Test Specimens in the Field," ASTM Designation C31.
2. Tests for compression shall be performed in accordance with "Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens," ASTM Designation C 39.
3. Tests of beam specimens shall be made in accordance with "Standard Test Method for Flexural Strength of Concrete" (Using Simple Beam with Center-Point Loading), ASTM Designation C 293.
4. Slump tests shall be made using "Standard Test Method for Slump of Portland Cement Concrete," ASTM Designation C 143.
5. Air content shall be determined for concrete mixes composed of sand, gravel, and stone aggregates by use of "Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method," ASTM Designation C 231. Where slag aggregate is used, the air content shall be determined by the Volumetric Method, ASTM Designation C 173.
6. Should the twenty-eight (28) day strength fall below that specified for the particular class of concrete, the Contractor shall take such action as necessary to assure that the strength is not less than that specified.
7. Acceptance of concrete shall conform to ACI 301, Chapter 17.

F. Concrete Plant

1. Plant equipment and facilities shall be in accordance with applicable requirements of ASTM Designation C 94 and as specified herein.
2. Equipment shall comply with the following requirements:
 - a. The accuracy of the weighing equipment shall conform to the requirements of the United States Bureau of Standards.
 - b. Equipment shall be capable of compensating for the varying weight of moisture contained in the aggregates, or for changing the proportionate batch weights.
 - c. The equipment shall be capable of accurately controlling the weight of the cement and aggregate.
 - d. The equipment shall be so arranged as to permit the convenient removal of overweight material.
 - e. Standard testing weights and other necessary equipment for testing the accuracy of the weighing equipment shall be available at the plant at all times.

3. Plant Inspection

- a. A qualified representative of the testing laboratory shall, as directed by the Engineer, inspect the plant and determine if the necessary facilities and equipment are available and adequate for the scheduled production of concrete as specified.
- b. If the plant does not meet requirements, the Contractor shall be informed of the deficiencies so that they may be corrected.
- c. When, in the opinion of the laboratory representative, the plant meets the requirements for specified production, he shall so notify the Engineer in writing. The notification shall include a list of all major facilities necessary for use in production of specified concrete for use in the Project.

4. Production of concrete shall not be started until the Engineer has approved the plant for use.

G. Mixing and Transporting Concrete

1. Concrete may be mixed in portable mixers located at the job site, in central plant mixers, or in transport mixers. Mixers of all types shall conform to the requirements specified herein.
2. Transit and central plant mixed concrete shall be mixed in approved batch mixers of the rotary drum type having sufficient capacity to assure continuous delivery at the required rate, except that relatively small quantities may be hand mixed with special permission. The mixing drum shall be kept free of set concrete at all times. A water storage tank equipped with a gauge glass and an accurate measuring device shall be provided to determine the exact amount of water added to each batch. The measuring device shall be readily adjustable, and so designed that it can be locked after setting and that the amount of added water cannot be altered after such setting. Mixing shall continue at least one (1) minute at the manufacturer's rated drum speed after water, all aggregate, and cement have been added; and until every particle of aggregate is coated with mortar and the whole mass is uniform in color and homogeneous in texture. The Contractor shall supply a discharge locking device, so designed that concrete cannot be discharged in less than the required mixing time. The mixer also shall be equipped with an alarm that sounds at the end of the mixing time, and with an approved batch meter that will accurately record each batch delivered.
3. Transit mixed concrete shall be mixed completely in truck mixers equipped with the specified water-measuring control and locking device. Each batch of concrete shall be mixed for not less than 70 nor more than 100 revolutions of the drum or blades at the rate of rotation designated by the manufacturer of the equipment as mixing speed. Mixing shall be at the speed designated by the manufacturer of the equipment at their rated capacity. Trucks shall be equipped with counters that register the number of revolutions of the drum or blades.
4. The Contractor shall furnish two (2) delivery tickets with each load containing the following information:
 - a. Date
 - b. Producer and Plant
 - c. Job, name, and location
 - d. Truck number and time dispatched
 - e. Concrete designation and cement type
 - f. Admixture descriptions and contents
 - g. The time discharge was started and completed
 - h. Amount of concrete in load
 - i. Amount of any materials added at the site and authorized signature.

1.03 SUBMITTALS

A. Contractor

1. Plant certification
2. Cement certificate for each shipment
3. Admixture certificate
4. Concrete mix design

- a. Design mix approval
- b. Test results
- c. Sieve analysis of coarse and fine aggregates
- d. Admixtures
- d. Pozzolan admixture, Type F

PART TWO - PRODUCTS

2.01 MATERIALS

A. Cement shall conform to the requirements of ASTM C 150 or ASTM C 595. Types as provided in Table 1.

B. Admixtures

1. Air entrainment admixtures conforming to ASTM Designation C 260 shall be introduced into the mix in quantities to entrain air as follows:

Class A, B & D	5% optimum - allowable variance 1%
Class C	6% optimum - allowable variance 2%

2. Pozzolan admixture shall conform to the requirements of ASTM Designation C 618, Class F.
3. Calcium chloride or admixtures containing more than 0.1% chloride ions are prohibited.
4. High range water reducing admixture (super-plasticizer) may be used as an option by the Contractor, but at no additional cost to the Owner.
 - a. The admixture shall conform to ASTM C494, Type F.

- 1) Approved products are Eucon - 37 by Euclid Chemical Company, Sikament by Sika Chemical Corporation or equal.

C. Fine Aggregate

1. Fine aggregate shall consist of natural sand composed of clean, hard, strong durable, uncoated grains, It shall be free from injurious amounts of shale, clay lumps, soft or flaky particles and other unsound or deleterious substances. It shall conform to Specifications for Concrete Aggregates, ASTM Designation C 33.

D. Coarse Aggregate

1. Coarse aggregate shall consist of gravel, slag, or broken stone composed of strong, hard, clean, durable, uncoated pebbles or rock fragments free from injurious amounts of shale, coal, clay lumps, soft fragments, dirt, glass, and organic or other deleterious substances. It shall conform to Specifications for Concrete Aggregates, ASTM Designation C 33, Size 467, 57 or 67, Class 4S. Slag shall weigh at least 75 lbs/cf.
2. For thin sections, the maximum stone size used shall be reduced when directed. For heavy sections the maximum stone size shall be increased when directed. In both cases, the gradation of other stone sizes shall be modified as directed. Crushed stone and gravel shall be washed if necessary to remove dust, dirt, or loam and if unsatisfactory shall be excluded from the work.

E. Non-shrinking Grout

1. Materials for non-shrink grout shall conform to CRD-C-621 "Corps of Engineers Specifications for Non-Shrink Grout". Approved products are Sauereisen F-100 Grout as manufactured by Sauereisen Cements Co., Pittsburgh, Pennsylvania; Five-Star Grout as manufactured by U.S. Grout Corp., Old Greenwich, Connecticut; Masterflow 713 as manufactured by Master Builders, Cleveland, Ohio and "Euco N-S" by Euclid Chemical Co.

F. Forms for Concrete

1. Forms shall be in accordance with Section 03100 Concrete Formwork and the following:

2. Forms for exposed surfaces shall be of approved material to produce a smooth surface with minimal joint marks.
3. When wood forms are used, they shall be constructed of sound top construction grade western fir or hemlock, or equivalent acceptable lumber, dressed on forming sides and neatly fitted. Joints shall be of quality to produce a smooth surface compatible with the type of finish required.
4. Plywood used for formwork shall be manufactured using waterproof glue made for this type of installation.

G. Concrete Reinforcement

1. Concrete reinforcement shall be in accordance with Section 03200 Concrete Reinforcement.

PART THREE - EXECUTION

3.01 PROPORTIONING

- A. Normal weight concrete shall be designated Class A, B, C or D and be proportioned and mixed to develop not less than the minimum compressive strength shown in Table I. (ACI 301 - Proportioning on the basis of previous field experience or trial mixtures).

TABLE 1 CONCRETE REQUIREMENTS						
Concrete Class	Cement Type	Min. 28-Day Compressive Strength PSI	Maximum Water- Cement Ratio	Minimum Cement Content Sack/CY	Slump Minimum	Max.
A	I	4000	0.45	6 - 1/2	1	4
B	I	2000	0.74	4 - 1/2	2	6
C	I	4000	0.50	6 - 1/2	1	4
D	II or IP	4000	0.45	6 - 1/2	1	4
Note: See paragraph 3.11 herein for the uses of the various classes of cast-in-place concrete.						

B. Water-Cement Ratio

1. Except by special permission of the Engineer, maximum amounts of water (U.S. gallons), including the surface water carried by the fine and coarse aggregates per sack (94 lbs. net) of cement shall be that listed in Table 1. Standard methods shall be used for determination of surface moisture in the aggregates.
2. Concrete of the maximum strength, density, and durability possible with the specified water-cement ratio is required. No increase of these ratios will be permitted.
 - a. Refer to ANSI/ACI 304.2R for placing concrete by pumping methods.
3. Water may be added with the approval of the Engineer, but in no case shall the maximum slump limit be exceeded.

C. Each cubic yard of concrete shall contain the minimum number of sacks (94 lbs. net per sack) of cement listed in Table 1.

1. The minimum amounts of cement listed shall be used regardless of tests and design methods used.

D. Proportions

1. The proportions of aggregate to cement for concrete of the specified water-cement ratio shall be such as to produce concrete that can be puddled readily into the corners and angles of forms and around reinforcement without excessive spading and without segregation of materials or collections of free water on the surface. In no case shall concrete be placed which shows slumps outside the limits listed in Table 1.
2. Consistency of the concrete shall be closely regulated and the proportions of fine and coarse aggregate shall be such as to produce no harshness in placing nor honeycombing in the structures. If required, the mixture shall be modified by changing the relative volume of fine and of coarse aggregate. The Contractor shall cooperate in every way to the end that concrete of the desired quality shall be obtained.

3.02 FORMS FOR CONCRETE

A. Concrete forms shall be in accordance with Section 03100 Concrete Formwork and the following:

B. Erection

1. All walls shall be plumb with level tops; all floors shall be either level or sloped toward a floor drain where provided.
2. Forms for repeated use shall be supplied in numbers to provide for the required rate of progress. Defective forms shall not be used.
3. Forms for all exposed surfaces of ceilings, beams and columns, and of walls of tanks, conduits and buildings shall be constructed of 3/4 inch or 7/8 inch plywood or lined by a method that assures smooth surfaces.

C. Forms shall not be removed until the concrete has attained sufficient strength to assure structural stability under all dead and construction loads, and so that removal can be accomplished without marring concrete surfaces. The determination of when forms may be removed shall take into account temperature and humidity. Formwork that does not support the weight of concrete shall remain in place for at least 24 hours after concrete placement. Formwork supporting the weight of concrete shall remain in place until the concrete has obtained 80% of the specified 28-day strength.

3.03 PLACING CONCRETE

A. Scheduling

1. The Contractor shall notify the Engineer at least twenty-four (24) hours in advance of placing concrete.
2. Concrete shall be placed between the hours of 8:00 A.M. and 6:00 P.M. unless permission is obtained to extend that time. No slab shall be placed after 12:00 Noon on any last working day of the week.
3. Each concrete pour shall be completed in a continuous operation with no interruption in excess of forty-five (45) minutes.
4. No concrete shall be placed after its initial set has occurred, and no re-tempered concrete shall be used under any circumstances.
5. When columns, brackets, or walls are to support beams or slabs, the concrete in the vertical or supporting member shall be deposited up to 1/2 inch above the bottom of the supported member and a period of at least twelve (12) hours shall elapse for settlement before placing concrete in the horizontal member.
6. No concrete shall be placed during rain, sleet, or snow unless adequate protection is provided and approval is obtained. Rainwater shall not be allowed to increase the mixing water nor damage the surface finish.

B. Before placing the concrete, all forms shall be thoroughly cleaned and the space to be occupied by the concrete shall be free from all laitance, silt, dirt, shavings, sawdust, and other debris.

C. Conveying Concrete to Forms

1. The method or device used for conveying the concrete from the mixer to its place in the work shall be such as

to assure against the separation of the materials.

2. Where placing operations involve dropping the concrete more than four (4) feet, it shall be deposited through sheet metal or other approved pipes. These pipes shall be made in sections not to exceed four (4) feet in length.

D. Placing Concrete in Forms

1. Concrete placing shall conform to ACI 304.
2. Concrete shall be deposited at or near its final position and carried up evenly within forms, in layers not exceeding eighteen (18) inches in depth. It shall be thoroughly consolidated around and into contact with forms, reinforcement, pipes, or other shapes built into the work, by spading and vibrating. Voids or pockets of coarse aggregate shall be prevented and the completed work shall be a solid, watertight unit with smooth form surfaces. A sufficient number of workers shall be available at all times to perform the work properly. Control of methods and practices of placing shall be subject to the approval of the Engineer.
3. Where pipe or other shapes are built into the work, the concrete shall be placed from one side only and shall flow under the pipe or shape to the other side until all air is displaced.

3.04 PLACING CONCRETE DURING COLD WEATHER

- A. Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.
- B. When concrete is placed at or below an atmospheric temperature of 40°F, or whenever, in the opinion of the Engineer, the temperature may fall below 40°F within the curing period, the water, aggregate, or both shall be heated and suitable enclosures and heating devices shall be provided.

C. Heating of Materials

1. Heating of mixing water shall be controlled to maintain uniform temperature from batch to batch. In no case shall the water be heated to a temperature greater than 140°F.
2. Aggregate shall be uniformly heated to eliminate all frozen lumps, ice, and snow. However, the aggregate shall not be heated to a temperature of more than 100°F.

D. Placing

1. Concrete shall be placed at a temperature of not less than 50°F. and not more than 75°F. and the air surrounding the forms and deposited concrete shall be maintained within this temperature range for a period of not less than seven (7) days. The enclosures and heating devices shall not be removed at the end of this period until the temperature of the concrete has been permitted to drop, at a rate not to exceed 20°F. per twenty-four (24) hours, to within 20°F. of the atmospheric temperature. Thermometers shall be furnished by the Contractor so that the temperature within the enclosure may be determined.
2. Concrete shall not be placed in contact with materials having a temperature of less than 40°F. If necessary, the forms, reinforcing steel, and foundation materials shall be enclosed and heated before the concrete is placed.
3. The completion of suitable enclosures and the application of heat to bring the air surrounding the forms and deposited concrete to the specified temperature shall follow the placing of concrete as soon as possible.
4. Heaters shall be vented at all times. No products of combustion shall be permitted to come in contact with concrete surfaces before twenty-four (24) hours after finishing.

E. Form Insulation

1. In lieu of heated enclosures, the Contractor may protect concrete in slabs more than twelve (12) inches thick and in walls of structures by the use of insulation, if approved by the Engineer.
2. When form insulation is used, the concrete shall be placed at a temperature of not less than 50°F and not more than 75°F as directed by the Engineer, and maintained by the insulation at a surface temperature of the

concrete of not less than 50°F and not more than 100°F. Sufficient thermometers shall be furnished and installed by the Contractor in such a manner that the surface temperature of the concrete may be readily determined. Whenever the surface temperature as indicated by the thermometer reading exceeds the specified maximum temperature, the forms or insulation shall be loosened or otherwise vented until the surface temperature is within the specified limits. If the thermometer readings indicate that the minimum required temperature is not being maintained, the structure shall be promptly enclosed and heat furnished as required.

3. The insulation material shall be wind and water-resistant. Special precautions shall be taken at edges and corners to insure that such points are adequately protected. The tops of pours shall be protected by a tarpaulin, or other approved waterproof cover over the insulation.
4. At the close of the protection period, the temperature of the concrete within the form shall be gradually decreased, by loosening the forms of insulation to permit a rate of cooling not to exceed 20°F per twenty-four (24), to within 20°F of the atmospheric temperature.

3.05 PLACING CONCRETE DURING HOT WEATHER

- A. When hot weather conditions exist that would seriously impair the quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.
- B. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90°F. Mixing water may be chilled, or chopped ice may be used to control the concrete temperature provided the water equivalent of the ice is calculated to the total amount of mixing water.
- C. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that the steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
- D. Wet forms thoroughly before placing concrete.
- E. Do not use retarding admixtures without the written acceptance of the Engineer.

3.06 JOINTS AND BONDING

- A. Construction joints and expansion joints shall be placed as shown on the Drawings. Approval of the Engineer must be secured for the placing of any construction joints not shown on the Drawings.
- B. Keyways shall be provided in all construction joints. Unless shown otherwise on the Drawings, the width of all keyways shall be 1/3 of the wall or slab thickness by two (2) inches deep.
- C. Horizontal Construction Joints (in walls).
 1. Lower Joint Surface Construction
 - a. Proposed joint surfaces shall be finished straight by use of temporary straight edges tacked to the inside of the form with the lower edges on the line of the joint.
 - b. Keyway shall be formed before the concrete attains its initial set.
 2. Completing Joint
 - a. Within twelve (12) hours after the keyway has been formed, the lower surface of the joint shall be thoroughly cleaned by the use of wire brushes and all laitance and loose material removed so as to expose clean, solid concrete. Care must be taken not to loosen any of the coarse aggregate in the concrete. If for any reason this laitance is not removed within twelve (12) hours after the concrete is placed, it shall be removed using such tools and methods as may be necessary to secure the results specified above.
 - b. After the lower surface has been prepared and immediately before placing concrete above the joint, the lower surface shall be thoroughly wetted and flushed and a bed of mortar composed of one (1) part Portland Cement and two (2) parts sand spread over the entire surface (two (2) inches minimum depth in wall pours). The mortar shall be thoroughly worked into all openings and crevices.

3.07 SURFACE FINISH

- A. Concrete surfaces shall be finished even and reasonably free from imperfections and roughness. Angles shall be true and edges straight.
- B. Patching
 - 1. Upon removal of forms, cavities produced by form ties, honeycomb spots, broken corners or edges, and other defects shall be cleaned, saturated with water, and completely filled, pointed and trued with a mortar mix of cement and fine aggregate of the same proportions used in the concrete being finished. Form tie holes shall be completely filled by use of a pressure gun or by a hand ramming method.
 - 2. On all exposed surfaces, all fins and irregular projections shall be removed with a stone or power grinder, in such a way as to avoid contrasting surface textures. Holes and other areas requiring corrective work shall be coated with neat cement and patched. Except where the surface is to be painted or otherwise covered, sufficient white cement shall be substituted for the regular cement in the patching mortar to produce finished patches of the same color as the surrounding concrete.
- C. General Related to Finishing:
 - 1. After removal of forms, give the concrete surfaces one or more of the finishes specified below where so indicated on the Drawings.
 - 2. Revise the finishes as needed to secure the approval of the Engineer.
 - 3. Concrete surfaces which will be exposed to view in the completed construction shall have a smooth even surface. Repairs shall be made to surface as soon as forms are stripped.
- D. As-Cast Finish:
 - 1. Rough form finish:
 - a. Leave surfaces with the texture imparted by forms, except patch tie holes and defects.
 - b. Remove fins exceeding 1/4" in height.
 - 2. Smooth form finish:
 - a. Coordinate as necessary to secure form construction using smooth, hard, uniform surfaces, with the number of seams kept to a practical minimum and in a uniform and orderly pattern.
 - b. Patch tie holes and defects.
 - c. Remove fins completely.
 - d. Unsightly ridges or lips on exposed concrete shall be removed by tooling and rubbing. All surfaces requiring rubbing shall be thoroughly washed with water after the rubbing is completed. Voids or stone pockets shall be cleaned out and patched. Wires and rods shall be cut off depressed not less than one inch below finished surface. Loose stones and all holes shall be cleaned out and the defects repaired with concrete to a smooth even surface. Holes left by removal of form ties shall be thoroughly and completely filled with patching concrete, as specified under Repairs and Patching. Plastering or cement wash will not be permitted unless otherwise specified in this section.
- E. Finishing Slabs:
 - 1. Definition of Finishing Tolerances:
 - a. "Class A": True plane within 1/8" in ten feet as determined by a ten foot straightedge placed anywhere on the slab in any direction.
 - b. "Class B": True plane within 1/4" in ten feet as determined by a ten foot straightedge placed anywhere on the slab in any direction.

- c. "Class C": True plane within 1/4" in two feet as determined by a two foot straightedge placed anywhere on the slab in any direction.
- 2. Scratched Finish: After the concrete has been placed, consolidated, struck-off, and leveled to a Class C tolerance, roughen the surface with stiff brushes or rakes before the final set.
- 3. Float Finish:
 - a. After the concrete has been placed, consolidated, struck-off, and leveled, do not work the concrete further until ready for floating.
 - b. Begin floating when the water sheen has disappeared and when the surface has stiffened sufficiently to permit the operation.
 - c. During or after the first floating, check the surface plane with a ten-foot straightedge applied at not less than two different angles.
 - d. Cut down high spots and fill low spots, and produce a surface with a Class B tolerance throughout.
 - e. Re-float the slab immediately to a uniform sandy texture.
- 4. Trowel Finish:
 - a. Provide a floated finish as described above, followed by power trowelling and then a hand trowelling.
 - 1. Produce an initial surface which is relatively free from defects, but which still may show some trowel marks.
 - 2. Provide hand trowelling when a ringing sound is produced as the trowel is moved over the surface.
 - 3. Thoroughly consolidate the surface by hand trowelling.
 - 4. Small areas may be entirely hand trowelled.
 - b. Provide a finished surface essentially free from trowel marks, uniform in texture and appearance, and in a plane of Class A tolerance.
 - 1. For concrete on metal deck, Class B plane tolerance is acceptable.
 - 2. On surfaces intended to support floor coverings, use grinding or other means as necessary and remove all defects of such magnitude as would show through the floor coverings.
- 5. Broom Finish:
 - a. Provide a floated finish as described above.
 - b. While the surface is still plastic, provide a textured finish by drawing a fiber bristle broom uniformly over the surface.
 - c. Unless otherwise directed by the Engineer, provide the texturing in one direction only.
 - d. Provide "light", "medium", or "course" texturing as directed by the Engineer or otherwise called for on the Drawings.
- 6. Scratch Finish:
 - a. If a surface is to receive bond-applied cementitious coating, provide a scratch finish.
- 7. Finish Schedule, unless otherwise indicated:
 - a. Building Interiors

Floors, bases, & curbs:	Trowel finish
Other slabs:	Float finish

Exposed formed surfaces: Smooth-rubbed finish
Other formed surfaces: As-cast finish

b. Building Exteriors

Slabs, drives, & walks: Broom finish
Exposed formed surfaces: Smooth-rubbed finish to 6 in. below grade
Other formed surfaces: As-cast finish

c. Pedestrian ramps & exterior steps

Trowel finish (with slip-resistant aggregate applied) landings, platforms, garage floors

d. Tanks and Other Liquid Retaining Structures:

Slabs: Float finish
Interior formed surfaces: Smooth-rubbed down to 6 in. below water line when exposed to view
As-cast finish below water line
Exterior formed surfaces: Smooth-rubbed finish down to 6 in. below finished grade
As-cast finish below finished grade
Other formed surfaces: As-cast finish

F. Concrete floor hardener shall be furnished and applied to all interior exposed concrete floors, unless indicated otherwise on the Drawings. Floor hardener shall be Lapidolith as manufactured by Sonneborn, Inc., Hornolith as manufactured by A.C. Horn, Inc., or equal. Products shall be applied in conformance with the manufacturer's instructions and as specified herewith. The hardener shall be applied diluted with water in the following proportions:

1. First application - 1 part hardener to 2 parts water
2. Second application - 1 part hardener to 1 part water
3. Third application - 2 parts hardener to 1 part water

3.08 CURING OF CONCRETE

A. Curing of concrete shall be in conformance with ACI "Manual of Concrete Practice" Part I ACI 308 and as specified herein.

B. Beginning immediately after placement, concrete shall be protected from premature drying, excessively hot or cold temperatures, and mechanical injury, and shall be maintained with minimal moisture loss and at a relatively constant temperature for the period necessary for hydration of the cement and hardening of the concrete. The Contractor shall provide thermometers as required by the Engineer.

C. Horizontal units such as floor slabs and sidewalks shall be cured in two stages:

1. Initial curing shall begin immediately after concrete finishing is complete and shall be continued for twenty-four (24) hours and shall be in conformance with one of the following methods:
 - a. The concrete shall be covered with two thicknesses of an acceptable woven fabric such as burlap thoroughly saturated with water and shall be maintained in a saturated condition for the specified period. Lap the burlap strips by half widths when placing to give greater moisture retention and aid in preventing displacement of burlap during high wind or heavy rain.
 - b. Ponding of water over the entire surface for the specified period.
 - c. Continuous application of water by means of suitable sprinkling devices for the specified period.
2. Final curing shall last for a minimum of six (6) days and shall employ one of the following methods:
 - a. Continuation of the water curing process employed in the initial curing period.
 - b. An impervious paper or plastic covering, meeting ASTM Specification C 171, placed and maintained in contact with the concrete.

D. Vertical elements such as walls and columns shall be cured in two stages:

1. Initial curing shall begin immediately after the finishing of the concrete or within three (3) hours after placing operations cease. Curing shall consist of covering exposed surfaces with two (2) thicknesses of an approved woven fabric such as burlap, thoroughly saturated with water and maintained in a saturated state by means of a soaker hose placed on top of the burlap. If form work is to be left in place for more than forty-eight (48) hours, the forms should be loosened to assure that water runs down the inside of the forms, to keep the concrete surfaces wet.
2. Upon removal of the wet coverings and formwork used for the initial curing, one of the following methods for final curing may be used:
 - a. Application of a continuous mist spray of water directly on the concrete.
 - b. Application of an impervious paper or plastic covering, meeting ASTM Specifications C 171, directly upon the surface of the concrete.

E. When the mean daily temperature of the surrounding air is less than 40°F., the concrete shall be protected to maintain the temperature of the concrete between 50°F. and 70°F. for the curing period.

F. Curing water shall be approximately the same temperature as the concrete to alleviate temperature-change stresses that could be detrimental to the concrete.

3.09 PROTECTION

A. Free Water

1. Concrete for structures shall not be placed in water, nor shall water be allowed to come into contact with freshly poured concrete until it has attained a sufficient set, except where special permission may have been given to place concrete under water by the Engineer.
2. Water used for cleaning the placing equipment shall be discharged outside the forms.

B. All forms and reinforcing steel, located above the concrete being placed, and all placing equipment shall be kept clean and free of hardened concrete.

C. Aluminum Inserts:

1. All aluminum materials inserted in or in contact with concrete shall have the contact surface coated with bitumastic.

3.10 MUD MATS

A. Where called for on the plans or as directed by the Engineer, the Contractor shall construct concrete mud mats immediately after cleaning the excavation bottom, to preserve the bearing surface condition. Concrete for mud mats shall be not less than three (3) inches thick. Bottom of excavation shall be free of water, mud and loose material prior to mud mat placement.

3.11 CAST-IN-PLACE CONCRETE

A. All reinforced concrete shall be Class A, except as otherwise specified or shown on the Drawings.

B. Concrete used for mud mats, fill and channeling in manholes and chambers shall be Class B unless otherwise noted on the Drawings.

C. Concrete conforming to ODOT Current Edition shall be used for all concrete pavement, curbing, driveways, and sidewalks, unless noted otherwise on the Drawings.

D. Class B concrete may be used for encasing pipelines, fill, and pipe bedding.

E. Where Class B concrete fill is called for an installed in or on structures, the following steps shall be taken:

1. Scrub concrete slabs and/or walls with a stiff wire brush and streams of clean water.

2. Apply a bonding agency with a product name of Euco-Weld as manufactured by Euclid Chemical Company or equal.
 3. The Class B concrete shall then be placed and screeded to bring the surface to final grade.
- F. Class D concrete shall be used for sewerage treatment plants and sewerage pump stations, or as noted on the Drawings.

PART FOUR - SPECIAL PROVISIONS

END OF SECTION

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CONCRETE REINFORCEMENT

PART ONE - GENERAL

1.01 SCOPE

- A. This Item includes furnishing and placing concrete reinforcing steel of the quality, type and size designated including steel dowels.

1.02 STANDARDS

- A. Concrete reinforcement shall conform to requirements of ACI 301, latest edition, "Specifications for Structural Concrete for Buildings", except as modified herein.

1.03 SUBMITTALS FOR ENGINEER'S APPROVAL

- A. The manufacturer shall submit certified results of at least one representative tensile and bending test for each size bar and fabric reinforcement furnished for contracts requiring 10,000 lbs. of reinforcing steel or more, unless otherwise required.

1.04 DELIVERY AND IDENTIFICATION

- A. Reinforcing steel, as delivered to the job site, shall be bound in bundles of either bent or straight bars identified by a numbered weatherproof tag. The tag numbers shall identify the bars corresponding to those shown on the bar lists and placement drawings.
- B. The Engineer shall be given a copy of the weigh bill and invoice for each shipment delivered.

1.05 PROTECTION

- A. All reinforcing steel, metal chairs and supports shall be stored on timber supports above the ground and out of flood areas. It shall be protected from dirt, oil, grease, and rust.

PART TWO - PRODUCTS

2.01 QUALITY AND GRADE

- A. Structures:
 - 1. Bar reinforcement shall be Grade 60 deformed bars meeting the requirements of ASTM A 615 or ASTM A 616.
 - 2. Steel fabric shall conform to "Specification for Fabricated Steel Bar or Rod Mats for Concrete Reinforcement", ASTM A 184, and shall be furnished in flat sheets.
 - 3. Sizes shall be as indicated on the drawings.
- B. Pavements, Curbing and Walks
 - 1. Dowel bars for load transfer joints shall be straight, smooth, round bars conforming to the dimensions shown on the Drawings and shall be shop coated with a suitable rust inhibitor. For expansion joints, the dowel bars shall be fitted with expansion caps.
 - 2. Longitudinal Bulkhead Joint Devices:
 - a. Hooked bolts for mechanically coupled lane tie assemblies shall have a 5/8-inch minimum shank diameter. Each assembly shall have a 24,000 lbs. minimum ultimate tensile strength.
 - b. Self-drilling anchors shall be the flush-end type of the snap-off chuck end type conforming to Federal Specifications No. FF-S-325 Group III, Type 1(a) or (c).

- c. Longitudinal lane ties shall be 5/8-inch minimum diameter deformed reinforcing bars of length to embed fifteen (15) inch minimum into each lane of pavement.
- 3. Reinforcing steel shall be deformed bars conforming to ASTM A 615, A 616, or 617, Grade 60.
- 4. Fabric reinforcement shall conform to ASTM A 184.

2.02 DETAILED DRAWINGS

- A. All detailing, fabrication accessories, and erection of reinforcing steel unless otherwise noted shall conform to the "Manual of Standard Practice for Detailing Reinforced Concrete" (ACI 315).
- B. Laps and splices unless otherwise noted shall conform to "Building Code Requirements for Reinforced Concrete" (ACI 318).

PART THREE - EXECUTION

3.01 PLACEMENT

- A. Reinforcement of the size and shape shown on the approved shop drawings, or as may be directed by the Engineer, shall be placed where indicated on the Drawings or as necessary to carry out the intent of the Drawings and Specifications.
- B. The steel shall not be bent nor straightened in any injurious manner, such as by heating in the field. Bars with kinks or bends not shown on the Drawings shall be rejected.
- C. Reinforcement shall be securely tied at intersections as often as necessary to maintain the bars in their proper position during placement of concrete.
- D. The ends of spliced reinforcing bars shall overlap not less than forty (40) bar diameters unless otherwise shown on the Drawings. The splices in adjacent bars shall be staggered.
- E. No reinforcing bars shall be driven nor forced into concrete after it has obtained its initial set.
- F. Welding of main reinforcing is prohibited.
- G. Before placing concrete in freezing weather, reinforcing bars shall be heated and kept warm to prevent concrete from freezing to the steel.
- H. Reinforcing bars may be moved within allowable tolerance to avoid interference with other reinforcing steel, conduits, other embedded items, or openings.
- I. The clear space between the outside face of reinforcing bars and the surface of concrete shall conform to the following dimensions, except as otherwise shown on the Drawings:
 - 1. Concrete not in contact with earth or water or located over water
 - a. Columns, Beams, and Girders 1-1/2 in.
 - b. Slabs and Walls 3/4 in.
 - c. Wearing Surfaces 1 in.
 - 2. Concrete in contact with or over water
 - a. All Members 2 in.
 - 3. Concrete in contact with earth
 - a. Formed Walls and Columns 2 in.
 - b. Slabs on Ground 3 in.

3.02 SUPPORTS

- A. All supports for reinforcement shall be of adequate strength, of the proper depth and number to securely hold the reinforcement in position while placing the concrete.
- B. Metal supports shall have a shape that is easily enveloped by the concrete.
- C. Metal supports in contact with formwork shall have plastic tips.
- D. Where slabs are placed on forms, only metal supports will be permitted.
- E. Where slabs are to be poured on firm ground or concrete mud mats, reinforcement may be supported by pre-cast concrete blocks or metal supports.
- F. Pre-cast concrete spacer blocks of the required thickness shall be wired to wall and column steel to assure required concrete protection. However, pre-cast concrete spacer blocks will not be permitted where walls or columns will remain exposed after forms are removed.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

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CONCRETE FINISHING AND CURING

PART ONE - GENERAL

1.01 DESCRIPTION

- A. Work included: Provide finishes on cast-in-place concrete as called for on the Drawings, specified herein, and needed for a complete and proper installation.
- B. Summary of PART TWO - PRODUCTS
 - 1. Subsection 2.01: Materials
 - 2. Subsection 2.02: Sealer
 - 3. Subsection 2.03: Waterproofing
 - 4. Subsection 2.04: Other Materials
- C. Summary of PART THREE - EXECUTION
 - 1. Subsection 3.01: Surface Conditions
 - 2. Subsection 3.02: Coordination
 - 3. Subsection 3.03: Installation
 - 4. Subsection 3.04: Finishing of Formed Surfaces
 - 5. Subsection 3.05: Finishing Slabs
 - 6. Subsection 3.06: Curing and Protection
 - 7. Subsection 3.07: Sealing
 - 8. Subsection 3.08: Waterproofing
- D. Related Work
 - 1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions, and sections in Division 1 of these Specifications.
 - 2. Section 03120: Cast-in-Place Concrete

1.02 QUALITY ASSURANCE

- A. Qualifications of Suppliers: Products used in the work of this Section shall be produced by suppliers regularly engaged in the manufacture of similar items and with a history of satisfactory production acceptable to the Engineer.
- B. Qualifications of Installers: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods needed for proper installation of the work in this Section.
- C. Except as may be modified herein or otherwise directed by the Engineer, comply with ACI 301, "Specifications for Structural Concrete for Buildings".

1.03 SUBMITTALS AND SUBSTITUTIONS

- A. Comply with pertinent provisions of Section 01300.
- B. The following product data shall be submitted in accordance with the approved Construction Schedule required in Section 01300 of these Specifications:
 - 1. Manufacturer's recommended installation procedures which, when approved by the Engineer, will become the basis for accepting or rejecting actual installation procedures used on the Work.
 - 2. Test data required elsewhere in this Specification.

1.04 PRODUCT HANDLING

- A. General: Comply with pertinent provisions of Section 01350.

PART TWO - PRODUCTS

2.01 MATERIALS

- A. General:

1. Carefully study the Drawings and these Specifications, and determine the location, extent, and type of required concrete finishes and curing.
2. As required for the Work, provide the following materials, or equals approved in advance by the Engineer.

- B. Concrete Materials:

1. Comply with pertinent provisions of Section 03120, except as may be modified herein.

- C. Curing and Protection Paper or Film:

1. Use waterproof paper or polyethylene film.
2. Approved products:
 - a. "Sisalkraft, Orange Label".
 - b. Equal products, comply with ASTM C171.
3. Where concrete will be exposed and will be subjected to abrasion, such as floor slabs, use non-staining paper such as "Sisalkraft, Seekure 896", or equal paper faced with polyethylene film.

- D. Membrane Type Curing Compound:

1. Use products conforming to ASTM C-309/type 1D/Class A and Fed. Spec. TT-C-800A Type 2/Class. Approved products include the following:
 - a. Maximent floor seal, Set Projects, Inc.
 - b. Masterseal, Master Builders.
 - c. Sealtight CS-309 Acrylic Curing and Sealing Compound, W.R. Meadows, Inc.
 - d. Kure-N-Seal, Sonneborn, Building Products Division.
 - e. "Traz" Sealer, as manufactured by Chem-Masters Corporation, Chagrin Falls, Ohio.
2. Where application of specified finish materials will be inhibited by use of curing agents, cure the surface by water only; do not use chemical cure.

- E. Floor and Deck Sealer with Hardener:

1. Approved products where no floor covering is to be installed:
 - a. Sealtight Cure-Hard Curing and Harding Compound, as manufactured by W.R. Meadows, Elgin, Illinois.
 - b. "Polyseal 4 in 1" Curing and Hardening Compound, as manufactured by Chem-Masters Corporation, Chagrin Falls, Ohio.
2. In areas where floor covering is to be installed, the chemical must be compatible with the adhesives to be used. Liquid curing and sealing agents, as specified above, may be used if shown to be compatible.

- F. Slip-Resistant Abrasive Aggregate:

1. Provide aluminum oxide, 14/36 grading.
2. Acceptable manufacturers:
 - a. Carborundum Company
 - b. Norton Company
 - c. L.M. Schofield Company

2.02 SEALER

- A. The sealer shall be Hydrozo Clear 16 as manufactured by Hydrozo Coatings Company, Lincoln, Nebraska or an approved equal. The sealer shall be an aluminum modified siloxane material containing approximately 6% solids and be applied by an approved applicator as per manufacturer's directions. It shall pass ASTM C67-80 with a repellency rating of 96%. It shall show, in twenty-eight (28) day submersion tests, a repellency rating of 99.55%. When tested for chloride ion resistance, it shall show little or no absorption. When tested per ASTM C672, Scaling Resistance Test, it shall have a rating of "No Scaling" after 40 cycles as compared to untreated concrete that had a rating of "Severe Scaling" after 10 cycles on non-air-entrained concrete. It shall have a Moisture Vapor Transmission Rate, per ASTM C 1653-72, of 52 grams per square foot per twenty-four (24) hours at 25°C.

2.03 WATERPROOFING

- A. The waterproofing Xypex shall be as manufactured by Xypex Chemical Corporation, Richmond, British Columbia, Canada or an approved equal. The waterproofing shall be of the cementitious crystalline type that controls and permanently fixes non-soluble crystalline growth throughout the capillary voids of the concrete. The waterproofing material shall exhibit no leakage when two (2) inches, 2000 psi design samples are tested in conformance with U.S. Army Corps of Engineers' Permeability Specifications CRD C-48-73.
- B. Clear sealers or cement-based compounds which utilize sodium silicate as a "gel" are not acceptable.

2.04 OTHER MATERIALS

- A. Provide other materials, specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer.

PART THREE - EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 COORDINATION

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

3.03 INSTALLATION

- A. Install the work of this Section in strict accordance with the manufacturer's recommendations and shop drawings as approved by the Engineer.
- B. Upon completion of the installation, carefully inspect each component and verify that all items have been installed in their proper location, adequately anchored, and adjusted to achieve optimum operation.

3.04 FINISHING OF FORMED SURFACES

- A. General:
 1. After removal of forms, give the concrete surfaces one or more of the finishes specified below where so

indicated on the Drawings.

2. Revise the finishes as needed to secure the approval of the Engineer.
3. Concrete surfaces which will be exposed to view in the completed construction shall have a smooth even surface. Repairs shall be made to surface as soon as forms are stripped.

B. As-Cast Finish:

1. Rough form finish:
 - a. Leave surfaces with the texture imparted by forms, except patch tie holes and defects.
 - b. Remove fins exceeding 1/4" in height.
2. Smooth form finish:
 - a. Coordinate as necessary to secure form construction using smooth, hard, uniform surfaces, with number of seams kept to a practical minimum and in a uniform and orderly pattern.
 - b. Patch tie holes and defects.
 - c. Remove fins completely.
 - d. Unsightly ridges or lips on exposed concrete shall be removed by tooling and rubbing. All surfaces requiring rubbing shall be thoroughly washed with water after the rubbing is completed. Voids or stone pockets shall be cleaned out and patched. Wires and rods shall be cut off depressed not less than one inch below finished surface. Loose stones and all holes shall be cleaned out and the defects repaired with concrete to a smooth even surface. Holes left by removal of form ties shall be thoroughly and completely filled with patching concrete, as specified under Repairs and Patching. Plastering or cement wash will not be permitted unless otherwise specified in this section.

C. Unspecified Finish: If the finish of formed surfaces is not specifically called out elsewhere in the Contract Documents, provide the following finishes as applicable.

1. Rough form finish:
 - a. For all concrete surfaces not exposed to public view.
2. Smooth form finish:
 - a. For all concrete surfaces exposed to public view.

3.05 FINISHING SLABS

A. Definition of Finishing Tolerances:

1. "Class A": True plane within 1/8" in ten feet as determined by a ten foot straightedge placed anywhere on the slab in any direction.
2. "Class B": True plane within 1/4" in ten feet as determined by a ten foot straightedge placed anywhere on the slab in any direction.
3. "Class C": True plane within 1/4" in two feet as determined by a two foot straightedge placed anywhere on the slab in any direction.

B. Scratched Finish: After the concrete has been placed, consolidated, struck-off, and leveled to a Class C tolerance, roughen the surface with stiff brushes or rakes before the final set.

C. Floated Finish:

1. After the concrete has been placed, consolidated, struck-off, and leveled, do not work the concrete further

until ready for floating.

2. Begin floating when the water sheen has disappeared and when the surface has stiffened sufficiently to permit the operation.
3. During or after the first floating, check the planeness of the surface with a ten-foot straightedge applied at not less than two different angles.
4. Cut down high spots and fill low spots, and produce a surface with a Class B tolerance throughout.
5. Re-float the slab immediately to a uniform sandy texture.

D. Trowelled Finish:

1. Provide a floated finish as described above, followed by a power trowelling and then a hand trowelling.
 - a. Produce an initial surface which is relatively free from defects, but which still may show some trowel marks.
 - b. Provide hand trowelling when a ringing sound is produced as the trowel is moved over the surface.
 - c. Thoroughly consolidate the surface by hand trowelling.
 - d. Small areas may be entirely hand trowelled.
2. Provide a finished surface essentially free from trowel marks, uniform in texture and appearance, and in a plane of Class A tolerance.
 - a. For concrete on metal deck, Class B plane tolerance is acceptable.
 - b. On surfaces intended to support floor coverings, use grinding or other means as necessary and remove all defects of such magnitude as would show through the floor coverings.
 - c. The inside of the chlorine contact tank shall be very carefully trowelled, with a hard smooth finish acceptable to the Engineer.

E. Broom Finish:

1. Provide a floated finish as described above.
2. While the surface is still plastic, provide a textured finish by drawing a fiber bristle broom uniformly over the surface.
3. Unless otherwise directed by the Engineer, provide the texturing in one direction only.
4. Provide "light", "medium", or "course" texturing as directed by the Engineer or otherwise called for on the Drawings.

F. Unspecified Finish: If the finish of slab surfaces is not specifically called for elsewhere in the Contract Documents, provide the following finishes as applicable:

1. Scratch finish:
 - a. For surfaces scheduled to receive bond-applied cementitious applications.
2. Floated finish:
 - a. Only in areas directed.
3. Trowelled finish:
 - a. For floors intended as walking surfaces.
 - b. For floor scheduled to receive floor coverings or waterproof membrane.

- c. For parking areas.
- 4. Non-slip finish (trowelled finished with slip-resistant aggregate applied):
 - a. For exterior platforms, steps, and landings.
 - b. For interior and exterior pedestrian ramps and walks.
 - c. For garage floors.

3.06 CURING AND PROTECTION

- A. Beginning immediately after placement, protect concrete from premature drying, excessively hot and cold temperatures, and mechanical injury.
- B. Preservation of Moisture:
 - 1. All concrete shall be cured in a manner which will prevent loss of moisture from the concrete surface and keep the concrete in a continuously moist condition for at least seven days.
 - 2. Unless otherwise directed by the Engineer, apply one of the following procedures to concrete not in contact with forms, immediately after completion of placement and finishing.
 - a. Ponding or continuous sprinkling.
 - b. Application of absorptive mats or fabric kept continuously wet.
 - c. Application of sand kept continuously wet.
 - d. Continuous application of steam (not exceeding 150°F) or mist spray.
 - e. Application of waterproof sheet materials specified in Part 2 of this Section.
 - f. Application of other moisture retaining covering as approved by the Engineer.
 - g. Application of the curing agent specified in Part 2 of this Section or elsewhere in the Contract Documents.
 - 3. Where forms are exposed to the sun, minimize moisture loss by keeping the forms wet until they can be removed safely.
 - 4. Cure concrete by preserving moisture as specified above for at least seven (7) days.
 - 5. If forms are removed sooner than seven (7) days after placement of concrete, curing shall be continued until at least seven (7) days have elapsed by application of the curing and sealing or curing and hardening compound of type specified in this Section, or as otherwise allowed by the Engineer. No compound shall be used which will adversely affect the application of any coatings, adhesives, waterproofing or damp-proofing or any other finishes indicated for the concrete surface on the Drawings or elsewhere in the Specifications. Any dyes in curing compounds used on exposed concrete must be fugitive-type.
 - 6. Where hardeners are required on a floor, the floors shall be cured and hardened simultaneously as specified in this Section or an Engineer approved equal and compatible with any topping or finish which will be applied to the slab.
 - 7. The Contractor shall make arrangements with the curing and hardening material manufacturer to make available at no cost to the Owner the services of a field representative to clarify to the Contractor the proper application of the products under prevailing job conditions.
- C. Temperature, Wind and Humidity:
 - 1. Cold Weather:
 - a. When the mean daily temperature outdoors is less than 40°F, maintain the temperature of the concrete

between 50°F and 70°F for the required curing period.

- b. When necessary, provide proper and adequate heating system capable of maintaining the required heat without injury due to concentration of heat.
 - c. Do not use combustion heaters during the first 24 hours unless precautions are taken to prevent exposure of the concrete to exhaust gases which contain carbon dioxide.
- 2. Hot Weather: When necessary, provide windbreaks, fog spraying, shading, sprinkling, ponding, or wet covering with a light colored material, applying as quickly as concrete hardening and finishing operations will allow.
 - 3. Rate of Temperature Change: Keep the temperature of the air immediately adjacent to the concrete during and immediately following the curing period as uniform as possible and not exceeding a change of 5°F in any one-hour period, or 50°F in any 24-hour period.
- D. Protection from Mechanical Injury:
- 1. During the curing period, protect the concrete from damaging mechanical disturbances such as heavy shock, load stresses, and excessive vibration.
 - 2. Protect finished concrete surfaces from damage from construction equipment, procedures, rain and running water.
 - 3. Do not load self-supporting structures in such a way as to overstress the concrete.

3.07 SEALING

- A. Unless otherwise specified, all exterior and submerged (extend sealer to two (2) feet above liquid level) cast-in-place concrete which is not painted (Section 09900) or waterproofing (Section 03345, paragraph 3.08) shall be sealed with two (2) coats of the specified sealer, Type "B" Waterproofing in section 03535.
- B. All work shall be done in strict accordance with the manufacturer's printed instructions. The sealer shall be applied with approved equipment and shall be removed from any surfaces not specified to be coated.
- C. All interior concrete floor subject to vehicle traffic shall receive sealer at the rate of 1.5 PSF.

3.08 WATERPROOFING

- A. All below grade exterior concrete walls shall receive two (2) coats of Type "A" Waterproofing as per section 03535. Coverage shall extend to two (2) feet above liquid level.
- B. The construction joints shall receive one (1) coat of Xypex Concentrate on all joint surfaces between pours.
- C. All work shall be done in strict accordance with the manufacturer's printed instructions. The waterproofing shall be applied with approved equipment and shall be removed from any surfaces not specified to be coated.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

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PART ONE - GENERAL

1.01 SCOPE

- A. Under this Item the Contractor shall furnish and apply the waterproofing materials necessary for the protection of concrete surfaces.
- B. These materials shall be designed to protect the concrete surfaces against the penetration of moisture and the disintegrating influences of alkalis, acids, and frost.
- C. Other finishes for concrete surfaces are included in other sections in Division 3 as well as Section 09900 Painting.

1.02 SUBMITTALS

- A. The Contractor shall submit complete descriptive literature from the manufacturer for each type of special waterproofing material he proposes to use. If requested by the Engineer, the Contractor shall submit the manufacturer's complete formula for the special material if different from those mentioned in the specifications, in order that the Engineer may determine that the proposed materials are equal to those specified.

1.03 ENVIRONMENTAL REQUIREMENTS

- A. The Contractor shall comply with manufacturer's recommendations as to environmental conditions under which waterproofing systems can be applied and to all applicable OSHA requirements.
- B. Interior waterproofing may be done only when the building has been thoroughly dried, by natural or artificial heat, and when the work area is properly heated and ventilated, clean, and as nearly dust free as possible. A room temperature of at least 60 degrees F shall be maintained during application and until waterproofing materials are dry.
- C. Face masks shall be used when applying toxic material in enclosed rooms or chambers, regardless of the amount of ventilation provided.
- D. Exterior waterproofing shall not be done during or immediately following rainy or frosty weather or when the temperature is below 50 degrees F or likely to drop below freezing during drying period. The application of treatment while surfaces are exposed to the hot sun, or when the temperature is above 90 degrees F, or likely to be during the drying period, shall be avoided.
- E. Waterproofing material shall not be applied in areas where dust is being generated.

PART TWO - PRODUCTS

2.01 MATERIALS

- A. There shall be two types of waterproofing.
- B. Type A.
 - 1. Type A shall be a bituminous material in a liquid form that is suitable for cold application.
 - 2. It shall be of such a nature as to bond firmly to the concrete surface without the use of primers and to maintain sufficient elasticity to perform its protective function permanently in spite of cracks which develop.
 - a. Concrete surfaces shall be sand blasted in accordance with SSPC-SP7 Brush-off Blast Cleaning.
 - b. Concrete surfaces shall be clean and dry in accordance with ACI 515.
 - 3. In a non-potable water situation, Type A shall be "Super Service Black" by Koppers, "46-465 H.B." by Tnemec; or equal.

C. Type B

1. Type B shall be clear colorless liquid silicone polymer material.
2. It shall not alter the appearances of the surface. It shall penetrate the concrete surface pores and deposit silicones which will retard water absorption by the concrete.
3. Type B shall be "Hydrocide S-X" by Sonneborn, "Dehydratine 22" by A.C. Horn, Inc., or equal.

PART THREE - EXECUTION

3.01 PREPARATION

- A. All surfaces which are to be treated shall be thoroughly cleaned and dried in conformance with manufacturer's recommendations.

3.02 APPLICATION

A. Type A

1. Type A shall be applied to all concrete walls and columns in contact with sewage, sludge, or water from top to bottom; the underside of concrete covers and slabs on tanks and conduits; freeboard to tops of wall and to other surfaces.
 - a. In addition to the above, Type A shall be applied to exterior building walls from the footing to finish grade.
2. Type A shall be applied in two coats. Each coat shall have a coverage rate of 60 to 80 sq. ft. per gallon.

B. Type B

1. Type B shall be applied to all exposed exterior concrete surfaces of new structures above grade to a line 6 in. below finished grade, including adjoining concrete steps and platforms. The Contractor shall use application equipment recommended by the manufacturer.
 - a. Interior concrete shall be treated with two coats as specified below, unless otherwise shown on the Drawing.
2. Type B shall be applied in two coats. Each coat shall have a coverage rate of 80 to 100 sq. ft. per gallon.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

PART ONE - GENERAL

1.01 SECTION INCLUDES

- A. Removal of deteriorated concrete and replacement.
- B. Repair of floor joints.
- C. Crack repair with injected epoxy.
- D. Repair of concrete reinforcement.
- E. Resurfacing concrete.
- F. Placement of anchors.
- G. Repair of Concrete Walkways and Tank Walls at railing posts.

1.02 RELATED SECTIONS

- A. Section 01500 - Quality Requirements, for field quality control testing.
- B. Section 01500- Execution Requirements, for cutting and patching.
- C. Section 03100 - Concrete Forms and Accessories.
- D. Section 03120 - Cast-In-Place Concrete.
- E. Section 03200 - Concrete Reinforcement.

1.03 UNIT PRICES - MEASUREMENT AND PAYMENT

- A. See Section 01011 – Measurement and Payment.
- B. Unit prices include the cost of required field-testing for quality control.
- C. Repair Surfaces: Paid for by the square foot, including surface preparation, repair, and finishing.
- D. Repair Volumes: Paid for by the cubic foot, including removal of deteriorated concrete, preparation, installation and bonding of new concrete and reinforcement, and surface finishing; measured orthogonally to the nearest whole cubic unit.
- E. Repair Cracks: Paid for by the linear foot of crack, measured on surface used for injection.

1.04 REFERENCES

- A. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel; 1996.
- B. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 1995.
- C. ASTM A 307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength; 1994.

- D. ASTM C 321 - Standard Test Method for Bond Strength of Chemical-Resistant Mortars; 1994.
- E. ASTM C 881 - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 1990.
- F. ASTM D 570 - Standard Test Method for Water Absorption of Plastics; 1995.
- G. ASTM D 638 - Standard Test Method for Tensile Properties of Plastics; 1996.
- H. ASTM D 638M - Standard Test Method for Tensile Properties of Plastics (Metric); 1993.
- I. ASTM D 695 - Standard Test Method for Compressive Properties of Rigid Plastics; 1996.
- J. ASTM D 790 - Standard test Methods for Flexural Properties of un-reinforced and reinforced Plastics and Electrical Insulating Materials; 1996a.
- K. ASTM D 790M - Standard test Methods for Flexural properties of un-reinforced and reinforced Plastics and electrical Insulating Materials (Metric); 1993.
- L. AWS D1.4 - Structural Welding Code - Reinforcing Steel; American Welding Society; 1998.

1.05 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Include manufacturer's printed data sheets specifying chemical and physical properties, uses and limitations of use, maintenance instructions, and general recommendations.
- C. Shop Drawings: Provide drawings of formwork and temporary shoring prepared and stamped by a qualified professional engineer retained by the Contractor.
- D. Test Reports: Test results and interpretations prepared by a qualified testing agency.
- E. Project Record Documents: Accurately record locations and types of repairs to structural reinforcement.

1.06 QUALITY ASSURANCE

- A. Perform welding work in accordance with AWS D1.4.
- B. Manufacturer: Provide all bonding, patching, anchoring, and injecting materials by a single manufacturer and provided through a single source.
- C. Installer: Company specializing in operations of the types required for this project, with not less than 5 years of documented experience and approved by the manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver all concrete repair materials to project site in manufacturer's original, unopened containers, clearly labeled.
- B. Comply with manufacturers' instructions for storage and handling, including maximum shelf life limitations.

1.08 ENVIRONMENTAL REQUIREMENTS

- A. Comply with requirements of Section 03120 - Cast-In-Place Concrete, for precautions related to placement of concrete in hot and cold weather.

- B. Comply with temperature limitations and precautions for use recommended by manufacturer of rehabilitation products.

PART TWO - PRODUCTS

2.01 MANUFACTURERS

- A. Provide concrete rehabilitation products as manufactured by Polytite Manufacturing Company; 324 Rindge Avenue, Cambridge, MA 02140-3144. ASD. Telephone: 617-864-0930; fax 617-864-9006; www.polytite.com. or Master Builders, Inc., Cleveland, Ohio

Requests for substitutions will be considered in accordance with provisions of Section 01300.

2.02 EPOXY REPAIR PRODUCTS

A. Anchoring Materials:

- 1. Custom-Packaged, Multi-Use Epoxy: Quick-Kit 1, high modulus, high strength epoxy; complying with ASTM C 881, Type IV, Grade 2, Class B and C; and with properties as follows:
 - a. Pot life: 40 minutes at 77 degrees F (25 degrees C).
 - b. Tensile strength: Minimum 8,900 psi (61 MPa), per ASTM D 638.
 - c. Flexural strength: Minimum 16,000 psi (110 MPa), per ASTM D 790.
 - d. Compressive strength: Minimum 14,000 psi (96.5 MPa), per ASTM D 695.
 - e. Bond strength: Minimum 2,200 psi (15.2 MPa) after 48 hours, per ASTM C 321.
 - f. Elongation: 2.4 percent, per ASTM D 638.

B. Bonding Agents:

- 1. High Modulus, Clear Binding Epoxy: Pebble-Bond high modulus, medium viscosity, moisture insensitive epoxy binder/bonding system; complying with ASTM C 881, Type II, Grade 2, Class B and C; and with properties as follows:
 - a. Pot life: 21 minutes at 77 degrees F (25 degrees C).
 - b. Gel time: 6-8 hours at 77 degrees F (25 degrees C).
 - c. Tensile strength: Minimum 6,000 psi (41.3 MPa), per ASTM D 638.
 - d. Flexural strength: Minimum 7,000 psi (48 MPa), per ASTM D 790.
 - e. Compressive strength: Minimum 6,500 psi (45 MPa), per ASTM D 695.
 - f. Bond strength: Minimum 600 psi (4.1 MPa) after 24 hours, per ASTM C 321.
 - g. Elongation: 22 percent, per ASTM D 638.
- 2. Underwater Injection Epoxy: Underwater-Inject waterproof epoxy resin system; complying with ASTM C 881, Type II, Grade 1, Class B and C; and with properties as follows:
 - a. Pot life: 25 minutes at 77 degrees F (25 degrees C).
 - b. Gel time: 6-8 hours.
 - c. Tensile strength: Minimum 3,000 psi (20.8 MPa), per ASTM D 638.
 - d. Flexural strength: Minimum 1,500 psi (10.4 MPa), per ASTM D 790.
 - e. Compressive strength: Minimum 5,500 psi (38 MPa), per ASTM D 695.
 - f. Bond strength: Minimum 500 psi (3.5 MPa) after 24 hours, per ASTM C 321.
 - g. Elongation: 45 percent.
 - h. Water absorption: Maximum 0.25 percent after 24 hours.

C. Epoxy Gels:

- 1. Pre-Injection Concrete Sealant: Gel-Loc R high modulus, high strength, moisture insensitive epoxy system; complying with ASTM C 881, Type IV, Grade 3, Class B and C; and with properties as follows:

- a. Pot life: 15 minutes at 77 degrees F (25 degrees C).
- b. Gel time: 2-3 hours.
- c. Tensile strength: Minimum 10,000 psi (69 MPa), per ASTM D 638.
- d. Flexural strength: Minimum 12,000 psi (83 MPa), per ASTM D 790.
- e. Compressive strength: Minimum 14,000 psi (96.5 MPa), per ASTM D 695.
- f. Bond strength: Minimum 600 psi (4.1 MPa) after 24 hours, per ASTM C 321.
- g. Elongation: 2 percent.
- h. Water absorption: Maximum 0.1 percent after 24 hours.

D. Injection Resins:

- 1. High Modulus, General Purpose Injection Epoxy: Injection-Loc rigid, high strength, low viscosity epoxy; complying with ASTM C 881, Type IV, Grade 1, Class B and C; and with properties as follows:
 - a. Pot life: 12-15 minutes at 77 degrees F (25 degrees C).
 - b. Gel time: 3 hours.
 - c. Tensile strength: Minimum 10,000 psi (69 MPa), per ASTM D 638.
 - d. Flexural strength: Minimum 13,500 psi (93 MPa), per ASTM D 790.
 - e. Compressive strength: Minimum 12,000 psi (83 MPa), per ASTM D 695.
 - f. Bond strength: Minimum 500 psi (3.5 MPa) after 24 hours, per ASTM C 321.
 - g. Elongation: 2 percent, per ASTM D 638.
 - h. Water absorption: Maximum 0.1 percent after 24 hours.

E. Joint Fillers:

- 1. Fast Setting, Chemical Resistant Epoxy: Flex-Seal fast curing, flexible joint sealer; complying with ASTM C 881, Type III, Grade 3, Class B and C; and with properties as follows:
 - a. Color: Gray gel.
 - b. Viscosity: Flowable gel.
 - c. Pot life: 9 minutes at 77 degrees F (25 degrees C).
 - d. Gel time: 1-2 hours.
 - e. Tensile strength: Minimum 1,600 psi (11 MPa), per ASTM D 638.
 - f. Flexural strength: Minimum 100 psi (689 MPa), per ASTM D 790.
 - g. Compressive strength: Minimum 1,000 psi (6.9 MPa), per ASTM D 695.
 - h. Bond strength: Minimum 250 psi (1.7 MPa) after 24 hours, per ASTM C 321.
 - i. Elongation: 70 percent, per ASTM D 638.
 - j. Water absorption: Maximum 0.35 percent after 24 hours.

2.03 CONCRETE MATERIALS

- A. Concrete: Comply with requirements of Section 03120 - Cast-In-Place Concrete.
- B. Reinforcement Materials: Comply with requirements of Section 03200 - Concrete Reinforcement.
- C. Concrete Formwork: Comply with requirements of Section 03100 - Concrete Forms and Accessories.
- D. Repair Mortar: "EMACO T415" by MBT Protection and Repair, or approved equal.
 - 1. Provide rapid strength, single component, repair mortar that, when air cured, produces the following minimum properties:

- | | | |
|----|---|--|
| a. | Compressive Strength
(ASTM C 109) | 2-hour 2,400 psi (16.5 MPa);
24-hour 6,300 psi (43.4 MPa);
7-day 8,500 psi (58.6 MPa);
28-day 10,000 psi (68.9 MPa) |
| b. | Flexural Strength
(ASTM C 348) | 1-day 850 psi (5.9 MPa);
7-day 1,000 psi (6.9 MPa);
28-day 1,100 psi (7.6 MPa) |
| c. | Split Tensile Strength
(ASTM C 496) | 1-day 750 psi (5.2 MPa);
7-day 1,100 psi (7.6 MPa);
28-day 1,200 psi (8.3 MPa) |
| d. | Slant Shear Bond Strength
(ASTM C 882, modified) | 28-day 2,500 psi (17.2 MPa) minimum |
| e. | Freeze-Thaw Resistance
(ASTM C 666, 300 cycles) | Minimum RDF 85% |
| f. | Abrasion Resistance
(ASTM C 779, 60 minutes) | Maximum 0.030 in. (0.065 cm) |
| g. | Sulfate Resistance
(ASTM C 1012) | 0.15% maximum expansion after 14 weeks |
| h. | ASTM C 928 | Shall meet all current requirements for "Very Rapid Hardening" repair materials. |
- E. Aggregate (ASTM C33): 1/4" to 1/2" Rounded, non-reactive.
- F. Curing Compounds: "Master Kure 200 W" by MBT Protection and Repair, or approved equal.
- G. Miscellaneous Materials:
- Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- Carbon Steel Bolts and Nuts: ASTM A 307, Grade A, galvanized to ASTM A 153/A 153M, Class C, for galvanized structural members.

2.04 MIXES

- A. Epoxy Repair Products:
1. Mix epoxy products in accordance with manufacturer's instructions for intended application and project conditions.
 2. Mix components in clean equipment or containers, conforming to pot life and workability limitations as recommended by manufacturer.
- B. Concrete Mixes: Comply with requirements of Section 03120 - Cast-In-Place Concrete.

PART THREE - EXECUTION

3.01 EXAMINATION

- A. Locate areas to be repaired and mark boundaries using straight lines.

- B. Verify that concrete surfaces are ready to receive work.

3.02 PREPARATION

- A. Protect adjacent areas from damage due to concrete repair and rehabilitation work.
- B. Install temporary supports before beginning concrete removal.
- C. Saw-cut perimeter of areas marked for removal, using perpendicular cuts that go no deeper than cover on reinforcing. Remove loose and deteriorated concrete by breaking up and dislodging from reinforcement.
- D. Remove heavily rusted reinforcement altogether. Remove loose and flaking rust from sound reinforcement by wire brushing or abrasive blast cleaning.
- E. Clean sound concrete surfaces to be repaired using water and wire brush.

3.03 CONCRETE REPLACEMENT

- A. Repair deteriorated reinforcement by welding new bar reinforcement to sound portions of existing reinforcement or by using sleeve splices to obtain stress values not less than originally required.
- B. Apply epoxy-bonding agent to clean concrete surfaces that will receive new concrete, complying with manufacturer's instructions. Pour replacement concrete within limitations of bonding agent, using concrete with properties not less than those required for original work.

3.04 CRACK REPAIR

- A. Flush out cracks and voids with chemical agent or chemical solvent to remove dirt and laitance prior to epoxy injection.
- B. Provide temporary entry ports spaced to accomplish movement of fluids between ports, complying with manufacturer's recommendations. Provide temporary seal at concrete surface to prevent adhesive leakage.
- C. Inject epoxy adhesive into prepared ports under pressure, using equipment appropriate for the particular application. Begin injection at lower entry port and continue until adhesive appears at adjacent entry port; continue from port to port until each crack is filled.
- D. After epoxy adhesive has set, remove temporary seal and excess adhesive. Grind surfaces smooth.

3.05 JOINT FILLER

- A. Install in nonmoving floor joints where indicated.
- B. Install epoxy joint filler to depth recommended by manufacturer, bringing flush to level of adjacent concrete. If necessary, overfill joint and grind off excess when epoxy has cured.

3.06 MORTAR INSTALLATION

- A. Trowel apply epoxy mortar mix to required thickness, tamping into place to fill voids at spalled areas.
- B. For patching honeycomb, trowel mortar onto surface and work into voids, bringing mortar surface flush with surrounding areas. Trowel finish to match.

3.07 REPAIR OF CONCRETE WALKWAYS AND TANK WALLS AT RAILING POSTS

- A. Surface Preparation

1. Mechanically remove unsound concrete to the limits indicated on the drawings.
 2. Remove at least 1/4 in. (6 mm) of existing concrete facing and continue removal as required to expose sound aggregate.
 3. Saw-cut perimeter of the area to be repaired to a minimum depth of 1/4 in. (6 mm). Do not cut existing steel reinforcement.
 4. Where reinforcing steel with active corrosion is encountered, comply with the following:
 - a. Abrasive blast reinforcing steel to remove rust and contaminants to achieve a white metal finish.
 - b. If half of the diameter of the reinforcing steel is exposed, chip out behind the reinforcing to a 1/2 in. (13 mm) minimum depth.
 - c. Splice new reinforcing steel to existing steel where corrosion has depleted the cross-section area by 25%, as directed by the Architect/Engineer.
 5. Thoroughly clean the roughened surface and exposed reinforcement of rust, dirt, loose chips, and dust using high pressure water. Maintain substrate in a saturated, surface-dry condition.
 6. Coat exposed reinforcing steel with EMACO® P22 rebar protection prior to patching.
- B. Aggregate Extension
1. Use neat rapid strength repair mortar for patches less than 1" (25 mm) in depth or width.
 2. For patches deeper than 1 in. (25 mm), extend repair mortar by adding up to 30 lb. (15 kg) of clean, sound, non-reactive, 1/2 in. (13 mm) ASTM C 33 No. 8 hard aggregate to each 55 lb. (25 kg) of "EMACO® T415".
- C. Mixing
1. Comply with rapid strength repair mortar manufacturer's recommendations for water quantity and mixing procedures.
 2. Product shall not require more than 3 minutes of mixing to achieve a flowable mortar meeting the requirements of this specification.
- D. Application
1. Bond Scrub Coat: Apply a bond scrub coat of repair mortar on properly prepared substrate.
 - a. Thoroughly scrub mixed EMACO® T415 into the cleaned, saturated surface with a stiff-bristled brush.
 - b. Apply scrub coat at a rate that will not dry before placement of repair mortar.
 - c. Do not re-temper slurry material if it begins to set.
 2. Apply rapid strength repair mortar in patches of 1/4 in. (6 mm) or greater in depth. Place repair mortar into prepared areas from one side to the other. Work material firmly into the bottom and sides of the patch to assure good bond.
- E. Finishing
1. Level surface of repair mortar using a wooden float, screed, or other suitable device.
 2. Apply final finish when mortar has begun to set.
- F. Curing
1. Air curing is permissible. Moist curing with burlap and plastic sheet for one day or with MASTERKURE® 200W curing compound will optimize ultimate physical properties.

2. Use CONFILM® evaporation reducer as necessary to prevent premature surface drying under severe conditions.

3.08 FIELD QUALITY CONTROL

- A. As specified in Section 01500, perform field inspection and testing.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

DIVISION 4

MASONRY

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SECTION 04200

MASONRY

PART ONE – GENERAL

1.01 SCOPE

- A. This section includes the furnishing of specified masonry units; accessories including wall ties, wall reinforcements, anchors, and similar embedded specialties; equipment, and labor related to the installation of masonry units as necessary for the completion of the work. Masonry includes: Bond Beams; Face Brick; Common Brick; Utility Brick; Structural Glazed Tile; Acoustical Glazed Facing Tile; Concrete Block (load bearing); Concrete Block (non-load bearing); Architectural Concrete Masonry Units; Glazed Concrete Masonry Units; Acoustical Concrete Masonry Units; Glazed Acoustical Concrete Masonry Units; Concrete Brick; Precast Concrete Lintels; Masonry Reinforcements, Joint Materials, Anchors and Ties, Accessories, Grout, and Mortar; and the installation of Glass Units, Dimensioned Cut Stone, and Cast Stone.
- B. Related work specified elsewhere, but not limited to Section 01300 Submittals, Section 01350 Product Requirements and Handling, Section 01410 Testing Laboratory Services, Section 03120 Cast-in-Place Concrete, Section 05100 Structural Steel, Section 06100 Carpentry, Section 07200 Building Insulation, Section 07652 Flexible Flashing, and Section 09900 Painting.
- C. Related products to be installed under this Section, but furnished elsewhere includes: Section 04270 Glass Unit Masonry.

1.02 SUBMITTALS

- A. Submittals shall be in accordance with the requirements of Section 01300 and include the following:
 - 1. Prior to delivery, furnish six copies of the material manufacturer's affidavit or private laboratory tests showing that all masonry units comply with specifications.
 - 2. Present sample units at the job site, for the Engineer's approval, showing the texture and color of face brick, glazed masonry and tile, cut and cast stone, concrete block, and other finished masonry units.
 - 3. Furnish drawings showing placement and anchorage for cut stone and/or other masonry specialties to be included in the construction.
 - a. Furnish catalog sheets showing details of metal wall ties, wall reinforcements, and anchors required.
 - b. Identify brand name, catalog number, and manufacturer.

1.03 QUALITY ASSURANCE

- A. Masonry work shall conform to "Building Code Requirements for Masonry Structures (ACI 530/ASCE 5/TMS 402)".
- B. Certification:
 - 1. Clay masonry shall be tested in accordance with ASTM C67.
 - 2. Concrete masonry shall be tested in accordance with ASTM C140.
- C. Mock-ups:
 - 1. Mock-up panels shall be constructed of each type of masonry wall using proposed materials and procedures. Minimum panel size shall be 4-ft x 4-ft.
 - a. The mock-up panels shall include the selected color and texture, mortar color and tooling, bonding and joints, and reinforcement and ties.

2. Upon acceptance of the mock-up panels, the panels shall establish the standard for acceptance of the project Work.
3. Unless directed otherwise, the panels shall be constructed separate from the work and shall be retained at the job site until all masonry work has been completed and accepted.

1.04 DELIVERY, STORAGE AND HANDLING

- A. All masonry units and accessories shall be protected against adverse physical, environmental, storage, and handling conditions that could cause staining, corrosion, physical harm, or other damage.

1.05 COLD WEATHER PROTECTION

- A. Precondition masonry units and mortar sufficiently with warm water to obtain a mortar temperature of 60°F when laid.
- B. Mixing water shall be between 130°F and 165°F.
- C. The completed masonry shall be protected from rain or snow for a period of 24 hours by non-staining weather-resistant membrane and protected from freezing by use of insulating blankets and auxiliary heat as recommended by the International Masonry Industry All-Weather Council.
- D. The tops of masonry walls shall be protected with covers during the night, inclement weather, or delays during construction.
- E. Do not apply uniform or concentrated loads to newly laid masonry walls or columns for at least 3 days.

1.06 HOT WEATHER PROTECTION

- A. Masonry units shall be wetted periodically with sufficient water to prevent the rapid absorption of moisture from the mortar when laid.
- B. Finished work shall be protected from winds and sun by wet covers for a period of 24 hours.

PART TWO – PRODUCTS

2.01 MATERIALS

- A. Provide masonry units similar in texture and physical properties to the samples approved and stored for inspection at the work site.
- B. Bond beams shall be provided as shown on the Drawings, or as required, and shall consist of load bearing units filled with concrete or grout and reinforced with steel reinforcement. The reinforcement shall be continuous except through expansion joints. Where the bond beam is not broken at the expansion joint, a dummy control joint shall be formed in the bond beam.
- C. Face brick shall be ASTM C216, Grade SW, type FBS. Face brick shall be cored except for soffits, offset bands, and any other location where holes would be visible. In such locations solid brick shall be used. The size of the brick shall be either 2-1/4" x 3-3/4" x 8" or 2-1/4" x 3-5/8" x 7-5/8". Coordinating height shall be 3 courses to 8-inches.
- D. Common brick shall be ASTM C62, Grade MW. Common brick shall be used as backup in all load bearing walls and may be used anywhere that is not visible. The size of the brick shall be either 2-1/4" x 3-3/4" x 8" or 2-1/4" x 3-5/8" x 7-5/8". Coordinating height shall be 3 courses to 8-inches.
- E. Utility brick shall conform to ASTM C216, Grade SW, Type FSB. Nominal dimensions shall be 4" x 4" x 12".
- F. Structural glazed tile shall conform to ASTM C126, Grade S, 6T or 8W Series with vertical cores unless otherwise noted on the Drawings. Three courses of solid masonry units shall be provided under all structural steel beams and bar joists bearing on glazed tile. In general, all external corners, joints, and lintels shall be square, except where shown otherwise. Sills shall be bullnosed. Tile shall be a product of Stark Co.; Burn & Russell Co.; or equal. Colors shall be as indicated in PART FOUR or as selected by the Owner.

- G. Acoustical structural glazed facing tile shall conform to ASTM C126, Grade SS, Type I, 6T Series. Thickness shall be as shown on the Drawings. Colors shall be as indicated in PART FOUR or as selected by the Owner. Units shall have random face perforations and shall be furnished with vermin-resistant, chemically inert, moisture-proof, fiberglass pads, that are factory inserted in the cores.
- H. Concrete block in load bearing walls shall be ASTM C145 Grade N, Type I; or C90, Grade N, Type I. Blocks shall be nominal 8" x 16" by the thickness shown on the Drawings. All block shall be set in running bond with all intersections bonded or keyed with wall ties. Block shall be laid two courses in 16". Block shall be set with cells vertical. Two courses of solid masonry units shall be provided under all roof or beam loads, unless otherwise noted on the drawings.
- I. Concrete block in non-load bearing walls shall be ASTM C90, Grade N, Type I. Blocks shall be nominal 8" x 16" by the thickness shown on the Drawings. All units used in exposed areas shall be of uniform texture with all exposed edges free of chips.
- J. Architectural concrete masonry units shall conform to ASTM C90, Type I, normal weight. Nominal dimensions of shall be 8" x 16" by the thickness shown on the Drawings.
1. Units shall be split-ribbed type with 8 ribs per standard unit.
 2. Units shall contain integral polymer water repellant admixture. Admixture shall be Forrer Industries "Dry-Block Water Repellant Admixture", or equal.
 3. Units shall be integrally colored with mineral oxide pigments. Color shall be as listed in PART FOUR or as selected by Owner from manufacturer's standard colors.
- K. Glazed concrete masonry units shall conform to ASTM C744 and ASTM C90, Type I, normal weight. Nominal dimensions of standard unit shall be 8" x 16" by the thickness shown on the Drawings. Color shall be as listed in PART FOUR, or as selected by Owner from manufacturer's standard colors. Glazing shall be "Spectra Glaze II" as licensed by The Burns & Russell Company, or equal.
- L. Acoustical concrete masonry units shall conform to ASTM C90, Type I, normal weight. Nominal dimensions of standard unit shall be 8" x 16" by the thickness shown on the Drawings.
1. 8" and 12" thick units shall have flared slots, and sequential cavities with metal septa laminated to the back of incombustible fibrous filler in each cavity. Units shall be "Soundblox Type RSC" as licensed by The Proudfoot Co., Inc., or equal.
 2. 4" and 6" thick units shall have flared slots with metal septa laminated to the back of incombustible fibrous filler in each cavity. Units shall be "Soundblox Type R" as licensed by The Proudfoot Co., Inc., or equal.
- M. Glazed acoustical concrete masonry units shall conform to ASTM C744 and ASTM C90, Type I, normal weight. Nominal dimensions of standard units shall be 8" x 16" by the thickness shown on the Drawings. Color shall be as listed in PART FOUR or as selected by the Owner from the manufacturer's standard colors.
1. 8" and 12" units shall have flared slots, and sequential cavities with metal septa laminated to the back of incombustible fibrous filler in each cavity. Units shall be "Soundblox Type RSC" as licensed by The Proudfoot Co., Inc., or equal.
 2. 4" and 6" thick units shall have flared slots with metal septa laminated to the back of incombustible fibrous filler in each cavity. Units shall be "Soundblox Type R" as licensed by The Proudfoot Co., Inc., or equal.
 3. Glazing shall be "Spectra Glaze II" as licensed by The Burns & Russell Company, or equal.
- N. Concrete Brick shall conform to ASTM C55, Type I, Grade N.
- O. Precast concrete lintels shall have an appearance similar to the masonry units in the wall surrounding the lintel. Lintel shall be constructed as shown and shall be marked for proper location and orientation.

2.02 BAR REINFORCEMENT

- A. Reinforcement shall be grade 60 deformed bars conforming to ASTM A615 or ASTM A616 including supplementary requirement S1.
- B. Bars shall be fabricated in conformance with CRSI Manual of Standard Practice.
- C. Reinforcement shall be cold bent, and shall not be bent or straightened in an injurious manner.

2.03 JOINT REINFORCEMENT

- A. Joint reinforcement shall be manufactured with wire conforming to ASTM A82, size number W1.7 (9 gauge). Longitudinal wires shall be deformed in conformance with requirements of ACI 530.1/ASCE 6/TMS 602.
- B. Joint reinforcement shall be fabricated in truss and ladder configurations.
 - 1. Ladder type reinforcement shall have three longitudinal wires. Two wires shall reinforce back-up warp and the third wire shall act as a tie and reinforcement for the facing warp. Cross wires shall be spaced at 15" centers and shall not have moisture drip. Dur-O-Wal "Ladder Type Trirod", AA Wire Products Company "AA510 Tri-Lok", or equal.
 - 2. Truss type reinforcement shall have two longitudinal wires. Cross wire intersections shall be located at 16" maximum centers. Dur-O-Wal "Truss", AA Wire Products Company "AA600 Blok-Truss", or equal.
- C. Corners and intersections shall be factory fabricated.
- D. Joint reinforcements that incorporate adjustable ties are not permitted.
- E. Joint reinforcement shall be hot dip galvanized in accordance with ASTM A153.

2.04 PREMOLDED JOINT MATERIAL

- A. Control joint filler shall be highly compressible extrusion of four connected rubber tubes. Material shall conform to ASTM D1056, Grade 2A1. Williams Products, Inc. "Everlastic Neo-Seal IV", or equal.
- B. Shear keys shall be made of rubber conforming to ASTM D2000, M2AA-805 with minimum durometer hardness of 80 or PVC conforming to ASTM D2287, Type PVC 654-4 with minimum durometer hardness of 85. Material shall be Williams Products, Inc. Dur-O-Wal "Rapid Control Joint Rubber Compound", "Rapid Poly-Joint PVC Compound", or equal.
- C. Expansion joint filler shall be expanded neoprene conforming to ASTM D1056 Grade 2A1. Thickness shall be as shown. Filler shall be Williams Products, Inc. "Williams Neoprene Type NN1, 1040 Series", or equal.
- D. Isolation Gasket shall be expanded PVC conforming to ASTM D1056 Grade 2A1 and ASTM D1667, Grade VE41. Williams Products, Inc. "Williams Vinyl U Gasket, 1000 Series", or equal.

2.05 ANCHORS AND TIES

- A. Dovetail Anchors
 - 1. Dovetail anchor slots shall be minimum 22 gauge mill-galvanized steel. Anchor slot shall be 1" deep x 1" wide with a 5/8" throat and furnished with removable filler.
 - 2. Anchor shall be 12-gauge dovetail, factory assembled to 3/16" thick flexible wire anchor without moisture drip. Anchor shall have mill galvanized finish. Dur-O-Wal "D/A 720", AA Wire Products Company "AA200", or equal.
- B. Flexible anchors shall be 1/4" weld-on wire with 3/16" hot-dip galvanized triangular ties, Dur-O-Wal "D/A 709/710", AA Wire Products Company "AA401", or equal.
- C. Corrugated wall ties shall be 7/8" wide x 20 gauge, mill-galvanized steel. Dur-O-Wal "D/A CWT", AA Wire Products Company "AA311", or equal.

- D. Rigid straps shall be 1-1/4" wide x 1/4" thick x 2'- 0" long, ASTM A36 steel bar formed in a Z-shape with 2" legs.

2.06 ACCESSORIES

- A. Through-wall flashing shall be minimum 5-oz. weight copper sheet permanently bonded between two layers of asphalt coated glass fabric.
- B. Weepholes and brick vents shall be injection molded PVC vents. Williams Products, Inc. "Williams-Goodco Brick Vent", or equal.
- C. Hardware cloth shall be corrosion proof, biologically inert and shall not reduce bond in mortar joint. Dur-O-Wal "Dur-O-Stop", or equal.

2.07 GROUT

- A. Grout shall conform to ASTM C476. Admixtures shall not be used without written permission of Engineer.
- B. Grout shall be proportioned and mixed in accordance with ASTM C476. Minimum compressive strength of grout shall be 2000 psi. Slump shall be between 8" and 11".

2.08 MORTAR

- A. Mortar for load-bearing building walls shall conform to ASTM Specifications for Mortar for Unit Masonry, Designation C270, Type M. Mortar for partitions and non-bearing walls shall conform to ASTM Specification C270, Type N.
- B. Mortar for special use shall follow the same specifications and use either white cement or coloring added to the mortar, as required. When colored block are specified, coloring shall be added to the mortar.
- C. Mortar for underground use shall conform to ASTM Specification Designation C270, type S (A-2), but shall not contain masonry cement.
- D. Materials shall be proportioned by measuring the ingredients thoroughly mixed in a portable drum type mortar mixer or approved other methods. Mixing shall continue until the mortar is uniform in color and consistency.
- E. Only sufficient mortar shall be prepared for immediate use, and any mortar that has set shall not be re-tempered or used in the work.
- F. Setting accelerators or anti-freeze compounds shall not be used.
- G. Masonry cement shall conform to ASTM Designation C91, type II, and shall be a product of the Huron Portland Cement Co., North American Cement Corp., or equal.
- H. Mortar shall be mixed with sand of the type and gradation recommended by the cement manufacturer in proportion to volume of 1 part cement to 3 parts sand.

PART THREE – EXECUTION

3.01 GENERAL

- A. Units shall be laid in a full bed of mortar.
- B. Courses shall be carried up level with no section of wall extended more than 3 ft. above an adjacent section. When specifically permitted or required, in certain locations, courses shall be stepped as directed.
- C. Where brickwork starts on top of concrete walls, the wall shall be plastered with approved roofing cement, and approved through-wall flashing shall be thoroughly bedded in the cement and turned up outside the interior face brick. Brick laying shall then be started.
- D. The coursing of brickwork must be predetermined to assure the proper location of sills, lintels, and similar units, at their proper elevation without the use of half courses or brick pinnars.

- E. Exterior face brick, interior common brick, and backup brick shall be laid in running bond, unless shown otherwise on the Drawings. Glazed tile shall be laid in running bond, except where stacked bond is shown. Horizontal joints in all brickwork shall be such as to permit three courses in 8". Vertical joints shall be 3/8" thick. Metal wall ties shall be used in every third course for bonding. Where wall tie inserts are used in concrete walls, they shall be installed in continuous vertical lines spaced not more than 2'-6" centers and be of galvanized steel. One line of inserts shall be used wherever a brick wall abuts a concrete surface. Other anchors shall be installed at not more than 2'-0" centers. Glazed facing tile shall be bonded to brickwork by horizontal wall reinforcement, spaced not more than 16" vertically.
- F. Interior and exterior joints shall be finished concave, unless otherwise ordered.
- G. Window and doorframes shall be set plumb and true, and securely braced, and joints between brick and frames thoroughly filled.
- H. Control Joints
1. Construct vertical control joints in all brick and concrete masonry unit walls at intervals not exceeding 25'-0" except where otherwise shown on the drawings.
 2. Extend concrete brick or block jambs of all door and window openings vertically as control joints wherever the height of the masonry above or below the opening is less than the opening. Grease end of lintels or wrap with 15 pound roofing felt to permit movement at control joints.
 3. Provide control joints at all junctions of bearing and non-bearing walls. Interrupt wall reinforcing at control joints.
- I. Expansion joints, masonry flashing, flue liners, and other specialties shall be accurately installed as detailed on the Drawings.
- J. Concrete block walls shall have truss design masonry wall reinforcement in every second horizontal joint (16" C.C.) and in each joint (8" C.C.) for two joints above and below all block openings. Reinforcement shall be continuous with 6" laps and bent corners. Extra reinforcement at openings shall be extended 2 ft. beyond each side of opening.
- K. All non-painted masonry walls shall be treated with two coats as specified below, unless otherwise shown on the Drawing.
- Type B:
1. Type B shall be clear colorless liquid silicone polymer material.
 2. It shall not alter the appearances of the surface. It shall penetrate the concrete block surface pores and deposit silicones that will retard water absorption by the block concrete.
 3. Type B shall be "Hydrocide S-X" by Sonneborn, "Dehydratine 22" by A.C. Horn, Inc., or equal.
 4. Each coat shall have a coverage rate of 80 to 100 sq. ft. per gallon.
- L. Structural glazed tile walls shall be provided with a structural glazed tile coved wall base where noted on the Drawings.
- M. Tuck Pointing Procedures - All defective or other joints that require tuck-pointing shall be repaired as follows:
1. Remove mortar to a depth of at least 1/2 inch. If power tools are to be used, care shall be taken to prevent damage to existing brick.
 2. After completion of cutting, remove all loose material with a hose stream.
 3. Carefully select and proportion mortar for tuck-pointing.
 4. Wet joints thoroughly before applying fresh mortar to insure a good bond.

5. Allow water to soak into wall. Do not apply mortar to any surface visibly wet with free-standing water.
6. Pack mortar into joint in thin layers until joint is filled, then tool to a smooth concave surface.

3.02 CUT STONE

- A. Stones shall be squared and full edged with all necessary holes, chases, drips, and openings machine cut. All stones shall be cut to lie on their natural beds
- B. Anchors, supports, fasteners, and other attachments shall be secured to stones and supporting surfaces. Anchors and dowels shall be firmly placed and holes shall be filled with mortar. Pierced flashing shall be resealed.
- C. Stones shall be cleaned before setting using only water or mild cleaning compounds containing no caustics or abrasives. Stones shall be thoroughly drenched with water just before setting.
- D. Stone shall be set in a full bed of mortar. Horizontal bed joints shall be tooled 3/8" thick and match those in the brickwork. Plastic setting pads of same thickness as joint shall be placed under heavy units to prevent squeezing of mortar. Vertical joints shall be as narrow as possible. In every fourth vertical joint of all stone copings and continuous sills, a neoprene control joint meeting ASTM D1056 and C509 shall be provided. Neoprene gasket shall be 1/4" thick and shaped to the profile of the stone section with allowance for 3/8" depth of caulking. After setting, joints shall be raked and mortar smears and splashes shall be removed.
- E. All exposed surfaces of the stone shall be coated with a damp-proofing product. The exposed surfaces shall receive a clear material that does not discolor the stone. Unexposed stone surfaces shall be damp proofed with bituminous paint to within 1" of the exposed surfaces.
- F. Shop drawings shall be submitted to the Engineer showing all stone sizes and methods of anchoring and installing.
- G. After setting, all exposed cut stone surfaces such as projecting ledges, window sills, copings, and other finished stone that may be injured by subsequent operations shall be securely boxed with a non-staining wood for protection. Any damaged stonework shall be removed and replaced. Patching or concealing defects will not be permitted. All stone shall be thoroughly cleaned with soap and water, and all joints shall be carefully pointed with white cement mortar upon completion of the building.
- H. POINTING
 1. Prior to pointing, exposed faces shall be cleaned with fiber brushes, soap powder, and clean water, and shall be rinsed thoroughly.
 2. Joints shall be tooled when mortar is thumbprint hard with rounded jointer having diameter 1/8" larger than width of joint.

3.03 CAST STONE

- A. Cast stone shall be installed in accordance with manufacturing tolerances, procedures, and methods of the Cast Stone Institute.
- B. Cast copings and sills shall be formed within the tolerances given in the Section 03120.
- C. Stones shall be cleaned before setting using only water or mild cleaning compounds containing no caustics or abrasives. Stones shall be thoroughly drenched with water just before setting.
- D. Anchors, supports, fasteners, and other attachments shall be secured to stones and supporting surfaces. Anchors and dowels shall be firmly placed and holes shall be filled with mortar. Pierced flashing shall be resealed.
- E. Cast stone shall be set in a full bed of mortar. Horizontal bed joints shall be 3/8" thick and match those in the brickwork. Plastic setting pads of same thickness as joint shall be placed under heavy units to prevent squeezing of mortar. Vertical joints shall be as narrow as possible. In every fourth vertical joint of all copings and continuous sills, a neoprene control joint meeting ASTM D1056 and C509 shall be provided. The neoprene gasket shall be 1/4" thick and shaped to the profile of the precast concrete section with allowance for 3/8" depth of caulking. After setting, joints shall be raked and mortar smears and splashes shall be removed.

- F. All exposed surfaces of the cast stone shall be coated with a Type B colorless damp-proofing product that does not discolor the stone. Unexposed stone surfaces shall be damp proofed with bituminous paint to within 1" of the exposed surfaces.
- G. Shop drawings shall be submitted to the Engineer showing all stone sizes and methods of anchoring and installing.
- H. After setting, all exposed cast stone surfaces such as projecting ledges, window sills, copings, and other finished stone that may be injured by subsequent operations shall be securely boxed with non-staining wood for protection until their removal is authorized upon completion of the building. Any damaged stonework shall be removed and replaced. Patching or concealing defects will not be permitted. All stone shall be thoroughly cleaned with soap and water, and all joints shall be carefully pointed with white cement mortar.
- I. POINTING
 - 1. Prior to pointing, exposed faces shall be cleaned with fiber brushes, soap powder, and clean water, and shall be rinsed thoroughly.
 - 2. Joints shall be tooled when mortar is thumbprint hard with rounded jointer having diameter 1/8" larger than width of joint.

3.04 GLASS BLOCK

- A. Installation of Glass block shall be in strict accordance with manufacturer's recommendations. In general, the Contractor shall:
 - 1. Remove surplus mortar from the faces of the glass block at the time joints are struck or tooled. Mortar should be removed while it is still plastic using a clean, wet sponge or an ordinary household scrub brush having stiff bristles.
 - 2. Do not use harsh cleaners, acids (of any strength), abrasives or alkaline materials while cleaning glass block. Never use a wire brush to remove mortar from glass block surfaces.
 - 3. Remove mortar residues with a clean, wet sponge or cloth. Rinse sponge or cloth frequently in clean water to remove abrasive particles that could scratch glass surfaces. Allow any remaining film on the block to dry to a powder.
 - 4. After all organic sealants, caulking, and other materials have been applied, remove excess materials with commercial solvents such as xylene, toluene, mineral spirits or naphtha and follow with normal wash and rinse. Be careful not to damage caulking by over-generous application of strong solvents. Comply with solvent manufacturer's directions on label for toxicity and flammability warnings.
 - 5. Final cleaning of glass block panels is accomplished after they are completely installed. Wait until panels are not exposed to direct sunlight. Start at the top of the panel and wash with generous amounts of clean water. Dry all water from the glass block surface. Change cloth frequently to eliminate dried mortar particles or aggregate that could scratch the glass surface. To remove the dry powder from the glass surfaces, use a clean, dry, soft cloth.

3.05 RECESSES AND WALLING-IN WORK

- A. The Contractor shall attend to the walling-in at the proper positions: steel beams, steel columns, bar joists, lintels, window and door frames, anchors, anchor bolts, cutout boxes, electric conduits, downspouts, pipe sleeves, and all similar work. Contractor also shall form all flues, ventilating shafts, leader shafts, recesses, and openings in the walls for the complete performance of the other work of the Project. All aluminum materials inserted into or in contact with masonry shall have the contact surface coated with bitumastic.
- B. Provide weep holes at 32" centers horizontally in mortar joints of face brick enclosing cavity wall construction along the bottom of the cavity over the foundation. Provide a 3/8" nylon wick in the weep holes. The wick shall be cut off flush with the outside face of the masonry and extend to flashing on the cavity side.

3.06 COLD WEATHER PLACEMENT

- A. No masonry units shall be laid in weather below 40°F except by written permission of the Engineer. When such permission is granted, laying shall be in accordance with the recommendations of the International Masonry Industry All-Weather Council.

3.07 PROTECTION

- A. Units shall be protected from mortar droppings and stains.
- B. Sills, projecting belt courses, and other masonry that may be subject to damage shall be protected with non-staining building paper and substantial wood coverings.
- C. Protection shall be maintained until final acceptance of the work.

3.08 CLEANING

- A. Promptly, after completion of masonry work, all joints shall be carefully pointed and surfaces thoroughly cleaned, using dilute muriatic acid and exercising extreme care to prevent acid from contacting concrete work, cut stone, metal sash, or doors.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

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PART ONE – GENERAL

1.01 DESCRIPTION

- A. The Contractor, under this Item, shall furnish and properly install as shown on the Drawings, or as directed, all glass unit masonry required for the Contract.
- B. It is the intent of this Contract that the final installation shall be complete in all respects, and the Contractor will be responsible for all minor details, whether or not shown on the drawings or specifically included in these specifications.

1.02 SECTION INCLUDES

- A. Glass Block Units, hollow or solid
- B. Integral Joint Reinforcement
- C. Mortar

1.03 REFERENCES

- A. ASTM A82-Spec. for Cold Drawn Steel Wire
- B. ASTM A153-Class B-2, Spec. Zinc Coating (Hot dip) on iron and steel hardware (Canada same)
- C. ASTM C144, Spec. for Aggregate for Masonry (Canada - A179-94)
- D. ASTM C150, Spec. for Portland Cement (Canada-CANICSA-A5-93)
- E. ASTM E163, Fire Test of Window Assemblies (equivalent to UL[®] 9 and CAN 4-S106-M80)
- F. ASTM C207, Spec. for Hydrated Lime for Masonry Purposes (Canada same)
- G. ASTM C270, Spec. for Mortar for Unit Masonry (Canada - A179-94)
- H. ASTM D1187, Type II-Spec. for Asphalt-Base Emulsions (For Metal Surfaces)
- I. ASTM D1227, Type III-Spec. for Emulsified Asphalt (For Porous Surfaces)

1.04 SYSTEM DESCRIPTION

- A. Knowledge of the following basic information is essential for proper installation of Pittsburgh Corning Glass Block units, or approved equal:
 - 1. Glass block panels shall not be designed to support structural loads.
 - 2. Maximum deflection of structural members supporting glass block panels shall not exceed L/600.
 - 3. Sills of all panels must be painted with a heavy coat of asphalt emulsion and must dry for two hours before first mortar beds placed.
 - 4. Provision for expansion and movement must be made at jambs and heads of all panels. Mortar must not bridge expansion spaces.
 - 5. Mortar should be mixed and applied in accordance with the recommendations of Pittsburgh Corning Corporation. See Materials.

1.05 SUBMITTALS

A. Product Data

1. Submit two (2) copies of manufacturer's literature and two (2) copies of manufacturer's installation instructions.

B. Samples

1. Submit two (2) glass block units of each type specified showing size, design and pattern of faces.
2. Submit representative samples of (panel reinforcing), (panel anchors), (expansion strips), and (sealant).

C. Test Reports:

1. Fire Tests: Submit documents verifying glass block units are classified for a %, 1 or 1/2-hour fire exposure according to ASTM E163, Underwriters Laboratories of Canada CAN 4-S106-MB0 or Up 9 "Fire Tests of Window Assemblies." All such glass block unit cartons shall carry appropriate UL® labels.

1.06 STORAGE AND PROTECTION

- A. Store unopened cartons of glass block in a clean, cool, dry area.
- B. Protect opened cartons of glass block against windblown rain or water run-off with tarpaulins or plastic covering.

1.07 PROJECT/SITE CONDITIONS

- A. Do not install glass block units when temperature is 40°F (40C) and falling. Maintain the temperature of glass unit masonry above 40°F (4%) for the first 48 hours after construction.

1.08 WARRANTY

- A. Provide minimum 5-year warranty on Glass Block Units.

PART TWO – PRODUCTS

2.01 GLASS BLOCK UNITS

- A. Glass block units, nominally 6 inch x 6 inch x 4 inch thick shall be partially evacuated hollow units made of clear, colorless glass with a polyvinyl butyral edge coating. Pattern type: to be submitted for approval.

2.02 ACCESSORIES

- A. Panel Reinforcing: two parallel 9-gauge wires either 1-5/8 inch or 2 inch on center with electrically butt-welded cross-wires spaced at regular intervals, galvanized after welding.
- B. Panel Anchors: 20 gauge perforated steel strips 24 inches long by 1-3/4 inches wide, hot-dipped galvanized after perforation.
- C. Expansion Strips: made of polyethylene foam with a thickness of 3/8 inch.
- D. Asphalt Emulsion: a water-based asphalt emulsion, by Karnak Chemical Corp. (Karnak 100, 1-800-526-4236), or equal.
- E. Sealant (caulk): non-staining, waterproof mastic, (silicone), (urethane), (_____) type.
- F. Packing (Backer Rods): polyethylene foam, neoprene, fibrous glass or equal as approved by sealant manufacturer.

2.03 MORTAR MATERIALS

- A. Mortar: Type S in accordance with ASTM C270. Mortar shall be 1 part Portland Cement, 1/2 part lime, and sand equal to 2% to 3 times the amount of cementitious material (cement plus lime), all measures by volume. (For exterior glass block panels, an integral type waterproofer should be added to the mortar mix.) No antifreeze compounds or accelerators allowed.
1. Portland Cement: Type 1 in accordance with ASTM C150. If a waterproof Portland Cement is used, the integral type waterproofer shall be omitted. (Masonry Cement is not recommended.) Color: _____
 2. Lime: Type S, in accordance with ASTM C207. Shall be a pressure-hydrated dolomitic lime, provided that not less than 92% of all the active ingredients are completely hydrated.
 3. Sand: A clean, white quartzite or silica type, essentially free of iron compounds, for thin joints, in accordance with ASTM C144, not less than 100% passing a No. 8 sieve.
 4. Integral Type Water-repellent: Stearate type by Sonneborn Building Products (Hydrocide Powder, 1-800-243-6739), or equal. Note: Add hydrocide powder to dry mortar mix. Do not add powder to wet mortar mix.
 5. External Type Waterproofer: Water based silane sealer type by Harris Specialty Chemicals, Inc. (ENVIROSEAL™ 20 or HYDROZO CLEAR 20, 1-800-327-1570). Note: Remove excess sealer from glass surfaces soon after application.

PART THREE – EXECUTION

3.01 PREPARATION

- A. Verify that (channels), (panel anchors) have been provided at head and jambs for the purpose of providing panel support within the opening.
- B. Mix all mortar components to a consistency that is drier than mortar for ordinary masonry. Retempering the mortar after it has taken its initial set shall not be permitted. Do not use antifreeze compounds or accelerators.
- C. Freshly mixed mortar may create skin irritation. Avoid direct contact where possible and wash exposed skin areas promptly with water. If any mortar gets into the eyes, rinse immediately with water and get prompt medical attention.

3.02 INSTALLATION

- A. Cover sill area with a heavy coat of asphalt emulsion. Allow emulsion to dry at least 2 hours before placing mortar.
- B. Where panel anchors are used at jambs and heads in lieu of channel or chase surrounds, install panel anchors in the same joints (16 inches O.C. maximum) where panel reinforcing will be laid. EXCEPT THAT, at panel corners, anchors shall be placed in each mortar joint, both at the jamb and head, 24 inches on each side of the corner. Install panel anchors across head joint spaced 16 inches O.C. maximum.
- C. Adhere expansion strips to jambs and head. Make certain expansion strip extends to sill and covers leg of panel anchor which is attached to jambs and head.
- D. Set a full mortar bed joint, applied to sill.
- E. Set lower course of block. Maintain a uniform joint width of 1/4, to 3/8 inch plus or minus 1/8 inch. All mortar joints must be full and not furrowed. Steel tools must not be used to tap blocks into position. (Place a rubber crutch tip on end of trowel to tap block into position). Do not realign, tap or otherwise move block after initial placement.
- F. Install panel reinforcing every 16 inches O.C. maximum in the horizontal mortar joint and in joints immediately above and below all openings within panels. Run reinforcing continuously from end to end of panels. Lap reinforcing not less than 6 inches whenever it is necessary to use more than one length. NOTE: In corrosive

atmospheres, (i.e. saline air, chlorine air, etc.), the use of stainless steel channels, reinforcing and panel anchors should be considered. Do not bridge expansion joints with reinforcing. Install reinforcing as follows:

1. Place lower half of mortar in bed joint. Do not furrow.
 2. Press panel reinforcing into place.
 3. Cover panel reinforcing with upper half of mortar bed and trowel smooth. Do not furrow.
- G. Place full mortar bed for joints not requiring panel reinforcing-do not furrow. Maintain uniform joint width.
- H. Set succeeding courses of block. Space at head of panel and jambs must remain free of mortar for caulking with sealant.
- I. Use only wooden or rubber tipped tools when tapping glass blocks in place.
- J. Strike joints smooth while mortar is still plastic and before final set. Remove surplus mortar from faces of glass blocks and wipe dry. (See Section 3.03). Tool joints smooth and concave before mortar takes final set. At this time, remove and clean out all excess mortar from jamb, head and other locations.
- K. After final mortar set (approximately 24 hours), install packing tightly between glass block panel and jamb and head construction. Leave space for sealing.
- L. Apply sealant evenly to the full depth of recesses as indicated on the drawings and in accordance with the manufacturer's application manual and instructions.
- M. All exterior glass block panels shall be well sealed to prevent water entry

3.03 CLEANING

- A. Remove surplus mortar from the faces of the glass block at the time joints are struck or tooled. Mortar should be removed while it is still plastic using a clean, wet sponge or an ordinary household scrub brush having stiff bristles.
- B. Do not use harsh cleaners, acids (of any strength), abrasives or alkaline materials while cleaning glass block. Never use a wire brush to remove mortar from glass block surfaces.
- C. Final mortar removal is accomplished with a clean, wet sponge or cloth. Rinse sponge or cloth frequently in clean water to remove abrasive particles that could scratch glass surfaces. Allow any remaining film on the block to dry to a powder.
- D. After all organic sealants, caulking, etc., have been applied, remove excess caulking materials with commercial solvents such as xylene, toluene, mineral spirits or naptha and follow with normal wash and rinse. Be careful not to damage caulking by over-generous application of strong solvents. Comply with solvent manufacturer's directions on label for toxicity and flammability warnings.
- E. Final cleaning of glass block panels is accomplished after they are completely installed. Wait until panels are not exposed to direct sunlight. Start at the top of the panel and wash with generous amounts of clean water. Dry all water from the glass block surface. Change cloth frequently to eliminate dried mortar particles or aggregate that could scratch the glass surface. To remove the dry powder from the glass surfaces, use a clean, dry, soft cloth. For stubborn or hard to remove powder or stains, the use of an "extra fine" steel wool (grades 000 or 0000) is suggested. Try this first in an unobtrusive area.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

DIVISION 5

METALS

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PART ONE - GENERAL

1.01 DESCRIPTION

- A. Work included: provide all aluminum railings complete, in place as shown on the Drawings, specified herein and needed for a complete and proper installation.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions, Division 1 of and all applicable Divisions of the Technical Specifications.

1.02 QUALITY ASSURANCE

- A. Qualifications of Manufacturers: Products used in the work of this Section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of satisfactory production acceptable to the Engineer.
- B. Qualifications of Installers: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods needed for proper installation of the work in this Section.

1.03 SUBMITTALS AND SUBSTITUTIONS

- A. Comply with pertinent provisions of Section 01300.
- B. The following product data shall be submitted in accordance with the approved Construction Schedule required in Section 01300 of these Specifications:
 - 1. Shop Drawings in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this Section with the work of adjacent trades.
 - 2. Manufacturers' recommended installation procedures which, when approved by the Engineer, will become the basis for accepting or rejecting actual installation procedures used on the Work.

1.04 PRODUCT HANDLING

- A. General: Comply with pertinent provisions of Section 01350.

PART TWO - PRODUCTS

2.01 Railing Materials

- A. All rails, posts, formed elbows and ladders shall be formed from 1 1/2 inch schedule 40 aluminum pipe, type 6063. All other aluminum parts, including toe plates, shall be fabricated from 6063 or 6061 extruded aluminum. All blind rivets and self-tapping screws shall be 305 stainless steel. Railings shall be assembled only from components and pipe of the same manufacturer.
- B. All aluminum railing components shall be clear satin anodized finish on all exposed surface.
- C. All fittings, except bases, shall be a one-piece extrusion machined to final shape. Cast bases shall not be used. Blind rivets and self-tapping screws shall be as furnished by the manufacturer.
- D. Guardrails and handrails shall be designed in accordance with OBBC, Article 11, STRUCTURAL LOADS.
- E. Acceptable products:
 - 1. Aluminum railings: ReynoRail II Aluminum pipe railing system as supplied by the Architectural and Building Products Division of Reynolds Metals Company, Richmond, Virginia, or an approved equal.

PART THREE - EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 COORDINATION

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

3.03 INSTALLATION

- A. Install the work of this Section in strict accordance with the manufacturers' recommendations and shop drawings as approved by the Engineer.
- B. Posts shall be a single unspliced pipe length. Lower rails shall be single, unspliced length between posts. Top rails shall be continuous whenever possible, and single, unspliced length shall, where possible, be attached to a minimum of three posts. All fasteners shall be tightened so that completed railing is rigid and completely free of play at all joints and attachments.
- C. All pipe cuts shall be square and accurate for minimum joint-gap. Cuts shall be clean and straight, free of chamfer from deburring, burrs and nicks. All holes shall be drilled and countersunk the proper size, as required for a tight, flush fit of rivets. Where protection is applied for prevention of dissimilar material electrolysis, care shall be taken that none of the protective material is visible when assembly is completed.
- D. Railing post spacing shall not exceed 6'0" on center. Posts shall be set in pockets and filled with quick setting hydraulic cement.
- E. Contractor shall use all precautions necessary to protect the finish from scratches, nicks, gouges, dents, etc., during storage, assembly, and installation.
- F. All components of the aluminum railing in contact with other materials shall be painted with a coating of asphaltic paint to prevent contact between the two surfaces.
- G. For all exterior installations, provisions must be made to drain water from the railing system to prevent damage caused by freezing of entrapped water. Likewise, for interior installations subject to high humidity, provisions must be made to drain water from the railing system. When posts are mounted into concrete or when bends or elbows occur at low points, weep holes of approximately 1/4" minimum diameter must be drilled at the lowest possible elevations.
- H. Expansion joints are to be installed as recommended by the manufacturer to protect aluminum rail from temperature induced stresses. This shall include expansion joints at a spacing not exceeding 24'0". Expansion protections shall be as described in the manufacturer's brochure and in the Installation Details. Both top and bottom rails must have expansion joints when a straight run of railing occurs between two fixed objects.
- I. Upon completion of the installation, carefully inspect each component and verify that all items have been installed in their proper location, adequately anchored, and adjusted to achieve optimum operation.
- J. Installation of railings, where attachment is to be made to horizontal concrete, shall be by grouting the manufacturer's standard or optional mounting post into a hole in the concrete, and attaching the railing, with flange, over the installed post.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

GRATING, STAIRS AND LADDERS

PART ONE - GENERAL

1.01 DESCRIPTION

- A. Work included: Provide all aluminum and steel grating, stair treads and ladders, complete in place as shown on the Drawings, specified herein, and needed for a complete and proper installation.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions, and sections in Division 1 of these Specifications
 - 2. Section 05100: Structural Steel

1.02 QUALITY ASSURANCE

- A. Qualifications of Manufacturers: Products used in the work of this Section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of satisfactory production acceptable to the Engineer.
- B. Qualifications of Installers: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods needed for proper installation of the work in this Section.

1.03 SUBMITTALS AND SUBSTITUTIONS

- A. Comply with pertinent provisions of Section 01300.
- B. The following product data shall be submitted in accordance with the approved Construction Schedule required in Section 01300 of these Specifications:
 - 1. Shop Drawings in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this Section with the work of adjacent trades;
 - 2. Manufacturers' recommended installation procedures which, when approved by the Engineer, will become the basis for accepting or rejecting actual installation procedures used on the Work.
 - 3. Test data required in this Specification.
 - 4. The Engineer may require calculations to be submitted and approved for gratings and ladders, if shop drawings are not conclusive as to the load carrying capacity of the item.

1.04 PRODUCT HANDLING

- A. General: Comply with pertinent provisions of Section 01350.

PART TWO - PRODUCTS

2.01 GRATING MATERIALS

- A. Steel grating (for trench drains in vehicle areas) shall be heavy-duty welded steel type, in sections. Bearing bars shall be 1 1/2" x 1/4", spaced at 1 3/16" c.c., with cross bars at 4" maximum spacing. Grating shall be completely banded with full depth 3/16" or 1/4" edge bands. Banded sections shall be of size that will weigh between 60 and 120 pounds. Steel grating shall be as manufactured by IKG Industries (Gary Grating), Reliance Steel Products, or an approved equal.
- B. Aluminum gratings shall be of the mill finished I-Bar type, with straight parallel "I" shaped bearing bars having top and bottom flanges grooved for slip resistance. Bearing bars shall be spaced at 1 3/16" c.c., and cross bars at 4"

c.c. Aluminum gratings shall meet the following requirements:

1. Bearing bar webs shall be punched to receive the crossbars. Notching, slotting, or cutting the top or bottom flanges of bearing bars to receive cross bars will not be permitted.
2. Cross bars shall be secured to the main bars by a swaging process to prevent turning, twisting, or coming loose.
3. Bearing bars shall be made from aluminum alloy 6063-T6 or 6061-T6.
4. Cross bars shall be made from aluminum alloy 6063-T1 or 6063-T5.
5. Finish shall be standard mill as fabricated.
6. Aluminum 2 1/2" grating shall have a section modulus per foot of width sufficient to carry a uniform loading of 300 pounds per S.F. on a 7'0" span (based on a fiber stress of 12,000 psi).
7. Aluminum 1 1/2" grating shall have a section modulus per foot of width sufficient to carry a uniform loading of 100 pounds per S.F. with a concentrated load of 300 pounds on a 4'0" span (based on a fiber stress of 12,000 psi), with a maximum deflection of 1/4".
8. All gratings shall be banded with edge bands of the depth of the bearing bars, with a band thickness of 3/16" or more. Openings through the gratings with a dimension of 6" or more shall be completely banded. Smaller openings shall be rectangular and must be banded where required to support the area where equipment is located on the gratings. All grating, whether removable or not, shall be attached with no less than two (2) points of connection for each panel on each support. The attachment shall be positive of non-corrosive material, with no portion of the attachment above the top of the grating (saddle clips not permitted). Nor more than one nut and washer, or one bolt and washer, shall be removable at any one connection point (e.g. connection shall not be made with a loose bolt and nut). Removal and replacement of connections shall be such that it can readily be accomplished from the top of the installed grating.
9. The size of removable panel shall be determined by the manufacturer, but shall not exceed 140 pounds in weight.
10. Grating supports shall consist of aluminum angles set and anchored into concrete to provide a smooth, level, 1 1/2" minimum bearing surface, free of burrs, bridging, welds, or other irregularities. Suitable stainless steel anchors shall be provided. All surfaces in contact with concrete shall have a shop coat of heavy unthinned bitumastic paint. Where gratings are to be supported upon structural members, proper fastening devices as recommended by the grating manufacturer shall be provided to anchor the gratings.
11. The aluminum gratings shall be as manufactured by IKG Industries (Gary Grating), Reliance Steel Products, or an approved equal.

2.02 ALUMINUM STAIRS

- A. Stair treads shall be composed of aluminum I-Bar grating materials, and shall have a deep-faced nosing. The nosing shall be grooved and shall also have an applied abrasive material. Treads shall be designed for no less than a concentrated 400 pound loading applied at the center of the span. This loading shall be carried by the nosing and the first two bearing bars. The tread thickness shall be no less than 1-1/2". Treads shall be as manufactured by Reliance Steel Products, or an approved equal.
- B. Aluminum for structural members, plates, tubes, angles, etc., shall conform to the requirements of 6061-T6. Aluminum extrusions shall be 6351-T5 and all aluminum shall be anodized.

2.03 CHECKERED FLOOR PLATES

- A. Checkered floor plates shall be aluminum with raised diamond pattern on the upper surface. Floor plate shall be 1/4" thick and designed to support a uniform load of 200 lbs. per square foot with a deflection of not more than 1/4". Maximum fiber stress shall not exceed that allowed by the Aluminum Association. Reinforcing rib size, depth and spacing is to be determined by the floor plate fabricator. The fabricator of the floor plate shall submit calculations to the engineer for approval. Calculations shall show reinforcing rib size, spacing and weldment if calculations show that ribs are required.

2.04 ABRASIVE TREADS FOR CONCRETE STEPS

- A. Abrasive treads shall be aluminum oxide type bonded to aluminum and shall be as manufactured by Wooster Products, Inc., or an approved equal.

2.05 ALUMINUM LADDER

- A. Ladder shall be TUF Ladder as manufactured by Thompson Fabricating Co. (Birmingham, AL) or approved equal.
- B. Rung Description: The rung shall be designed to provide a non-slip power grip surface with a flat 1" wide serrated top surface and a semicircular bottom. The straight sides and semicircular bottom shall have striations of approximately 5/16" centers for gripping surface. The rung shall be an aluminum extrusion, alloy 6063-T6, of sufficient section modulus and moment of inertia to withstand the design loads.
- C. Side Rail Description: The side rail shall be 1-1/2" Schedule 40 pipe, alloy 6063-T6, 6105-T5 or 6061-T6. Pipe shall conform to ATM-B-429 or ASTM-B-221.
- D. Codes: The ladder shall meet the requirements of ANSI-A14.3.
- E. Design Loads:
 - 1. Ladder rungs shall be designed to withstand a concentrated load of 250 pounds plus 30% impact. Maximum rung deflection shall not exceed L/360. The design load shall be applied at the center of the rung on a 4" wide area.
 - 2. Ladder side rails shall be designed to withstand a minimum live load of two 250 pounds loads plus 30% impact concentrated between any two consecutive attachments.
- F. Testing: Submit test reports for the Engineer's approval to verify design loads and deflections on the rungs and rung to side rail attachments. Testing to be verified by an independent testing laboratory. The design load, 325 lbs. (250x1.3), shall be applied at the center of the rung on an area 4" wide. The test rung will be attached to the side rails in the same manner as the production ladder. Design loads shall be applied and released a minimum of 200,000 times to demonstrate fatigue resistance and a sole extended service life. Deflection shall be checked periodically and shall not exceed L/360 at any time under full design load. All completion of testing the rung and attachments to the side rail shall be inspected for cracks, looseness, distortion, bending (permanent set) or other obvious damage.
- G. Finish: Pipe for side rails shall have the same finish as handrail if the ladder is located at an opening in handrail. Rungs, cage and brackets are to be mill finish.
- H. Guarding Floor and Wall Openings and Holes [OSHA 1910.23(a)(2)]: Every ladderway floor opening or platform shall be guarded by a standard railing with standard toeboard on all exposed sides (except at entrance to opening), with the passage through the railing either provided with a swinging gate or so offset that a person cannot walk directly into the opening. Self-closing gates are required only where shown on plans.

2.06 ALUMINUM LADDER CAGE

- A. Cage general design and size shall be in accordance with ANSI-A-143. The cage shall be shipped knocked-down for field assembly.
- B. The prefabricated horizontal bands shall be aluminum bars, alloy 6061-T6, 3" x 1/4" for the top and bottom bands and 2" x 1/4" for the intermediate bands.
- C. The pre-cut, pre-drilled vertical bars shall be aluminum bars 1-1/2" x 3/16", alloy 6061-T6.
- D. All necessary stainless steel hardware shall be furnished for field assembly of the cage.
- E. Cages are required on ladders where shown on the plans or when length of ladder exceeds 10 feet.

PART THREE - EXECUTION

3.01 SURFACE CONDITIONS

- A. Prior to grating installation, inspect supports for correct size, layout, alignment and verify that surfaces to receive grating are free of debris. Contractor shall correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 COORDINATION

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

3.03 INSTALLATION

- A. Install the work of this Section in strict accordance with the manufacturers' recommendations and shop drawings as approved by the Engineer.
- B. Position grating sections flat, level, true, and free from rack with square ends bearing a minimum 1 1/2" on supporting aluminum angles. Band random cut ends and diagonal or circular cut exposed edges with aluminum bar welded at contact points at the direction of the Engineer.
- C. Anchor grating firmly into position as specified and as recommended by the manufacturer, or as directed by the Engineer.
- D. Install ladders with brackets supplied by the manufacturer, plus expansion bolts into the concrete walls.
- E. Wall step installation shall be as shown and shall comply with OSHA regulations for a fixed ladder.
- F. Upon completion of the installation, carefully inspect each component and verify that all items have been installed in their proper location, adequately anchored, and adjusted to achieve optimum operation.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

PART ONE - GENERAL

1.01 DESCRIPTION

- A. Work Included: The Contractor shall furnish all aluminum shapes, plates, bars, strips, tubes and pipes which are not a part of the structural steel or other metal systems in other Section of these Specifications.
- B. Related Work:
 - 1. Including but not limited to the General Conditions, Supplementary Conditions or General Requirements.
 - 2. All applicable Divisions of the Technical Specifications.

1.02 SUBMITTALS

- A. Shop Drawings
 - 1. The Contractor shall furnish for approval complete shop drawings showing all framed work and all connections to concrete or masonry. He shall also furnish erection drawings.
 - 2. Where the Drawings are diagrammatic, the Contractor shall design the connections using Aluminum Association design and allowable stresses and submit for approval. Where beam reactions are shown on the Drawings, the connections shall be designed to give a capacity at least equal to the reaction shown.
- B. Manufacturer's Materials Certificates
 - 1. If required, the manufacturer or supplier shall furnish certification that materials and shop welding conform to requirements of these Specifications.

PART TWO - PRODUCTS

2.01 MATERIALS

- A. Aluminum for structural members, plates, tubes, angles, etc. shall be 6061-T6.
- B. Aluminum extrusions shall be 6351-T5.
- C. All aluminum shall be anodized.

2.02 PROTECTION

- A. All material shall be kept clean and protected from the weather.

2.03 BOLTS AND NUTS

- A. All stainless steel bolts, washers and nuts shall be Type 316 stainless steel.

2.04 ANCHOR BOLTS AND INSERTS

- A. Anchor bolts and inserts for anchor bolts shall be placed before the concrete is poured. All anchor bolts and nuts shall be stainless steel, unless otherwise shown on the drawings. Galvanized bolts will not be permitted.
- B. Where permitted by the Engineer, the Contractor may use wedge type expanding anchors or adhesive anchors placed in pre-drilled holes. However, well in advance of pouring concrete he shall submit for the Engineer's

approval, drawings, information, and specifications showing the alternatives that will meet the requirements of the work.

- C. Connections to existing structures shall be made using approved expanding wedge type anchors or adhesive anchors in pre-drilled holes.
- D. Self-drilling anchors and powder-activated fasteners will not be permitted except where specified or shown on the Drawings.
- E. Where adhesive anchors are indicated on the Drawings, only that type shall be used.

PART THREE - EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 COORDINATION

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

3.03 FABRICATION

- A. Provide loose bearing plates for aluminum items bearing on masonry or concrete construction, made flat, free from warps or twists, and of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required.
 - 1. Direct contact between aluminum components and concrete or mortar shall be prevented by painting exposed aluminum surfaces with bituminous paint or water with methacrylate lacquer.
- B. Miscellaneous framing and supports
 - 1. Provide miscellaneous aluminum framing and supports as required to complete the work.
 - 2. Fabricate miscellaneous units to the sizes, shapes and profiles shown or, if not shown, of the required dimensions to receive adjacent grating, plates, doors or other work to be retained by the framing. Except as otherwise shown, fabricate from aluminum shapes and plates and aluminum bars, of all welded construction using mitered corners, welded brackets and splice plates and a minimum number of joints for field connection.

3.04 INSTALLATION

- A. Install the work of this Section in strict accordance with the manufacturer's recommendations and shop drawings as approved by the Engineer.
- B. Setting Loose Bearing Plates
 - 1. Clean concrete and masonry bearing surfaces of any bond-reducing materials, and roughen to improve bond to surfaces. Clean the bottom surface of bearing plates.
 - 2. Set loose bearing plates on wedges, or other adjustable devices. After items have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims, but if protruding, cut off flush with the edge of the bearing plate before packing with mortar.
 - 3. Pack bedding mortar solidly between bearing surfaces and plates to insure that no voids remain.

- C. Provide anchorage devices and fasteners where necessary for securing miscellaneous metal items to in-place construction.
- D. Cutting, Fitting and Placement
 - 1. Perform cutting, drilling and fitting required for installation of the miscellaneous metal items. Set the work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in framework for items which are to be built into concrete, masonry or similar construction.
 - 2. Fit exposed connections accurately together to form tight hairline joints. Weld those connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind joints smooth.
- D. Stainless steel fasteners shall be installed where indicated on the Drawings or as required.
- E. Contact surfaces between aluminum members and areas adjacent to washers and welds shall be free of dirt, oil, loose scale, burrs, pits, and other defects that would prevent seating of the parts.
- F. Where welded construction is shown, ordered, or permitted by the Engineer, welding shall be performed in accordance with the American Welding Society "Structural Welding Code," D1.1, latest edition.
- G. Upon completion of the installation, carefully inspect each component and verify that all items have been installed in their proper location, adequately anchored, and adjusted to achieve optimum operation.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

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DIVISION 6

WOODS AND PLASTICS

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PART ONE - GENERAL

1.01 DESCRIPTION

- A. Work included: Provide all wood, nails, bolts, screws, framing, anchors, and other rough hardware, and all other items needed for rough and finished carpentry in the work but not specifically described in other Sections of these Specifications.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions, and sections in Division 1 of these Specifications.
 - 2. Section 06100: Carpentry
 - 3. Section 06200: Fabricated Wood Trusses

1.02 QUALITY ASSURANCE

- A. Qualifications of Manufacturers: Products used in the work of this Section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of satisfactory production acceptable to the Engineer.
- B. Qualifications of Installers: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods needed for proper installation of the work in this Section.
- C. Standards: Comply with all pertinent codes and regulations, and with the standards listed in this Section as described in Item 21 of the General Requirements.
- D. Conflicting requirements: In the event of conflict between pertinent codes and regulations and the requirements of the referenced standards of these Specifications, the provisions of the more stringent shall govern.

1.03 SUBMITTALS AND SUBSTITUTIONS

- A. Comply with pertinent provisions of Section 01300.
- B. The following product data shall be submitted in accordance with the approved Construction Schedule required in Section 01300 of these specifications:
 - 1. Test data required elsewhere in this Specification.

1.04 PRODUCT HANDLING

- A. General: Comply with pertinent provisions of Section 01350.
- B. Protection: Identify all framing lumber as to grades, and store all grades separately from other grades.
- C. Materials shall be kept dry at all times. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber and plywood, and provide air circulation within stacks.

PART TWO - PRODUCTS

2.01 GRADE STAMPS

- A. Framing Lumber: Identify all framing lumber by the grade stamp of the West Coast Lumber Inspection Bureau, or other approved agency.
- B. Plywood: Identify all plywood as to species, grade, and glue type by the stamp of the American Plywood Association.
- C. Other: Identify all other materials of this Section by the appropriate stamp of the agency listed in the reference standards, or by such other means as are approved by the Engineer.

2.02 MATERIALS

- A. Nominal sizes are indicated, except as shown by detailed dimensions. Provide actual sizes as required. Lumber to be dressed, S4S, unless otherwise indicated, with 19% maximum moisture content at time of dressing. (Except Treated Lumber).
- B. All materials, unless otherwise specifically approved in advance by the Engineer, shall meet or exceed the following:

<u>Item</u>	<u>Description</u>
Horizontal and vertical framing:	Douglas Fir No. 2 grade (pressure treated where required or shown).
Plywood sheathing:	Exterior grade plywood (pressure treated where required).
Wood preservative:	Pentachlorophenol
Steel hardware:	ASTM A7 or A36 (use galvanized at exterior locations).
Machine bolts:	ASTM A307
Lag bolts:	Fed. Spec. FF-B-561
Nails:	Common (except as noted), Fed. Spec. FF-N-1-1 (use galvanized at exterior locations).

- C. Where lumber or plywood is indicated as "Treated", or is specified herein to be treated, comply with applicable requirements of The American Wood Preserver's Association (AWPA) Standards and of the American Wood Preserver's Bureau (AWPB) Standards listed below. Mark each treated item with the AWPB Quality Mark Requirements.
 1. Lumber shall be pressure-treated in accordance with AWPA C2 with pentachlorophenol as required for ground contact (0.4 pounds per cubic foot minimum).
 2. Plywood shall be pressure-treated in accordance with AWPC C9 with pentachlorophenol as required for above ground exposure.
 3. Treated lumber and plywood shall be certified by the preservative treater as complying with the treating, drying, retention and penetration requirements of the AWPB Standard and shall be appropriately marked attesting to such compliance. After treatment, kiln-dry to a maximum moisture content of 15%. Plywood shall be APA grade-trademarked C-D grade or better, and shall be manufactured with exterior glue.
 4. Pressure treat all indicated wood and the following:
 - a. Wood cants, nailers, curbs, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers and waterproofing.
 - b. Wood sills, sleepers, blocking, furring, stripping and similar concealed members in contact with masonry or concrete.
 5. Inspect each piece of treated lumber or plywood after drying and discard damaged or defective pieces.

2.03 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer.
- B. Fasteners and anchorages shall be provided in sizes, types, materials, and finishes as indicated and as recommended by applicable standards, complying with applicable Federal Specifications. Provide metal framing anchors of the size and type recommended by the manufacturer for each use, including recommended nails.

PART THREE - EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.02 COORDINATION

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

3.03 INSTALLATION

- A. Install the work of this Section in strict accordance with the manufacturer's recommendations and shop drawings as approved by the Engineer.
- B. Upon completion of the installation, carefully inspect each component and verify that all items have been installed in their proper location, adequately anchored, and adjusted to achieve optimum operation.

3.04 DELIVERIES

- A. Stockpiling: Stockpile all materials sufficiently in advance of need to ensure their availability in a timely manner for this work.
- B. Delivery schedule: Make as many trips to the job site as are necessary to deliver all materials of this Section in a timely manner to ensure orderly progress of the total work.

3.05 COMPLIANCE

- A. Do not permit materials not complying with the provisions of this Section of these Specifications to be brought onto or to be stored at the job site. Immediately remove from the job site all non-complying materials and replace them with materials meeting the requirements of this Section.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

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SECTION 06020

GYPSUM DRYWALL

PART ONE - GENERAL

1.01 SCOPE

- A. The Contractor shall furnish all labor, material, tools, services, etc., required to complete the installation of all interior drywall partitions and walls as indicated on drawings.
- B. In general, this item includes the following:
 - 1. Gypsum Drywall
 - 2. Metal and Vinyl Accessories
 - 3. Ceiling Suspension Systems
- C. Related work:
 - 1. The General Conditions, Supplementary Conditions, and applicable Provisions of Division 1 are hereby made a part of this Section as fully as if repeated herein.
 - 2. Section 06100: Carpentry
 - 3. Section 08105, 08106: Doors and Frames
 - 4. Section 08500: Metal Windows
 - 5. Section 09900: Painting

PART TWO - PRODUCTS

2.01 MATERIALS

- A. Materials specified herein are as manufactured by USG Products, or an approved equal. Equivalent materials manufactured by National Gypsum Company, Celotex Corp. or Georgia Pacific are acceptable.
- B. All interior drywall shall be 1/2" thick with tapered edges, 1/2" x 48" x 8'0" sheets.
- C. Drywall at exterior walls shall be foil-backed panels 1/2" thick.
- D. Moisture resistant board shall be used as the subsurface for ceramic tile and high moisture areas.
- E. Joint treatment shall include:
 - 1. Perforated tape. (Perf-A-Tape Joint System or an approved equal)
 - 2. Joint compound shall be powdered or ready mix.
 - 3. Topping Compound.
 - 4. Provide type of fastenings as recommended by wallboard manufacturer.
- F. Use NO. 100 Perf-A-Beat metal corner reinforcement for all vertical and horizontal external corners. Use No. 200B metal trim where drywall abuts a wall, sill, or etc.

- G. For stud walls use U.S.G., Gold Bond or Donn Products 22 gauge metal studs 3 5/8" and 1 5/8" where shown on 16" o.c. complete with floor and ceiling attachment for ceiling intersection at roof.
- H. Access Floors - Metal, 12' x 16" size.
- I. All materials and workmanship shall conform to the American Standard Association Specification current issue.
- J. Casing beads where drywall meets a non-drywall and vinyl casing beads where drywall meets window sash.

PART THREE - EXECUTION

3.01 INSTALLATION

- A. Meet requirements of ANSI A97.1 "Application and Finishing of Wallboard" and ANSI A97.1 "Installation of Steel Framing Members" except as modified by details. Comply with drywall manufacturers printed instructions.
- B. Wall Furring - Drywall hat shaped furring channels, 24" o.c. applied vertically, direct or bracketed.
- C. Metal Studding Not Otherwise Indicated:
 - 1. 3 5/8" or 6" metal studs 16" o.c., or as indicated. Set bottom runners in 2 continuous beads of acoustical sealant and set top runner against underside of structure above or braced to structure above.
 - 2. Bridging and cross-bracing to be 1 1/2" channels, fastened horizontally at 4' o.c. maximum.
 - 3. Door and similar openings are to be full height double studs in box fashion.
- D. Cut wallboard by scoring and breaking or by sawing. Work from face side. Scribe wallboard to fit abutting surfaces.
- E. Install wallboard with long edge parallel to supporting members. Use longest pieces practicable. Stagger joints on opposite sides of a wall. Provide support for all edges.
- F. Butt joints loosely over supports. Sand edges that have been cut. Cut neatly around outlet boxes and switches. Drive fasteners to slightly dimple surface but not to break paper.
- G. All walls and ceilings, unless otherwise noted, shall be as per manufacturers' specifications for the installation of gypsum wallboard on ceiling suspension, metal studs and furring, including taping at joints, internal corners and etc., all as required for a complete job. Also note the Gypsum Association Codes as previously described must also be followed.

In addition, the installation and application of all materials shall be in accordance with the latest printed directions of the manufacturer.

- H. All materials and workmanship shall conform to the American Standard Association Specification current issue.
- I. Temporary heat will be furnished if possible, from the time drywall installation starts until building is completed, but the Sub-contractor shall be responsible for protection of gypsum wallboard and in emergency cases, where necessary to prevent freezing or other damage, he shall furnish salamanders where necessary to reinforce and conceal all joints between gypsum wallboard panels, corner reinforcement, both vertical and horizontal.
- J. Perf-A-Tape Joint System
 - 1. Unless otherwise indicated, all drywall walls, partitions and ceilings noted to receive a finish such as paint, paneling, fabric, wall covering, or etc., are to receive a taped joint surfacing necessary to reinforce and conceal all joints between gypsum wallboard panels, corner reinforcement, both vertical and horizontal.

3.03 CLEAN UP

- A. After completion of work, leave area free of unused materials and clean.

Adjust - After all other mechanics have finished their work and just prior to painting and finishing work, point up all drywall work, as required, for a properly finished job.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

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SECTION 06100

CARPENTRY

PART ONE - GENERAL

1.01 DESCRIPTION

- A. Work included: Install all wood framing, sheathing, and related work, as indicated on the Drawings or required for a complete and operable facility.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions, and sections in Division 1 of these Specifications.

1.02 QUALITY ASSURANCE

- A. Qualifications of Manufacturers: Products used in the work of this Section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of satisfactory production acceptable to the Engineer.
- B. Qualifications of Installers: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods needed for proper installation of the work in this Section.

1.03 SUBMITTALS AND SUBSTITUTIONS

- A. Comply with pertinent provisions of Section 01300.
- B. Keep all materials clearly identified with all grade marks legible. Keep all damaged material clearly identified as damaged, and store separately to prevent its inadvertent use.

PART TWO - PRODUCTS

NOT USED

PART THREE - EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.02 COORDINATION

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

3.03 INSTALLATION

- A. Install the work of this Section in strict accordance with the manufacturer's recommendations and shop drawings as approved by the Engineer.
- B. Upon completion of the installation, carefully inspect each component and verify that all items have been installed in their proper location, adequately anchored, and adjusted to achieve optimum operation.

3.04 WORKMANSHIP

- A. General: All work shall be done by skilled craftsmen, and installations shall be full compliance with the drawings and specifications, and shall be neat, plumb, and straight with tight joints in accordance with accepted good

construction procedures, and in accordance with all pertinent codes and regulations.

B. Selection of lumber pieces:

1. Carefully select all members. Select individual pieces so that knots and obvious defects will not interfere with placing bolts or proper nailing or making connections.
2. Cut out and discard all defects which will render a piece unable to serve its intended function. Lumber may be rejected by the Engineer, whether or not it has been installed, for excessive warp, twist, bow, crook, mildew, fungus, or mold, as well as for improper cutting and fitting.

C. Shimming: Do not shim sills, joists, short studs, trimmers, headers, lintels, or other framing components.

3.05 TREATED LUMBER

- A. General: Use only treated lumber for all wood in, or in contact with, concrete, for all wood for fascia support systems on masonry buildings, and wherever otherwise shown on the Drawings.

3.06 GENERAL FRAMING

A. General:

1. In addition to all framing operations normal to fabrication and erection indicated on the Drawings, install all backing required for work of other trades.
2. Set all horizontal or sloped members with crown up.
3. Do not notch, bore or cut members for pipes, ducts, conduits, or other reasons except as shown on the Drawings or as specifically approved in advance by the Engineer.
4. When framing is not detailed, the contractor shall comply with the recommendation of the "Manual for House Framing", of the National Forest Products Association. Structural members shall not be spliced between supports, except as detailed or approved.

B. Bearings:

1. Make all bearings full unless otherwise indicated on the Drawings.
2. Finish all bearing surfaces on which structural members are to rest so as to give sure and even support. Where framing members slope, cut or notch the ends as required to give uniform bearing surface.

3.07 BLOCKING

- A. Install all blocking required to support all items of finish and to cut off all concealed draft openings, both vertical and horizontal.

3.08 NAILING

- A. All nailing shall meet or exceed the requirements of the "Recommended Nailing Schedule" as listed in the current ICC International Building Code.

3.09 INSTALLATION OF PLYWOOD

A. Placement:

1. Place all plywood with face grain perpendicular to support and continuously over at least two supports, except where otherwise specifically indicated on the Drawings.
2. Center joints accurately over supports. Unless otherwise specifically shown on the Drawings, stagger the end joints of plywood panels to achieve a minimum of continuity of joints.

- B. Protection of Plywood: Protect all plywood from moisture by use of all required waterproof coverings until the plywood has in turn been covered with the next succeeding component or finish.

3.10 FASTENING

A. Nailing:

1. Use only common wire nails or spikes except where otherwise called for on the Drawings.
2. Provide penetration into the piece receiving the point of not less than 1/2 the length of the nail or spike provided, however, that 16d nails may be used to connect two pieces of two inch nominal thickness.

B. Bolting: Drill holes 1/16 inch larger in diameter than the bolts being used. Drill straight and true from one side only. Bolt threads shall not bear on wood. Use washers under head and nut where both bear on wood; use washers under all nuts.

C. Screws: For lag screws and wood screws, pre-bore holes same diameter as root of thread; enlarge holes to shank diameter for length of shank. Screw, do not drive, all lag screws and wood screws.

3.11 CLEANING UP

A. General: Keep the premises in a neat, safe, and orderly condition at all times during execution of this portion of the work, free from accumulation of sawdust, cut ends and debris.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

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DIVISION 8

DOORS AND WINDOWS

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PART ONE - GENERAL

1.01 SCOPE

- A. The Contractor, under this Item, shall furnish and properly install as shown on the Drawings, or as directed, all doors and frames required for the buildings included in this Contract.
- B. In general, the work under this Item shall include doors and frames, together with all other items as required, shown on the Contract Drawings, and/or as required by job conditions, including but not limited to:
 - 1. Aluminum Doors
 - 2. Aluminum Metal Frames
- C. Related Work
 - 1. The General Conditions, Supplementary Conditions and applicable Provisions of Division 1 are hereby made a part of this Section as fully as specified herein.

1.02 SUBMITTALS

- A. Shop Drawings and Submittals
 - 1. Submit for your approval, four copies of shop drawings showing topical construction, dimensions, finish etc. for all items, indicating all installation details, method of attachment etc., and a schedule listing the location for each opening.
 - 2. Where the work is not fully explained by drawings and/or specifications, the Contractor shall, before the execution of the work, submit for approval a detailed working drawing and description of same. The Engineer shall be at liberty to alter or amend if described is not of material, size, arrangement or workmanship best adapted for the purpose.
 - 3. Submit plastic laminate samples for approval by Engineer.
 - 4. Corner assembly of each type door and frame to be used on the project.
 - 5. Samples shall be clearly identified as to location and type of finish.

1.03 QUALITY ASSURANCE

- A. For purposes of designating type and quality for work under this Item, drawings and specifications are based on products manufactured or furnished by manufacturers listed under various sections of Item.
- B. Source - Products for use in this Item shall be of one manufacturer unless specifically shown otherwise.
- C. Erector - The erector shall be approved by the manufacturer.
- D. Comply with the current specifications of the following applicable standards:
 - 1. American Society for Testing & Materials (ASTM).
 - 2. U.S. Commercial Standards.
- E. In addition to other requirements as indicated herein, fabricate materials and components of door units to withstand the anticipated traffic as follows for the life of the building (40 years), with normal maintenance:

1. Building entrances: 50 open/close cycles per day.
2. Wind loading: Fabricate exterior door and frame units to withstand the wind pressure loading shown or, if not shown, 20 lbs. per sq. ft. on the gross areas of the frames, doors, panels, and glass, acting inward and also acting outward.

PART TWO - PRODUCTS

2.01 MATERIALS

A. Aluminum Doors and Frames

1. Flush doors shall be as manufactured by Special-Lite, Inc., Decatur, Michigan. Construction details of similar products not fully meeting these specifications shall be submitted for approvals before bidding.
2. Flush doors shall be 1-3/4" thick and constructed of aluminum alloy rails and stiles, joined with steel tie rods, and have an inner core consisting of foamed-in-place urethane.
3. Aluminum alloy rails to be extruded 6063 T5, with a minimum wall thickness of 1/8".
4. Stiles to be tubular shape to accept hardware as specified.
5. Top and bottom rails to be extruded with legs for interlocking "rigidity weather bar". Face sheets to be locked in with extruded interlocking edges. No snap on trim will be accepted.
6. Joinery to be 3/8" tie rods, top and bottom, bolted through an extruded spline and 3/16" riveted reinforcing angels, and secured with aircraft type nuts.
7. Core to be urethane foam of 5 pounds per cubic foot density. All doors to be properly reinforced for hardware before urethane core is foamed in door.
8. Door face sheets to be backed with 1/8" tempered hardboard for added impact reinforcement.
9. Door face sheets to be E-5 pattern of 5005 alloy, .064" thick or fiberglass reinforced polyester, 0.120" thick
10. Meeting stiles on pairs of doors to be fitted with two-part rotary astragal consisting of fixed blade and rotating gear. Blade and gear shall interlock when doors are closed, preventing insertion of any object between doors.
11. All doors shall be pre-machined in accordance with appropriate templates. For surface applied blade, doors shall have necessary reinforcement including the attachment of Rivnut blind fasteners for bolting.
12. All hardware for aluminum doors to be supplied by door manufacturer.
13. Doors shall be packaged in individual corrugated cartons. Doors shall be "floated" within cartons, with no portion of door or attached hardware to be in contact with outer corrugated shell.
14. Doors to be supplied with Model SL-11, continuous gear-hinge, as manufactured by Select Products Limited. The continuous gear-hinge shall be manufactured from extruded 6063, T-6 aluminum alloy with polyacetal thrust bearings. The hinge finish shall be the same as the doorframe. Stainless Steel flush screws shall be used to fasten hinge to the door and frame.

B. Door Hardware

1. All doors shall be mortised and reinforced for hinges and locks to allow field application. Hinge reinforcement shall be a minimum No. 14 U.S. gauge steel, die-formed to provide screw thread depth equivalent to No. 10 U.S. gauge steel for 1-3/4" doors and of No. 16 gauge steel for 1-3/8" doors. All hinge accommodations shall be preformed as an internal part of the continuous vertical member forming

the periphery of the unitized grid. The back-up reinforcement of hinges and lock shall be die-formed to extend no less than five (5) inches into the interior and shall join the parallel inner vertical member of the grid structure to insure a uniform distribution of torque and stresses created by operation of the door. Inserted plate-type reinforcement shall not be allowed as an acceptable method of door suspension. All doors shall be provided with built-in closer reinforcement.

C. Door Accessories

1. Door lights shall be provided as indicated on the drawings. Door lights shall be designed for glazing up to 1/4 in. thick.

D. Door Frames

1. Door frames shall be tubular extrusions of 6063 T5 Aluminum Alloy with a minimum 0.125" wall thickness. Size of framing members shall be 1.75" X 4".

E. Frame Accessories

1. Frames shall have 9 gauge steel hinge tap plate reinforcement projection welded with provisions for 4-1/2 in. x 4-1/2 in. full mortise template type hinges and 14 gauge steel strike tap plate reinforcement, extruded, and formed to the equivalent of 10 gauge projection welded.
2. Frames shall be provided for 1-1/2 pairs of hinges. Mortar guards of 26-gauge steel formed to a 1 in. depth shall be welded on. Sleeve type closer reinforcement shall be 12-gauge and furnished loose for installation in frame header when required according to the Door Schedule included in the Drawings.

F. Frames shall be rigidly attached to masonry, wood, or steel construction with masonry or stud anchors.

1. Each frame to be installed in wood or steel stud walls shall be provided with eight stud anchors.
2. Each frame to be installed in masonry walls shall be provided with six masonry anchors.
3. All anchors shall be furnished loose for field installation. All frames shall be furnished with an integral or welded-on sill anchor.

G. All doors and frames shall be thoroughly cleaned and phosphatized to inhibit corrosion and to increase the durability of the primer. One coat of baked-on universal primer shall be applied to all doors and frames.

PART FOUR – SPECIAL PROVISIONS

- A. Door face sheets shall be seamless fiberglass reinforced polyester, 0.120" in thickness with a pebble-like embossed finish. Color chosen by owner from standard options.
- B. Door hardware shall be corrosion resistant and lockable, keyed alike with 3 sets of keys provided to owner.

END OF SECTION

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PART ONE - GENERAL

1.01 DESCRIPTION

- A. This Item includes the furnishing of rolling service doors equal to those supplied by Overhead Door Corporation; or equal and installed complete and ready for service as shown on the Drawings and described in this Item.
- B. Each rolling service door shall be furnished complete with a curtain, hood, guides, gears, weather-stripping, safety strip, and all other accessories required for satisfactory operation.
- C. The erector of the doors shall be approved by the manufacturer.

1.02 SUBMITTALS

- A. Shop Drawings
 - 1. Submit shop drawings for approval in accordance with the General Requirements.
 - 2. Drawings shall show the following:
 - a. Complete elevations of doors, framing, and operators.
 - b. Details of anchorage to openings.
 - c. Details of construction, finishes, method of assembling section, location, and installation of hardware.
 - d. Size, shape and thickness of materials; points and connections; and details of jointing to other work.
 - e. Manufacturer's certificate of conformance with Specifications.
- B. Samples
 - 1. Samples of finish and frame corner construction shall be submitted to the Engineer for approval.
 - 2. Samples shall be clearly identified as to location and type of finish.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and handle rolling service doors and accessories in a manner to prevent damage and deterioration.
- B. Provide packaging of individual doors inside heavy paper wrappings and enclosed within cardboard containers.
- C. Store doors upright in a protected dry area at least 1 inch or more off the ground or floor and at least 1/4 inch between adjacent pieces.

PART TWO - PRODUCTS

2.01 EQUIPMENT

- A. General
 - 1. The dimensions of the rolling service doors to be as shown on the Drawings.
- B. Doors

1. The door curtain shall be of interlocking slats, formed in easy curves without sharp bends from aluminum.
2. Slates to be of sufficient section to provide curtain strength adequate to safely resist a wind load of 20 lbs. per sq. ft.
3. Ends of slats shall be provided with end locks with integral slat lugs as windsocks, which engage bars and lock the curtain in the guides. Bottom bar to be two aluminum angles.
4. The curtain to be coiled on a pipe or barrel of size sufficient to carry the door load with a deflection not to exceed 0.03 inch per feet of opening width. The door shall be evenly counterbalanced by helical springs contained in pipe. All springs shall be anchored to the same tension rod and held in position by the same adjusting wheel accessible from the outside.
5. The coil brackets shall be of high-grade iron or precision formed plate designed to house the ends of the coils and support counterbalance assembly.
6. The coil shall be housed in a minimum 24-gauge aluminum hood.
7. The gears shall be high-grade gray iron, cast teeth machine molded from machine-cut patterns.
8. The guides shall be built of structural aluminum angles to form a slot of sufficient depth to retain curtain in guides against heavy wind pressure. Guides shall be provided with wind lock bars.
9. Guides and hood shall be weather-stripped to prevent air passage.

PART THREE - EXECUTION

3.01 INSTALLATION OF FRAMES

- A. Set frames to maintain scheduled dimensions, hold head level, and set jambs plumb and square.
- B. Secure anchorages and provide connections to adjacent construction.

3.02 INSTALLATION OF DOORS

- A. Comply with manufacturer's instructions for installation of door hardware, operators, and other components.
- B. Adjust so doors operate smoothly and fit properly when closed.
- C. Adjust and lubricate locks and operators.
- D. Clean surfaces and remove protective tape and excess caulking sealants.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

DIVISION 9

FINISHES

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PART ONE - GENERAL

1.01 SCOPE

- A. Under this Item, the Contractor shall furnish all materials, equipment, and labor, and apply adequate protective coatings to all surfaces specified to be treated.
- B. In general, the work shall include the field painting of all exposed metal surfaces, except galvanized metal, aluminum, bronze, stainless steel, and shop finished surfaces; of interior exposed concrete, cement block, and gypsum board surface above ground floor or when otherwise specified; of all exposed wood surfaces; and of all exposed surfaces of pipe and pipe insulation.
- C. Cleaning and preparation of the surfaces to be painted and, where required, application of seal coat or prime coat are included under this Item.
- D. Mechanical equipment and similar items which have been specified with baked-on enamel or porcelain finish or similar finish standard with manufacturer shall not require field painting. Any injury or damage to such finished surface on new equipment prior to final acceptance of the work shall be remedied before final acceptance.
- E. Examine specifications for other trades relative to painting and paint of finish all exposed surfaces that are left unfinished by requirements of other sections.

PART TWO - PRODUCTS

2.01 MATERIALS

- A. Prepared Paint - Ready-mixed paint as manufactured by Pratt & Lambert, Inc.; The Sherwin Williams Company; The Glidden Company; Benjamin Moore & Company; The O'Brien Corporation; Pittsburgh Plate Glass Company; or approved equal. Deliver materials unopened in original containers bearing manufacturer's printed labels denoting quality and brand.
- B. Raw or Boiled Linseed Oil - Equal to the Federal Specification for that material.
- C. Turpentine - Best quality spirits of turpentine.

1.03 COLORS

- A. Paint colors will be selected by the Engineer.
- B. Before any painting work is done, the Engineer will furnish the Contractor with a set of color cards and a color schedule, showing locations of various colors. Prepare samples at the job as required until colors and textures are approved for application.

1.04 GENERAL REQUIREMENTS

- A. Number of coats and type of paint for various purposes are indicated on the Painting Schedule.
- B. Do not reduce or change painting materials except as specified by the manufacturer of the materials.
- C. Do not start work without accepting the surfaces to be finished as being suitable for first class work. Neutralize all masonry and concrete surfaces before applying painting materials.
- D. Paint grilles, registers, piping, etc., to match adjacent walls.
- E. Do not paint aluminum, copper, brass, bronze and other non-ferrous metal unless specifically designated.

PART THREE - EXECUTION

3.01 PREPARATION OF SURFACES

- A. Wood - Sandpaper to smooth even surface and then dust off. After priming coat has been applied, thoroughly fill

nail and other holes and cracks with plastic wood or putty.

- B. Steel and Iron - Remove grease, rust, scale, welding flux and dust, and touch-up any chipped or abraded places on items that have been shop coated. Where steel and iron have a heavy coating of scale, remove by a wire brushing or sand blasting as necessary to produce a satisfactory surface for painting.
- C. Galvanized Metal - thoroughly clean with gasoline and allow to dry. Prime the metal with a top quality alkyd resin metallic zinc primer made expressly for these surfaces.
- D. General - before painting, remove hardware, accessories, plates, lighting fixtures and similar items, or provide ample protection of such items. Upon completion of each space, replace above items. When necessary, disconnect heating units to permit painting of walls behind them; replace and reconnect upon completion. Use only competent mechanics for removing and connecting above items.

3.01 APPLICATION

- A. Do not apply paint or varnish when the temperature is below 50 Degrees F.
- B. Employ only competent mechanics on the job. Allow coats to dry thoroughly before applying succeeding coats. Spread materials evenly and flow on smoothly without runs or sags.
- C. Protect all finish work of other trades from damage from painting operations with suitable covering or other means. Leave all work in clean orderly condition.

3.02 PAINTING SCHEDULE

- A. Brand names specified are Pratt & Lambert. Equivalent materials by other specified manufacturers will be acceptable.
- B. Exterior:
 - 1. Pre-Primed Metal - Paint all abraded surfaces and touch-up with same paint as shop coat. Then paint all surfaces two finish coats as follows:
Second and Third Coats - Effecto Enamel
 - 2. Un-Primed Metal
First Coat - Effecto Rust Inhibiting Primer
Second and Third Coats - Effecto Enamel
- C. Interior:
 - 1. Concrete Block Walls:
2 Coats: B73W00111 - Waterbased Tile-Clad® Epoxy (Part A) Extra White/Tint Base
 - 2. Gypsum Drywall:
First Coat – Prohide Plus P.V.A. Latex Wall Primer
Second and Third Coat p Prohide Plus Latex Satin Enamel
 - 3. Woodwork, Painted Finish:
First Coat – Interior Trim Primer
Second and Third Coat – Prohide Plus Latex Satin Enamel
 - 4. Structural Steel and Pre-Primed Metal – Paint all abraded surfaces and touch-up in field with same paint as shop coat. Then paint all surfaces two finish coats as follows;
Second and Third Coats – Effecto Enamel
 - 5. Covered Pipes:
First Coat – Prohide Plus P.V.A. Latex Wall Primer
Second and Third Coats – Same as adjoining surfaces

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

BREATHEABLE SLIP RESISTANT FLOORING SYSTEM

Part One – General

1.01 Work Included

- A. Furnish necessary material, labor, and equipment required to prepare designated areas and install a Breathable Slip Resistant Flooring System.

1.02 Related Work

- A. Drawings and general provisions of contract including General and Special Conditions and Division I, excepting special Submittal and Quality Assurance provisions in this section.

1.03 Quality Assurance

A. Manufacturer's Qualifications

- 1. Obtain Breathable Non-Slip Flooring System materials from a single manufacturer with a minimum of 5 years verifiable experience providing materials of the type specified in this section.

B. Contractor's Qualifications

- 1. Installation must be performed by a manufacturer approved contractor with skilled mechanics having not less than three years satisfactory experience in the installation of the type of system as specified in this section, and must be approved in writing by the manufacturer of the Breathable Slip Resistant Flooring System.

C. Floor System Thickness Verification

- 1. At the owner's discretion and under his supervision the contractor shall take 2 1" random cores per 1,000 sq. ft. through the system into the substrate to verify proper system thickness. Cored areas less than specified thickness shall be removed and replaced or increased in thickness by the installing contractor, in a manner that does not affect the performance or integrity of the system. Cored areas that comply with the recommended system thickness shall be built-up to match the surrounding surface elevation prior to applying the seal coat(s). Cores taken and patched will be noticeable, therefore, cores should be taken from areas where aesthetics are less critical.

1.04 Warranty

- A. The contractor and the manufacturer shall furnish a standard guarantee of the Breathable Slip Resistant Flooring System for a period of one year after installation. The labor and material guarantee shall include loss of bond and wear-through to the concrete substrate from normal use.
- B. Not included in the warranty are damage due to structural design deficiencies including but not limited to slab cracking from lateral, vertical or rotational movement, and gouging or other damage due to fork lifts, other equipment, delamination caused by vapor transmission, Acts of God, or other elements beyond the scope of protection of this system nor causes not related to the system materials.
- C. In case of a warranty claim, the owner will notify the manufacturer and contractor in writing within 30 days of the first appearance of problems covered under this warranty. The owner will provide free and unencumbered access to the area during normal working hours for warranty rework. Property protection is also the owner's responsibility. Remedy is limited to direct repair of the Breathable Slip Resistant Flooring System.

1.05 Submittal

- A. System Data

1. Submit manufacturer's specifications on cured system and individual components of the Breatheable Slip Resistant Flooring System, including physical properties and performance properties and tests described in part 2.01 B and submit Material Safety Data Sheets. Each individual component of the system will be evaluated on the basis of these standards. For any tests not listed in the manufacturer's standard nationally published data, the manufacturer must supply the missing data accompanied by the independent testing laboratory's test results which prove compliance in accordance with the referenced standard(s). Furnish 3 sets of this information. Manufacturer's standard color chart shall also be submitted and must afford the owner color selection from at least 1 standard colors and computerized custom color matching shall be available upon request. Furnish 2 sets of this information.
 - B. The contractor shall submit a 6" x 6" cured system sample which the contractor has made for verification purposes and finish texture approval.
 - C. Contractor Experience
 1. The contractor shall furnish a list of projects using either specified material or equivalent that they have installed during the last 5 years. Information shall include: project name, square footage, owner, contact name with owner's address and phone number. Also, the contractor shall furnish résumés detailing the experience of key project personnel including supervisors and mechanics.
 - D. It is the intention of this Section to provide the products as named. Substitutions will be considered only when received by the Architect, Engineer or Design Professional through a bidding Prime Contractor at least ten days prior to the date set for receipt of bids. Upon receipt of any such submission, the Architect, Engineer or Design Professional will determine whether or not the proposed product is an equal. In the event the Architect, Engineer or Design Professional determines that a proposed system is an approved equal, he will issue an addendum and notify all bidders at least 48 hours prior to receipt of bids. No substitutions will be considered after contract bid date.
 - E. The contractor shall submit a copy of the manufacturer's packing slip, tagged for this specific job, along with calculations, signed by an officer of the primary material supplier demonstrating that the quantity of material furnished for the project will achieve the specified coverage and mil thickness.
- 1.06 Material Delivery, Handling and Storage
- A. Primary system materials shall be delivered in the manufacturer's undamaged, unopened containers. Each container shall be clearly marked with the following:
 1. Product name(s) and/or number(s)
 2. Manufacturer's name
 3. Component designation (A, B, etc.)
 4. Product Mix Ratio
 5. Health and Safety Information
 6. CHEMTREC Emergency Response Information
 - B. Provide equipment and personnel to handle the materials by methods which prevent damage.
 - C. The contractor shall promptly inspect direct jobsite material deliveries to assure that quantities are correct, comply with requirements and are not damaged.
 - D. The contractor shall be responsible for materials furnished by him, and he shall replace, at his own expense, such materials that are found to be defective in manufacture or that have become damaged in transit, handling or storage.
 - E. Store material(s) in accordance with manufacturer's instructions, with seals and labels intact and legible. Maintain temperatures within the required range. Do not use materials which exceed the manufacturer's maximum recommended shelf life.
- 1.07 Job Conditions

- A. The contractor shall visit the jobsite prior to beginning the installation of the Breatheable Slip Resistant Flooring System to evaluate substrate condition, including substrate moisture content, and the extent of repairs required, if any. Concrete substrates shall be tested to verify that the moisture content of the substrate does not exceed Breatheable Slip Resistant Flooring System manufacturers' recommendations.
- B. The contractor should exercise care during surface preparation and system installation to protect surrounding substrates and surfaces, as well as in-place equipment. The contractor shall prepare the substrate to remove laitance and open the surface. This shall be achieved by light brush grit blasting. Surface profile achieved shall be similar to medium grit sandpaper and free from bond-inhibiting contaminants. Costs incurred that are associated with damage from negligence or inadequate protection shall be the sole responsibility of the contractor.
- D. System must be protected by the General Contractor or, as a separate bid item, by the installing contractor until it is inspected and turned over to the owner.
- E. The minimum slab temperature must be conditioned to 40°F before commencing installation, during installation, and for at least 72 hours after installation is complete.
- F. Maintain lighting at a minimum uniform level of 50 or more foot-candles in areas where the Breatheable Slip Resistant Flooring System is being installed. It is the recommendation of the manufacturer that the permanent lighting be in place and working during the installation.
- G. Leaks from pipes and other sources must be corrected prior to the installation of the Breatheable Slip Resistant Flooring System

Part Two - Products

2.01 Materials

- A. System Overview
 - 1. The General Polymers FasTop Ceramic Carpet Flooring System as manufactured by Sherwin-Williams consists of 4050 Binder Resin, with 5050 Gray Aggregate as slurry, GP 3745 Self Leveling Epoxy as bonding coat, 5310-8 (30 Mesh Sand) for broadcast and GP3745 Self Leveling Epoxy Topcoat as seal coat.
- B. Typical Physical Properties @ 73°F (unless otherwise noted)

Typical Physical Properties

Color Decorative	Pre-Blended Colors, Custom color Blends available
Cure Time Recoat	8-12 hours
Foot Traffic	18-24 hours
Full Service	36-48 hours
Abrasion Resistance	20-30 mgs lost
ASTM D 4060, CS-17 Wheel, 1,000 Cycles	
Hardness, Shore D	75
ASTM D 2240	
Tensile Strength	550-600 psi
ASTM C 307	

Compressive Strength	5,000 psi
ASTM C 579	
Flexural Strength	3,700 psi
ASTM C 580	
Impact Resistance MIL-D-3134, Sec. 4.7.3	Withstands 16 ft. lbs. without cracking, delamination or chipping

Part Three - Execution

3.01 Surface Preparation

- A. For thorough instructions regarding preparation of concrete substrates consult General Polymers "Instruction for Concrete Surface Preparation" (Form G-1). Remove all tile and mortar bed as required and shotblast.

3.02 Installation

A. General

1. Apply each component of the Breatheable Slip Resistant Flooring System in compliance with manufacturer's written installation instructions and strictly adhere to mixing and installation methods, recoat windows, cure times and environmental restrictions. The Breatheable Slip Resistant Flooring System may be installed directly over non-moving control joints and cracks which have been treated with semi-rigid epoxy and the Breatheable Slip Resistant Flooring System will terminate at the edge of isolation and expansion joints as designated by the Architect, Engineer or Design Professional. Integral cove base shall be installed where specified in the drawings.

B. Cracks

1. For information pertaining to the treatment of cracks in concrete substrates, consult General Polymers Concrete 102.

C. Control Joints

1. For information pertaining to the treatment of control joints in concrete substrates, consult General Polymers Concrete 103.

D. Isolation/Expansion and Other Joints Subject to Movement

1. For information pertaining to the above, consult General Polymers Concrete 105.

E. Slurry Installation

- 4050 Binder Resin
- 5050 Gray Aggregate
- 5310-8-30 Mest Sand

F. Bonding Coat / Broadcast

- 3745 Self Leveling Epoxy Topcoat
- 5310-8-30 Mesh Sand

G. Seal Coat

- 3745 Self Leveling Epoxy Topcoat

3.03 Curing, Cleaning and Protection

- A. Cure Breatheable Slip Resistant Flooring System materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of the installation and prior to completion of the curing process.
- B. Protect the Breatheable Slip Resistant Flooring System from damage and wear during other phases of the construction operation, using temporary coverings as recommended by the manufacturer, if required. Remove temporary covering just prior to final inspection. Clean the Breatheable Decorative Quartz Flooring System just prior to final inspection, using materials and procedures suitable to the system manufacturer.
- C. Some cleaners will affect the color, gloss or texture of your polymer floor surfaces. To determine how your cleaner will perform, General Polymers recommends that you first test each cleaner, in a small area, utilizing your cleaning technique. This precaution will demonstrate the effect of your cleaner and technique. If no deleterious effects are observed, continue with the procedure. If deleterious effects do occur, modify the cleaning material and/or procedure. For recommendations regarding types of cleaners, contact the Breatheable Slip Resistant Flooring System manufacturer.

END OF SECTION

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DIVISION 10
SPECIALTIES

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PART ONE – GENERAL

1.01 SECTION INCLUDES

- A. Pre-engineered steel building primary and secondary framing.
- B. Metal wall panels, panel attachments, trim, and accessories.
- C. Metal roof panels, panel attachments, trim, and accessories.

1.02 DEFINITIONS

- A. Width – Distance measured from structural line to structural line and/or face of sidewall girt to face of sidewall girt.
- B. Length – Distance measured from structural line to structural line and/or face of endwall girt to face of endwall girt.
- C. Eave Height – Distance measured from the top of the eave member to the bottom of the primary frame base plate, or finish floor elevation when column base is above or below floor elevation.
- D. Bay Spacing/Interior Bay – Distance measured from centerline to centerline of the primary frames.
- E. Bay Spacing/End Bay – Distance measured from the face of the endwall girt to the centerline of the first interior primary frame.
- F. Roof Slope – Angle the roof surface makes with the horizontal. Roof slope limitations are given in the furnished table in conjunction with frame types and roof coverings.
- G. Dead Load – The weight of the metal building system supplied by manufacturer, such as roof, framing and covering members.
- H. Roof Live Load – The loads that are produced during maintenance by workers, equipment, and materials, and during the life of the structure by movable objects and do not include wind, snow, seismic, or dead loads.
- I. Floor Live Loads – Those loads induced on the floor system by the use and occupancy of the building.
- J. Roof Snow Load – The vertical load induced by the weight of snow, assumed to act on the horizontal projection on the roof of the structure.
- K. Wind Load – The load imposed on a structure by a given wind speed blowing from any horizontal direction.
- L. Auxiliary Load – The dynamic live loads which the structure must safely withstand, such as those induced by cranes and material handling systems.
- M. Collateral Load – The weight of additional permanent loads, including provision for future loads, specified in the order documents, other than the metal building system, such as sprinklers, mechanical and electrical systems, ceilings, and partitions.
- N. Seismic Load – The assumed loading acting in both the horizontal and vertical direction on the structural system due to the action of earthquakes.

1.03 REFERENCES

- 1. AISC 360 - Specification for Structural Steel Buildings; 2005.

2. AISC Steel Design Guide Series 3 - Serviceability Design Considerations for Low-Rise Buildings Second Edition; 2003.
3. AISI SG02-1 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2001 Edition with the 2004 Supplement.
4. ASTM A 6/A 6M - Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling; 2008.
5. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel; 2005.
6. ASTM A 108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished; 2007.
7. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2002.
8. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2005.
9. ASTM A194/A 194M - Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both; 2009.
10. ASTM A 307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength; 2007b.
11. ASTM A 325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2009.
12. ASTM A 475 - Standard Specification for Zinc-Coated Steel Wire Strand; 2003.
13. ASTM A 490 - Standard Specification for Structural Bolts, Alloy Steel, Heat Treated 150 ksi Minimum Tensile Strength; 2008b.
14. ASTM A 500/A 500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2007.
15. ASTM A 501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2007.
16. ASTM A 529/A 529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality; 2005.
17. ASTM A 563 - Standard Specification for Carbon and Alloy Steel Nuts; 2007a.
18. ASTM A 568/A 568M - Standard Specification for Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for; 2007a.
19. ASTM A 572/A 572M - Standard Specification for High Strength Low-Alloy Columbium-Vanadium Structural Steel; 2007.
20. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2007.
21. ASTM A 792/A 792M - Standard Specification for Steel Sheet, 55 Percent Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2006a.
22. ASTM A 924/A 924M - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process; 2007.
23. ASTM A 1008/A 1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2007a.

24. ASTM A 1011/A 1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability; 2008.
 25. ASTM A 1039/A 1039M – Standard Specification for Steel, Hot Rolled, Carbon, Commercial, Structural, and High-Strength Low-Alloy, Produced by Twin-Roll Casting Process; 2009.
 26. ASTM A 1063/A 1063M – Standard Specification for Steel Sheet, Twin-Roll Cast, Zinc-Coated (Galvanized) by the Hot-Dip Process; 2009.
 27. ASTM C 991 - Standard Specification for Flexible Glass Fiber Insulation for Metal Buildings; 2008.
 28. ASTM D 1494 - Standard Test Method for Diffuse Light Transmission Factor of Reinforced Plastic Panels; 1997(Reapproved 2008).
 29. ASTM E 1514 - Standard Specification for Structural Standing Seam Steel Roof Panel Systems; 1998 (Reapproved 2003).
 30. ASTM E 1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference; 2005.
 31. ASTM E 1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference; 1995 (Reapproved 2003).
 32. ASTM E 1680 - Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems; 1995 (Reapproved 2003).
 33. AWS A2.4 - Standard Welding Symbols; 2007.
 34. AWS D1.1/D1.1M - Structural Welding Code Steel; 2008.
 35. AWS D1.3 - Structural Welding Code Sheet Steel; 2007.
 36. IAS AC472 – International Accreditation Service, Inc., Accreditation Criteria for the Inspection Programs for Manufacturers of Metal Building Systems.
 37. MBMA (LR) - Metal Building Systems Manual; 2006.
 38. NAIMA 202 - Standard for Flexible Fiberglass Insulation Systems in Metal Buildings; 1996 (Rev. 2000).
 39. SJI (SPEC) - Catalog of Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders; 2005.
 40. SSPC-SP 2 - Specification for Hand Tool Cleaning; 1982 (Ed. 2004).
 41. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies; 2006.
 42. USACE CEGS-07416 - Structural Standing Seam Metal Roof (SSSMR) Systems; current edition.
- 1.04 DESIGN REQUIREMENTS
- A. The building shall be designed as a complete system. All components of the system shall be supplied or specified by the same manufacturer.
 - B. Design Code –Design criteria shall be the system of designing the primary, primary endwall and secondary framing systems for the loads as specified in the 2009 Ohio Building Code, and in general conformance with the MBMA Building Systems Manual.
 1. Occupancy Category S-2
 - C. Design Loads
 1. Dead Load – Weight of the building system as determined by manufacturer.

2. Roof Live Load – 20 psf,
 3. Collateral Load – As calculated
 4. Ground Snow Load – 20 psf.
 5. Roof Snow Load – 12.6 psf.
 6. Wind Load – 90 mph, fastest mile, Exposure Category C, and Importance Factor of 1.
 7. Seismic Load – $S_s=0.121g$, $S_1=0.057g$.
 8. Floor Load.
 - a. Live Load – 125 psf.
 - b. Dead Load – as calculated
 - c. Collateral Load – as calculated
- D. Deflection Requirements shall be in accordance with the applicable provisions of the AISC Steel Design Guide Series 3 – Serviceability Design Considerations for Low-Rise Buildings.
- E. Deflection Requirements – The vertical deflection limit shall be determined from the controlling load combination using a snow load with a 50-year mean-recurrence interval or the code required live load. The horizontal drift and deflections limits shall be determined from the loads induced by a basic wind speed corresponding to a 10 year mean-recurrence interval.
- F. Roof assembly shall permit movement of components without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to temperature range of 100 degrees F.
- G. Roof assembly shall have a class 90 wind uplift rating by Underwriters Laboratories when tested in accordance with test procedure UL 580.

1.05 SUBMITTALS

- A. Design Certification shall be a letter certifying that the building conforms to the order documents. The letter shall be signed and sealed by a registered engineer in the project state.
- B. Design Calculations, Drawings, and Documents shall contain the information requested for permits and approvals and sufficient information for building erection and are furnished as stipulated in the order documents.
- C. Submit anchor bolt placement plan and column reactions in advance of erection drawings. The manufacturer shall not be responsible for the design of the foundation.
- D. Shop or Erection Drawings – Submit drawings indicating building dimensions, locations and sizes of structural members, connections, attachments, openings, wall and roof system details, anchor bolt placement, reactions, and general construction details.

1.06 QUALITY ASSURANCE

- A. The manufacturing company shall be certified for Parts A, B, and C of the IAS AC472, Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems.
- B. Manufacturer shall be a company with at least 10 years experience specializing in the design and fabrication of metal building systems and a member of the Metal Building Manufacturer's Association (MBMA).
- C. All structural framing and covering shall be the design of a licensed Professional Engineer experienced in the design of metal building systems.
- D. Erector shall have specialized experience in the erection of metal building systems for a period of at least 3 years.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. All materials shall be unloaded, handled, hauled and delivered to storage by competent workmen in a manner that will prevent bends, dents, scratches or other damage.
- B. All materials shall be properly stored and protected from weather damage.

- C. Upon receipt, all bundles of primed material shall be stored on blocking at an angle sufficient to allow any trapped water to drain and should be protected from the weather by covers allowing air circulation.
- D. Water, ice and snow should not be allowed to collect and remain thereon.
- E. The panel bundles shall be elevated and sloped in a manner to allow moisture to drain.

1.08 WARRANTY

A. Building System Warranty

- 1. Furnish manufacturer's standard warranty for the metal building system, excluding paint.
- 2. The manufacturer shall warranty the metal building system against failure due to defective material or workmanship for a period of one (1) year from date of shipment
- 3. The liability under this warranty shall be limited to furnishing, but not dismantling or installing, necessary replacement material F.O.B. manufacturer's plant. In no event shall the manufacturer be liable for loss of profits, or other incidental, consequential, or special damages.

B. Roof and Wall Panel Finish Warrant

1. Paint systems

- a. Furnish manufacturer's standard warranty for the metal panel paint system against chipping, peeling, blistering, fading in excess of 5 NBS Hunter units, and chalking in excess of 8 units as set forth in ASTM D4214.
- b. The warranty shall be for a period of 35 years from the date of shipment for fluoropolymer paint systems.
- c. The warranty shall be for a period of 25 years from the date of shipment for silicone-polyester paint systems.

2. Zinc-Aluminum systems

- a. Furnish manufacturer's standard warranty for the zinc-aluminum hot-dipped alloy-coated panels against roof and rupture, structural failure, or perforation due to normal atmospheric conditions.
- b. The warranty shall be for a period of 20 years from the date of shipment for zinc-aluminum systems.
- 3. The liability under this warranty shall be limited to furnishing, but not dismantling or installing, necessary replacement material F.O.B. manufacturer's plant. In no event shall the manufacturer be liable for loss of profits, or other incidental, consequential, or special damages.
 - a. Roof System Weathertightness Warranty
 - Furnish manufacturer's standard warranty for the metal building roof system. The warranty period is for 20 years from the final inspection and acceptance from the manufacturer.

1.09 PRODUCTS

A. MANUFACTURER

- 1. Acceptable Manufacturers
 - a. Kirby Building Systems or approved equal
- 2. Substitutions - Permitted

B. METAL BUILDING SYSTEM

1. Bay Spacing - As shown on the contract drawings.
2. Eave Height - As shown on the contract drawings.
3. Roof Slope - 4 in 12.

C. PRIMARY FRAMING

1. Includes the transverse rigid frames, lean-to rafters and columns, canopy rafter, interior columns, and/or other types of main load carrying interior structural members.
 - a. Framing System Type - RF: clear span gable rigid frame.
 - b. The framing system shall be manufactured of solid web members.
 - c. Exterior column Shape - Most economical.
 - d. Interior column Type - Most economical.
 - e. Primary Framing Materials
 - Structural flat plate, strip and/or bar stock generally shall be of material based on the requirements of ASTM A 1008/A 1008M, ASTM A 1011/A 1011M or ASTM A 572/A 572M as applicable and shall have a minimum yield strength of 55,000 psi.
 - W, M, and S shapes, angles, channels and other hot-rolled shapes shall be of material based on the requirements of ASTM A 1008/A 1008M, ASTM A 1011/A 1011M, ASTM A 572/A 572M or ASTM A 36/A 36M as applicable and shall have minimum yield strengths 50,000 psi or 36,000 psi.
 - Other yield strength materials may be used based on the particular building design requirements.
 - Members fabricated from plate or bar stock materials shall have flanges and webs joined on one side of the web by a continuous process fillet weld.
 - Pipe and tube sections shall be of material based on the requirements of ASTM A 500/A 500M Grade B.

D. ENDWALL FRAMING

1. Includes the corner columns, endwall columns, and endwall rafters, and/or other types of main load carrying endwall structural members.
 - a. Framing System Type - Most economical.
 - b. Endwall Framing Materials
 - Hot rolled framing materials shall be composed of the materials and shapes specified in the primary framing material section.
 - Cold-form members shall be fabricated of material based on the requirements of ASTM A 1008/A 1008M, ASTM A 1011/A 1011M or ASTM A 572/A as applicable, and shall have a minimum yield strength of 55,000 psi.

E. SECONDARY FRAMING

1. Secondary framing shall be the structural members that carry the loads to the primary framing systems, and shall include the eave struts, purlins, girts, and other miscellaneous structural members.
 - a. Secondary framing shall be manufactured of cold-formed light gauge sections, welded plate sections, structural sections, and/or open web members.
 - b. Eave Struts shall be nominal 6 inches, 8 inches, 9.5 inches or 12 inches deep "cee" shaped members; and shall be manufactured of 12 through 16 gauge steel; and shall be designed as simple span for the specified loads.

- c. Purlins and girts shall be nominal 6 inches, 8 inches, 9.5 inches, or 12 inches deep "zee" shaped members; and shall be manufactured of 12 through 16 gauge steel designed simple span and/or continuous span for the specified loads.
- d. Secondary Framing Materials
 - Hot rolled framing materials shall be composed of the materials and shapes specified in the primary framing material section.
 - Cold-form members shall be fabricated of material based on the requirements of ASTM A 1008/A 1008M, ASTM A 1011/A 1011M or ASTM A 572/A as applicable, and shall have a minimum yield strength of 55,000 psi.
- i. Roof joist system.
 - Open web, parallel chord, simple span load carrying members suitable for the direct support of roof systems utilizing material sizes and yield strengths as required.
 - Bridging - Bolted.
 - Joist shall be bolted to the frames. (HINT: WELDED JOIST CONNECTIONS ARE AVAILABLE IF DESIRED FOR USE WITH WELDED BRIDGING)
 - Open web members shall be fabricated of material that conforms to the material specifications designated by the Steel Joist Institute as acceptable for this product.

F. MISCELLANEOUS FRAMING

1. Miscellaneous Members shall typically be those members to augment the primary, primary endwall and secondary framing systems. They shall include members such as base angles, flange braces, jamps, headers, and bridging or sag members, and shall be designed to be supportive of the framing systems using manufacturer's standard design and fabrication procedures.
 - a. Base Angles:
 - Cold-formed steel angle 3 inches by 2 inches by 14 gauge, 55,000 psi minimum yield.
 - Anchored to slab or other collateral construction at 4 feet maximum centers and within 12 inches of any end with power driven fasteners or other secure methods not provided by building manufacturer.
 - i. Flange Braces:
 - Cold-form angles fabricated of material based on the requirements of ASTM A 1008/A 1008M, ASTM A 1011/A 1011M or ASTM A 572/A as applicable, and shall have a minimum yield strength of 55,000 psi.
 - For large columns and rafters, angles based on the requirements of ASTM A 1008/A 1008M, ASTM A 1011/A 1011M, ASTM A 572/A 572M or ASTM A 36/A 36M as applicable and shall have minimum yield strengths 50,000 psi or 36,000 psi.
 - Attach flange brace to the purlin and/or girt and a clip on the interior flange of the primary framing system.

G. BRACING

1. Bracing for lateral loads (wind, seismic, etc.) shall be a system of diagonal, portal, fixed base, torsional and/or diaphragm bracing designed for the specified loads in accordance with manufacturer's design practices.
2. Materials used in the fabrication of bracing systems shall be designed utilizing manufacturer's standard practices, generally in compliance with the applicable sections of AISC and AISI.
 - a. Structural flat plate, strip and/or bar stock generally shall be of material based on the requirements of ASTM A 1008/A 1008M, ASTM A 1011/A 1011M or ASTM A 572/A 572M as applicable and shall have a minimum yield strength of 55,000 psi.
 - b. W, M, and S shapes, angles, rods, channels and other hot-rolled shapes shall be of material based on the requirements of ASTM A 1008/A 1008M, ASTM A 1011/A 1011M, ASTM A 572/A

572M or ASTM A 36/A 36M as applicable and shall have minimum yield strengths of 50,000 psi or 36,000 psi.

- c. Cables shall be ASTM A 475, 7 strand, extra-high strength material, 1/4 inch diameter minimum.

H. ROOF SYSTEMS

1. Roof systems typically consist of the roof panels, their attachments, trim and sealants used on the exterior of the roof.
2. Roof Panels
 - a. KirbyRibII or approved equal, roof panels providing a 36 inches wide net covering, having 1.25 inches high major ribs at 12 inches centers and two minor ribs between the major ribs.
 - Sheet steel shall be of material based on the requirements of ASTM A 653/A 653M, ASTM A 792/A 792M or ASTM A 1063/A 1063M as applicable.
 - Minimum yield strength shall be 80,000 psi.
 - Sidelaps shall be one full major rib and shall utilize the bearing edge of the underlying major rib for support.
 - Panels shall be continuous from ridge to eave until panel length exceeds 41 feet, in which case endlaps are provided. Endlaps shall be 6 inches and occur over a supporting member.
 - Panel thickness - 24 ga.
 - Panel exterior finish and color - Silicone polyester finish with color selected from manufacturer's standard colors.
 - Panel interior shall be precoated with a 0.5 mil minimum polyester wash coat.
 - b. Roof Insulation: Rigid board type insulation.
 - c. Thermal resistance of roof system – R Value = R13.
 - d. Nominal insulation density is in accordance with NAIMA 202.
3. Trim shall be manufacturer's standard material yield strength and thickness and shall be compatible with the material, finish, and profile of the adjoining roof or wall system.

I. WALL SYSTEMS

1. Wall systems typically consist of the wall panels, their attachments, and trim used on the exterior of the walls.
2. Wall Panel Systems
 - a. KirbyRibII System or approved equal
 - Wall panels providing a 36 inches wide net coverage having 1-1/4 inches high major ribs at 12 inches centers and two minor ribs between major ribs.
 - Sheet steel shall be of material based on the requirements of ASTM A 653/A 653M, ASTM A 792/A 792M or ASTM A 1063/A 1063M as applicable.
 - Minimum yield strength shall be 80,000 psi.
 - Sidelaps shall be one major rib and shall utilize the bearing edge of the underlying major rib for support.
 - Panels shall be continuous from eave to base until panel length exceeds 40 feet, in which case endlaps are provided. Endlaps shall be 4 inches and occur over a supporting member.
 - Panel thickness - 24 ga.
 - Panel exterior finish and color - Silicone polyester finish with color selected from manufacturer's standard colors.
 - Panel interior shall be precoated with a 0.5 mil minimum polyester wash coat.
 - b. Trim shall be manufacturer's standard material yield strength and thickness and shall be compatible with the material, finish, and profile of the adjoining roof or wall system.

- c. Framed openings in walls shall be an opening framed with 16 gauge minimum, cold-formed members, designed to meet specified loads. Openings shall be trimmed in accordance with manufacturer's standard practices.
- 3. Insulated Wall Panel Systems
 - a. Insulated Wall Panels shall be a system of wall panels with roll-formed exterior and interior faces chemically bonded to a continuously foamed-in place polyisocyanurate core.
 - b. Sheet steel shall be of material based on the requirements of ASTM A 653/A 653M, ASTM A 792/A 792M as applicable.
 - c. Minimum yield strength shall be 33,000 psi.
 - d. Joint configuration shall be an offset tongue and groove with concealed fastener.
 - e. Wall panels shall be rated with a Class 1 Fire Rating when tested in accordance with FM 4880.
 - f. Trim shall be manufacturer's standard material yield strength and thickness and shall be compatible with the material, finish, and profile of the adjoining roof or wall system.
 - g. Fluted Profile System
 - Panel Width – 42".
 - Panel Length – 8'-0" minimum to 56'-0" maximum
 - Panel Thickness - 2".
 - Thermal resistance of wall system – R Value = input when tested in accordance with ASTM C518.
 - Panel gauge – 26 exterior/26 interior.
 - Exterior panel finish and color – as approved by Village.
 - Interior panel finish and color – Manufacturer's standard silicone polyester.
- 4. Fasteners for roof and wall covering systems shall typically be one or more types of self-drilling or self-tapping screws. Blind rivets shall typically be used in trim and accessory attachment or splicing. For application details, see manufacturer's erection documents.
- 5. Systems covering sealants shall typically be preformed roll-tape sealants, tube sealants, and closures as required for weathertightness of the roof.
 - a. Sealants shall meet the FDA Regulations, as chemically acceptable to the U.S. Department of Agriculture for use in meat and poultry processing areas.
 - b. Tape sealants shall be of preformed butyl rubber base, and shall typically be supplied as a 3/16 inch by 1/2 inch extruded shape as standard.
 - c. Tube sealants shall be an acrylic or one part urethane base caulking material.
 - d. Closures shall be of a closed cell foam material of a gray or neutral color, and shall be die cut to panel profiles.
 - e. Closures shall be supplied as required to provide weathertightness.

J. FABRICATION

- 1. Structural members shall typically be fabricated by shearing, flame cutting, forming, welding, punching, drilling, reaming, etc., as required in accordance with manufacturer's standard practices.
 - a. Welded plate members fabricated from plate or bar stock materials shall have flanges and webs joined on one side of the web by a continuous process fillet weld.

- b. Shop connections shall typically be welded using either the submerged or the gas shielded arc process.
 - c. Welding shall be in accordance with manufacturer's standard practices, and generally in compliance with the applicable sections, relating to design requirements and allowable stresses, of the "AWS Structural Welding Code - Steel".
 - d. Field connections shall typically be by the bolting of structural members using high strength bolts and machine bolts in shop drilled, punched or reamed holes in accordance with manufacturer's standard practices.
 - e. Workmanship/tolerance of the manufactured building parts shall be in accordance with the quality control standards of Kirby.
2. Shop coating of members with shop primer shall be provided for the purpose of protecting the steel members during transportation, during proper and temporary jobsite storage, and during erection. Shop primer does not provide the appearance, durability and/or protection of an appropriate field applied finish.
- a. Cleaning of steel members shall typically be the removal of oil, dirt, loose scale and/or foreign matter prior to painting in accordance with SSPC-SP2.
 - b. Steel members shall receive one shop coat of manufacturer's standard primer with finish thickness of 1 mil.
 - c. Primer Color - Grey.

K. ACCESSORIES

1. Foundations and Anchor Bolts:
- a. Foundation design, including anchor bolt lengths and anchorage into the concrete, shall be done by a Registered Professional Engineer experienced in the design of such structures.
 - b. Anchor bolts shall not be less than the diameter or quantity shown on the metal building anchor bolt setting drawings.
2. Bolts:
- a. All primary bolted connections, as shown on drawings, shall be furnished with high strength bolts conforming to the physical specifications of ASTM A-325 or ASTM A-490.
 - b. All high strength bolts shall be zinc plated with yellow dichromate coloring for easy identification. A-325 bolts are furnished without washers unless noted on the erection drawings, and must be tightened to a snug-tight condition unless otherwise noted on the erection drawings supplied for the project.
 - c. All secondary bolted connections, unless noted otherwise and as shown on drawings, shall be furnished with high strength bolts conforming to the physical specifications of ASTM A-325 or shall be a "stud bolt" conforming to the physical specifications of ASTM A-449.
 - d. All "stud bolts" shall be silver zinc plated. A-325 bolts and stud bolts are furnished without washers unless noted on the erection drawings.
3. Mini-Ridge Ventilator
- a. Ventilator shall have a 9 inches by 23 inches throat with a cord operated damper and a birdscreen.
 - b. Ventilators color and finish - prepainted white.

- c. The base rating shall be 583 cubic feet per minute at 5 miles per hour, 20 degrees Fahrenheit, 20 feet stack height.
- 4. Continuous or Sectional Ridge Gravity Ventilator
 - a. Ventilator shall have a 9 inches by 10 feet throat with a cord operated damper and a birdscreen.
 - b. Ventilator color and finish – prepainted white.
 - c. The 10 feet sectional vents are such that continuous runs of ridge vents can be field assembled.
 - d. The base rating shall be 9 inches by 10 feet section vent is 2,170 cubic feet per minute at 5 miles per hour, 20 degrees Fahrenheit, 20 feet stack height.
- 5. Roof Curb Units
 - a. Curb units shall be fabricated, from zinc-aluminum coated sheet steel, to the size opening specified.
 - b. Units shall have endcaps that match the high rib of the roof panel.
 - c. Standard sub-frame shall be minimum 16 gauge steel "zee" or "cee" sections.
 - d. All fasteners and sealants required for installation shall be furnished by metal building manufacturer.
- 6. Pipe Flashing Units
 - a. Units shall be for the flashing of plumbing vent stacks and/or other pipe-like roof penetrations.
 - b. Base shall be neoprene with lead ring to be field configured to fit roof panel.
 - c. Boot shall be neoprene.
- 7. Adjustable Louvers:
 - a. Shop fabricated 18 gauge galvanized steel, self-framing, self-flashing welded frames with 20 gauge galvanized blades and painted bronze.
 - b. Louvers shall have a minimum free air flow area of 65 percent.
 - c. Louvers shall have exterior mounted removable birdscreens.
 - d. Adjustable louvers shall be equipped with a hand crank and a spring loaded closure system for optional operation by pull chain.
- 8. Canopies:
 - a. Shall typically be an overhang provided with a roof finish and trim finish matching that of the main structure.
 - b. Soffit panels are not required.
 - c. Canopies shall be framed of cold-formed light gauge shapes, welded built-up sections, hot-rolled sections and/or open web members at manufacturer's preference.

L. EXECUTION

1. Installation

- a. The erection of the building system shall be performed by a qualified erector, in accordance with the appropriate erection drawings, erection guides and/or other documents furnished by manufacturer, using proper tools, equipment and safety practices.
 - b. Erection practices shall conform to "Common Industry Practices", Section 6, MBMA (LR) - Building Systems Manual.
 - c. It shall be the erector's responsibility to comply with all appropriate legal and safety requirements.
 - d. It shall be the erector's responsibility to determine and provide any and all temporary bracing, shoring, blocking, bridging, and/or securing of components, etc., as required during erection of the building.
 - This temporary bracing, et al shall also be sufficient to secure the structural framing during erection against loads, such as wind and seismic, comparable in intensity to those for which the completed structure is designed.
2. Field connections shall be bolted (unless otherwise noted).
 3. All bolted connections shall be tightened to a snug-tight condition unless otherwise noted on the building drawings supplied for the project.
 4. There shall be no field modifications to primary structural members except as authorized and specified by manufacturer.

PART TWO – SPECIAL PROVISIONS

The Consolidated Appropriations Act of 2014 (Public Law 113-76) includes an "American Iron and Steel (AIS)" requirement that requires Clean Water State Revolving Fund (CWSRF) and Drinking Water State Revolving Fund (DWSRF) assistance recipients to use iron and steel products that are produced in the United States for projects for the construction, alteration, maintenance, or repair of a public water system or treatment works if the project is funded through an assistance agreement executed beginning January 17, 2014 (enactment of the Act), through the end of Fiscal Year 2014.

All items within this specification shall meet the "American Iron and Steel (AIS)" requirement as noted above.

END OF SECTION

PART ONE - GENERAL

1.01 DESCRIPTION

- A. Work included: Provide all special items included in this section, complete in place as shown on the Drawings, specified herein, and needed for a complete and proper installation.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions, Division 1, and all applicable Divisions of the Technical Specifications.

1.02 QUALITY ASSURANCE

- A. Qualifications of Manufacturers: Products used in the work of this Section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of satisfactory production acceptable to the Engineer.
- B. Qualifications of Installers: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods needed for proper installation of the work in this Section.

1.03 SUBMITTALS AND SUBSTITUTIONS

- A. Comply with pertinent provisions of Section 01300.
- B. The following product data shall be submitted in accordance with the approved Construction Schedule required in Section 01300 of these Specifications:
 - 1. Shop Drawings or brochures in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this Section with the work of adjacent trades;
 - 2. Manufacturer's recommended installation procedures which, when approved by the Engineer, will become the basis for accepting or rejecting actual installation procedures used on the Work;
 - 3. Test data required elsewhere in this Specification.

1.04 PRODUCT HANDLING

- A. General: Comply with pertinent provisions of Section 01350.

PART TWO - PRODUCTS

2.01 FIRE EXTINGUISHERS

- A. Fire extinguishers shall be multi-purpose dry chemical Model 5H-ABC, 5 pound capacity, UL rating 2A:10BC, as manufactured by Buckeye Fire Equipment Company, or approved equal. Extinguishers shall come complete with stainless steel hanging brackets of a standard approved type complete with fasteners, where required.

PART THREE - EXECUTION

3.01 SURFACE CONDITIONS

- A. Prior to installation of specialties, inspect supports and other construction for correct size, layout, alignment and

verify that surfaces to receive the work are acceptable. Contractor shall correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 COORDINATION

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

3.03 INSTALLATION

- A. Install the work of this Section in strict accordance with applicable codes and ordinances and in coordination with the local fire marshal.
- B. Upon completion of the installation, carefully inspect each component and verify that all items have been installed in their proper location, adequately anchored, and adjusted to achieve optimum operation.

PART FOUR – SPECIAL PROVISIONS

4.01 LOCATIONS

- A. Provide 3 fire extinguishers and install brackets where shown on plans or as indicated by local fire official.

END OF SECTION

DIVISION 11

WATER & WASTEWATER EQUIPMENT

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PROGRESSIVE CAVITY SLUDGE PUMPS**Part One – General**

1.01 DESCRIPTION

- A. SCOPE: This section specifies positive displacement progressing cavity pumps, complete with electric motors, and all specified appurtenances, as shown on the plans and specified herein.
- B. TYPE: The pumping units shall be of the self-priming, positive displacement, progressing cavity type specifically designed for pumping the specified waste water sludges.

C. EQUIPMENT LIST

<u>Item</u>	<u>Equipment Number</u>
Two (2) Sludge Pump	Seepix BN 10-6LS or approved equal

D. PERFORMANCE AND DESIGN REQUIREMENTS

1. Sludge handling pumps shall be specifically designed and selected for continuous duty pumping of liquids with the following properties:

Type of flow	Thickened Sludge
Percent Solids	Up to 8%
Viscosity	Flowable

2. The pumps shall be of the compact, close-coupled design. The gear reducer shall be sized for a minimum service factor of 1.5 and designed with a thrust load capability of 150 percent of the actual thrust load.
3. The pumps, along with associated drive appurtenances, shall be mounted on common fabricated steel baseplates.
4. Manufacturers must currently have installations for the same liquids and of the same size pump unit, in service for a minimum of three years. Manufacturers not named in this specification must also provide a pre-submittal package to the engineer no less than three weeks prior to the bid date for approval. The pre-submittal package must include, at minimum, the following: dimensional drawing, performance curve, O&M manual, electrical/drive details, installation list (for the same liquids as specified) with minimum three contacts and phone numbers.

- E. OPERATING CONDITIONS: The progressing cavity pumps shall have the following operating characteristics:

Equipment Service	Rated Capacity, gpm	Differential Pressure psi	Minimum motor hp	Drive
<u>Sludge Feed</u> High Flow Low Flow	30 GPM	30	5	Variable Speed from inverter

1.02 REFERENCES

- A. This section contains references to the following documents. They are part of this section as specified and modified. In case of conflict between the requirements of the section and those of the listed documents, the requirements of this section shall prevail.

Reference

Title

AGMA 6010-E-88 Spur, Helical, Herringbone, and Bevel Enclosed Drive

AGMA 6019-E-89 Gear Motors Using Spur, Helical, Herringbone, Straight Bevel, or Spiral Bevel Gears

AGMA 6023-A88 Design Manual for Enclosed Epicyclic Gear Drives

1.03 ENVIRONMENTAL CONDITIONS

- A. Pumps to be provided under this section will be installed in the basement of the sludge Building.

1.04 SUBMITTALS

- A. The following information shall be provided.

1. Manufacturer's data including materials of construction and equipment weight.
2. Predicted performance curves.
3. Motor data.
4. Universal joint warranty.
5. A copy of this specification section with addenda updates, and all referenced sections with addenda updates, with each paragraph check marked to show specification compliance or marked to show deviations.

Part Two – Products

2.01 ACCEPTABLE PRODUCTS

- A. Progressing cavity pumps shall be **seepex** Series BN or approved equal.

2.02 MATERIALS

Component	Material - Sludge Pumps
Rotor	D6 – Hardened Tool Steel – chromium nitride coated
Stator	Buna N
Pump Body	Cast iron
Shaft Sealing	Burgmann MG1 Q1Q1VGG

2.03 EQUIPMENT

- A. ROTOR AND STATOR: Each pump shall be a one stage design employing a convoluted rotor operating in a similarly convoluted stator. The convolutions shall be configured to form a cavity between the rotor and stator, which shall progress from the pump's inlet to discharge port with the operation of the rotor. The fit between the rotor and stator at the point of contact shall compress the stator material sufficiently to form a seal and to prevent leakage from the discharge back to the inlet end of the pumping chamber. Stators for sludge pumps shall have Buna elastomer. The sludge pump rotors shall be constructed of hardened tool steel. Additionally, the sludge pump rotors shall have a chromium nitride coating (Duktil process) with a minimum thickness of (.0108").
1. Stators shall be replaceable without dismantling the pump suction or discharge flanges or any associated piping. Pumps that require additional space for axial/horizontal removal of the stator shall not be allowed. Stator designs shall additionally incorporate a retensioning feature to compensate for wear in lieu of increasing pump speed.
 2. Rotors shall be replaceable without dismantling the pump suction or discharge flanges or associated piping. Pumps that require additional space for axial/horizontal removal of the rotor shall not be allowed. The rotor design shall include provisions so that rotor replacement does not require the disassembly of either universal joint.
- B. DRIVE TRAIN: The drive train shall be warranted for one (1) year from acceptance and shall consist of the following:
1. Each pump rotor shall be driven through a positively sealed and lubricated pin joint. The pin joint shall have replaceable bushings, constructed of air-hardened tool steel of 57-60 HRc, in the rotor head and coupling rod. The pin shall be constructed of high speed steel, air hardened to 60-65 HRc. The joint shall be grease lubricated with a high temperature (450° F), PTFE filled synthetic grease, covered with Buna N sleeve and positively sealed with hose clamps constructed of 304 stainless steel.
- C. CASINGS: A 150-pound (ANSI B16.5 RF) flanged connection shall be provided at both the inlet and discharge ports. The suction casing shall employ two opposed cleanout openings to facilitate removal of debris without dismantling the pump or pipework.
- D. BEARINGS: Each pump shall be provided with oil lubricated thrust and radial bearings, located in the gearmotor, designed for all loads imposed by the specified service. Minimum bearing L-10 shall be 50,000 hrs.
- E. SHAFT SEALING: Shaft shall be sealed using a single internal mechanical seal as specified in Section 2.02. The shaft shall be solid through the sealing area, but of a two part design which allows the rotating unit to be removed from the pump without disassembly of the gearmotor bearings. Seal materials shall be solid silicon carbide faces with 316 stainless steel metal parts and viton elastomers.
- F. MOTOR AND DRIVE UNIT:
1. Gear motors or gear reducers shall be designed in accordance with AGMA 6019-E (Class II). Unless otherwise noted, motors shall be energy-efficient, TEFC motors.
 2. Pumps that require variable frequency drives (VFDs) are noted in paragraph 1.01 E. VFDs shall be constant torque type. For VFD-driven units, the pump supplier shall be responsible for the provision of the fixed reduction between the motor and pump. The reduction ratio shall be that required to operate the pump at its maximum operating speed when the motor is operating at its nominal rated full speed in accordance with the schedule in paragraph 1.01 E. VFD-driven units may be operated at up to 85 Hz at the maximum speed.

2.04 ACCESSORIES:

- A. RUN DRY PROTECTION: The stator shall be fitted with a sensor sleeve and thermistor sensor. A controller shall also be provided and shall be installed by the contractor in the motor control center. The controller shall monitor the stator temperature and activate a shutdown and alarm sequence if the stator temperature reaches the adjustable limit on the controller. The controller shall include a manual local and remote reset function. Input to the controller shall be 1x115VAC/60 Hz.

2.05 STANDBY COMPONENTS

- A. One set of special tools shall be provided to service the pumps.

Part Three – Execution

3.01 INSTALLATION

- A. The pumps shall be installed as specified and in accordance with manufacturer's written recommendations. The installation and initial operation of all components shall be certified by an authorized representative of the pump manufacturer.

3.02 TESTING

- A. After completion of installation, the pumps shall be completely tested to demonstrate compliance with operating requirements as specified.

Part Four – Execution

4.01 INSTALLATION, START-UP AND OPERATOR TRAINING

- A. Contractor shall verify all dimensions in the field to ensure compliance of equipment dimensions with the drawings. Contractor shall notify engineer of significant deviations.
- B. Supplier shall furnish the services of a factory-trained service engineer for one (1) trip to include a total of eight (8) workdays to inspect the installation, observe start up, and provide operator training.
- C. Secondary start up services shall be required on the items listed in this Section. Secondary Start Up services shall typically be provided between 30 to 60 days but no later than 90 days following initial start-up. Scheduling shall be coordinated with Village of Crestline plant superintendent. The cost for these services shall be included within the Contractors Bid prices under the appropriate bid items. The intent of the Secondary start up services is to provide the plant superintendent the opportunity to work with the manufacturer's representative after having working knowledge of the equipment. Each manufacturer's representative shall be available for a full eight (8) hour day.

END OF SECTION

POSITIVE DISPLACEMENT BLOWERS

PART ONE - GENERAL

1.01 DESCRIPTION

- A. This Item includes the furnishing and installation of two (2) positive displacement blowers for the aerobic digesters, complete and in place, ready for service as shown on the Drawings and described in this Item.
- B. The accessories shall be furnished complete with inlet and discharge expansion joints, discharge check valve, discharge butterfly valve with operator, discharge silencers, filter, pressure relief valve, anchor bolts, and all other accessories required for satisfactory blower operation.
- C. All work performed under this Item shall be in accordance with all approved trade practices and manufacturer's recommendations.
- D. Summary of **PART TWO - PRODUCTS**
 - 1. Subsection 2.01: General
 - 2. Subsection 2.02: Baseplate
 - 3. Subsection 2.03: Inlet Air Filter
 - 4. Subsection 2.04: Inlet and Discharge Silencers
 - 5. Subsection 2.05: Pressure Gauges
 - 6. Subsection 2.06: Blower Piping
 - 7. Subsection 2.07: Other Materials
- E. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Section 09900: Painting
 - 3. Section 11900: Process Piping Systems
 - 4. Section 11910: Exposed Piping Installation
 - 5. Division 16: Electrical

1.02 QUALITY ASSURANCE

- A. Qualifications of Manufacturers: Products used in the work of this Section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of satisfactory production acceptable to the Engineer.
- B. Qualifications of Installers: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods needed for proper performance of the work in this Section.

1.03 SUBMITTALS AND SUBSTITUTIONS

- A. Comply with pertinent provisions of Section 01300.
- B. The following product data shall be submitted in accordance with the approved Construction Schedule required in Section 01300 of these Specifications:
 - 1. Shop Drawings in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this Section with the work of adjacent trades;
 - 2. Manufacturer's recommended installation procedures which, when approved by the Engineer, will become

the basis for accepting or rejecting actual installation procedures used on the Work;

3. Test data required elsewhere in this Section.

- C. Upon completion of this Portion of the Work, and as a condition of its acceptance, deliver to the Engineer three (3) copies of an operation and maintenance manual compiled in accordance with the provisions of Section 01730 of these Specifications.

1.04 VERIFICATION OF CONTRACT DOCUMENTS

- A. The Contract Drawings indicate the required pipe sizes and the general arrangement for all piping and equipment. Locations shall be verified in the field by the Contractor. In the event it should become necessary in some cases to change the location of any of the work due to building construction, the Contractor shall consult with the Engineer before making any changes. Any such changes approved by the Engineer shall be made without added cost to the Owner. Under no circumstances shall the pipe sizes indicated on the Contract Drawings be changed without first having the written approval of the Engineer.
- B. The Contractor is especially cautioned to install no work that connects to equipment until such time as complete Shop Drawings of such equipment have been approved by the Engineer. Any such work so installed by the Contractor prior to approval of Shop Drawings will be at the Contractor's risk.

1.05 PRODUCT HANDLING

Comply with pertinent provisions of Section 01350.

PART TWO - PRODUCTS

2.01 GENERAL

All products referenced by manufacturer's or supplier's name or model number are subject to "or equal" substitution procedures outlined in Section 01300, Submittals and Substitutions.

2.02 Positive Displacement Blowers

- A. General: The air blowers shall be fabricated, assembled and supplied as a package system. The package shall be completely assembled and ready for immediate start up after interface connection, motor wiring and blower servicing have been completed.
- B. Design Criteria:
1. The blowers shall also include both the capacity and turn down capacity to meet the entire range of air flow requirements and meet process objectives under any sludge loading condition between initial and design conditions.
 2. Each reactor will have its own independent ORP control loop to provide the control of the blower speeds.
- C. Products:
1. The blower package shall be an Aerzen GM25S, as manufactured by Aerzen Corporation, or approved equal.
 2. Design Requirements

Performance Data:

flow at intake conditions	icfm	620
intake pressure (absolute)	psia	14.09
differential pressure	psi	9.35
relative humidity	%	80
intake temperature	°F	100
blower speed	rpm	3,655
% of maximum		76%
motor speed	rpm	1,775
power required at blower shaft	bHp	32.9
motor rating	Hp	40
Tolerance on flow & power	± 5 %	
Sound pressure level w/ enclosure	dB(A)	71

D. Blowers:

- Each blower shall be of the horizontal, rotary, positive displacement type.
- Each assembly shall be rugged in construction and of such design that it may be disassembled and all parts inspected without disturbing the inlet or discharge piping.
- Casing shall be of one piece with separate headplates, and shall be made of close grained gray cast iron suitably ribbed to prevent distortion under the specified service conditions.
- Casing shall be able to withstand a minimum of 25 PSIG. The headplates shall be fabricated drive end and gear end of close-grained cast iron which is precision machined for exact bearings housing fit.
- Impeller and shaft shall be made from high strength cast iron.
- Impeller shall be of the straight, two lobe involute type and shall operate without rubbing or liquid seals or lubrication and shall be positively timed by a pair of accurately machined heat-treated alloy steel, spur tooth, timing gears.
- Timing gears shall be mounted on the impeller shafts on a tapered fit and properly secured.
- Each impeller/shaft shall be supported by cylindrical roller bearings sized for a minimum of 50,000 hours of B-10 life.
- The bearing seals provided shall be a lip type oil seal at each bearing, designed to prevent lubrication from leaking into the air stream. Further provision shall be made to vent the lubrication system to atmosphere to eliminate any possible carryover of lubricant into the air stream.
- The timing gears and the bearings shall be splash oil lubricated from oil slingers mounted on the drive shaft and dipping in the oil.
- Grease lubricated bearings are acceptable on the drive end only.

E. Electric Motors:

- Blower motors shall be premium efficiency, 40 HP, TEFC, 1800 RPM inverter duty motor, 1.15 S.F. suitable for VFD drive and for mounting on a slide base and connecting to the blower shaft by a V-belt and sheave drive assembly for the blowers.

F. Blower Package Accessories: The blower packages shall be fabricated and assembled with the following accessories and shipped complete as a unit.

- The base shall be built so that the blower and the motor are mounted to provide for horizontal tensioning

of the V-belt drive.

2. All welds are to be continuous and full penetration.
3. The V-belt drive assembly shall consist of sheaves, quick detachable bushings, V-belts, and sliding motor base.
4. The drive assembly shall be provided with a 1.4 service factor based on motor nameplate horsepower.
5. Each blower shall be provided with a suitably sized air filter for the flow rates listed under design criteria.
6. Inlet filter shall be Model EMS Type as manufactured by EM Products or equal.
7. The intake silencer shall be a heavy duty, all welded, noise attenuation unit constructed of carbon steel sheet and plate and featuring an acoustically treated outlet for pulse control. The silencer shall be equal to Model IS as manufactured by EM Products.
8. The discharge silencer shall be a heavy duty, all welded, noise attenuation unit constructed of carbon steel sheet and plate and featuring an acoustically treated outlet for pulse control. The discharge silencer shall be insulated for optimal noise reduction. The silencer shall be equal to Model PS, as manufactured by EM Products.
9. The expansion joints shall be flanged sleeved cylindrical type; three ply bias reinforced EPDM rubber connectors for blower inlet and discharge connections.
10. The pressure relief valve shall be weight type relief valve with proper sizing and weights for setpoint pressure.
11. Check valves shall be flanged type, cast iron body, and aluminum internals for mounting on blower discharge piping. The valve shall be Techno Model 5004, or equal.
12. The discharge butterfly valve shall be wafer type, resilient seated, and lever operated, tight closing butterfly valve for positively isolating the blower from the manifold system. Furnish valve with body and disc of nodular iron; Phosphate treated steel stem; Buna N seat; and position indicator. The valve shall be equivalent to Keystone AR2.
13. The discharge pressure gauge shall be equivalent to U.S. Gauge. Range is 0-15 psig. Accuracy is 1 percent of full scale. The dial is 2-1/2", 270 degree scale. The case is aluminum, front flanged. The connection is 1/4" NPT back connection.
14. A discharge temperature gauge shall be provided to assure normal operating conditions are not exceeded due to reduced blower rpm operating conditions.

2.03 BLOWER PIPING

- A. Unless otherwise shown or indicated, blower inlet and discharge piping including filters, silencers, valves, and accessories shall be the same nominal size and pipe connection style as the blower inlet and discharge connections. Unless otherwise shown or indicated, pipe and fittings 3" and smaller shall be SCH 40 galvanized steel with threaded connections; pipe and fittings 4" and larger shall be ductile iron with 125 lb. ASA flanges.
- B. All inlet and discharge pipe inside the building shall have neoprene bushings installed in all flange holes. The neoprene bushings shall comply with ASTM-D-735-SC-725-BF latest specification.
- C. All inlet and discharge piping inside the building shall have rubber grommets installed between the pipe flanges.

2.04 OTHER MATERIALS

- A. Provide other materials not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer.

PART THREE - EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 COORDINATION

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

3.03 INSTALLATION

- A. Install the work of this Section in strict accordance with the Shop Drawings and manufacturer's recommendations as approved by the Engineer.
- B. Upon completion of the installation, carefully inspect each component and verify that all items have been installed in their proper location, adequately anchored, and adjusted to achieve optimum operation.

3.04 SERVICE

- A. Demonstrate to the Owner's operation and maintenance personnel the proper methods for operating and maintaining the equipment, and the contents of the operation and maintenance manual required to be submitted under Article 1.03 in this Section.
- B. The Contractor shall furnish to the Owner, through the Engineer, a written report certifying that:
 - 1. The equipment has been properly installed and lubricated in accordance with manufacturer's recommendations.
 - 2. The equipment check out and initial start-up activities have been completed in accordance with manufacturer's recommendations and under the technician's supervision.
 - 3. The equipment is in accurate alignment.
 - 4. The equipment is free from any undue stress imposed by connecting piping or anchor bolts.

PART FOUR – SPECIAL PROVISIONS

4.01 INSTALLATION, START-UP AND OPERATOR TRAINING

- A. Contractor shall verify all dimensions in the field to ensure compliance of equipment dimensions with the drawings. Contractor shall notify engineer of significant deviations.
- B. Supplier shall furnish the services of a factory-trained service engineer for one (1) trip to include a total of eight (8) workdays to inspect the installation, observe start up, and provide operator training.
- C. Secondary start up services shall be required on the items listed in this Section. Secondary Start Up services shall typically be provided between 30 to 60 days but no later than 90 days following initial start-up. Scheduling shall be coordinated with Village of Crestline plant superintendent. The cost for these services shall be included within the Contractors Bid prices under the appropriate bid items. The intent of the Secondary start up services is to provide the plant superintendent the opportunity to work with the manufacturer's representative after having working knowledge of the equipment. Each manufacturer's representative shall be available for a full eight (8) hour day.

END OF SECTION

COARSE BUBBLE AERATION SYSTEM

PART ONE - GENERAL

1.01 DESCRIPTION

A. Work included:

1. The Contractor shall provide a non-clog coarse bubble air diffuser system for the aerobic digester tank. The systems shall be complete with all mounting brackets, fixed supports, header pipes, diffuser assemblies, swivel joints and accessories necessary for installation in place as shown on the Drawings, specified herein and needed for a complete and proper installation.
2. The diffuser system for the aerobic digester tank shall be a fixed aeration system mounted to the floor of the tank on support pedestals.

B. Summary of PART TWO - PRODUCTS

1. Subsection 2.01: General
2. Subsection 2.02: Materials and Fabrication
3. Subsection 2.03: Fixed Aeration Systems
4. Subsection 2.04: Air Diffusers
5. Subsection 2.05: Spare Parts
6. Subsection 2.06: Other Materials

C. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions, and sections in Division 1 of these Specifications.
2. Section 11900: Process Piping Systems
3. Section 11920: Valves and Appurtenances

1.02 QUALITY ASSURANCE

- A. Qualifications of Manufacturers: Products used in the work of this Section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of satisfactory production acceptable to the Engineer.
- B. Qualifications of Installers: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods needed for proper installation of the work in this Section.

1.03 SUBMITTALS AND SUBSTITUTIONS

- A. Comply with pertinent provisions of Section 01300. No substitution of the products in this Section shall be permitted.
- B. The following product data shall be submitted in accordance with the approved Construction Schedule required in Section 01300 of these Specifications:
 1. Shop Drawings in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this Section with the work of adjacent trades;
 2. Manufacturer's recommended installation procedures which, when approved by the Engineer, will become the basis for accepting or rejecting actual installation procedures used on the Work.

3. Test data required elsewhere in this Section.

4. Certified Performance Curve

- a. Submit certified oxygen transfer performance curve in accordance with Section 1.05 of these specifications before beginning fabrication of equipment.
- b. Certified curve shall be log-log plot of pounds of oxygen per day per 1000 cubic feet of tank volume versus air per unit volume in tap water at 14.7 PSIA, 20°C and zero dissolved oxygen at the specified submergence.
- c. Certified curve shall be prepared and sealed by a registered professional engineer.

C. Upon completion of this Portion of the Work, and as a condition of its acceptance, deliver to the Engineer three copies of an operation and maintenance manual compiled in accordance with the provisions of Section 01730 of these Specifications.

1.04 PRODUCT HANDLING

A. General: Comply with pertinent provisions of Section 01350.

1.05 PERFORMANCE GUARANTEE

- A. The manufacturer shall be responsible that all installed meters will function properly on the flow stream to be monitored.
- B. The manufacturer shall provide a written performance guarantee with his submittal information.

PART TWO - PRODUCTS

2.01 GENERAL

A. The diffusers, balancing nozzle and orifice inset to operate shall be designed for the following conditions:

Diffuser Location	Air Rate Per Unit (SCFM)	Headloss (inches)	Submergence (Feet)
Aerobic Digester Tank	10	8.5	22

- B. The system shall be designed with removable and interchangeable acetal orifice inserts to insure uniform air flow among diffusers.
- C. The coarse bubbler diffuser assembly shall be SSI's Relia-Bill Coarse bubble diffusers with compression molded EPDM membrane.

2.02 MATERIALS AND FABRICATION

A. Materials

1. Fabricate all diffuser welded parts and assemblies from sheets and plates of Type 304L stainless steel with a 2D finish.
2. Fabricate non-welded diffuser parts and pieces from sheets and plates of Type 304 stainless steel.
3. Provide droplegs and headers of the diameter and material type (s) shown on the Drawings.

4. Furnish air distribution headers and connectors with the following minimum nominal wall thicknesses.
 - a. For mutually reinforced diffuser connector and header systems as specified in Paragraph 2.03, E.

HEADER DIAMETER (Inches)	WALL THICKNESS (Inches)
2" Thru 18"	0.109

- b. For diffuser connectors and headers that are not mutually reinforced as specified in Paragraph 2.04, F.

HEADER DIAMETER (Inches)	WALL THICKNESS (Inches)
2" Thru 12"	Schedule 20

5. All welding of the diffuser header and drop pipe assemblies shall be completed in the factory. Field welding will not be permitted.
6. All stainless steel surfaces shall be pickled for corrosion protection and finish. Corrosion protection techniques not using full immersion will not be acceptable.
7. Furnish all nuts, bolts and washers including anchor bolts in Type 18-8 series stainless steel.
8. Furnish Type 304L stainless steel diffuser with a cast inlet end cap the equivalent of Type 304L stainless steel.

- B. Furnish neoprene gaskets 45 to 55 durometer (Shore A).
- C. Furnish PVC connector plugs (if required) for all unused diffuser connector ports.
- D. Furnish appropriately sized molded acetal orifice inserts when required.

2.03 FIXED AERATION SYSTEMS

- A. Provide a dropleg from the air main connection as shown on the drawings.
 1. Provide a loose follower flange for the top connection.
 2. Provide a band coupling for the lower dropleg to header connection for ease of installation and alignment.
 3. Support and restrain the dropleg from blow apart from its upper connection.
 4. Provide a thrust anchor on the connected header or manifold near the dropleg.
- B. Join sections of air distribution headers with special flanged joints, expansion joints or compression-sleeve couplings so that individual header sections can be rotated independently of adjacent sections for alignment purposes during installation.
- C. Design all joints to structurally transmit the longitudinal forces caused by expansion and contraction of the header and provide positive means to prevent joint blow-apart.
- D. Design and furnish an expansion/contraction system for all headers. The expansion/contraction system shall consist of simple supports, fixed supports and expansion joints in an integrated design.

Design the expansion/contraction system for all headers to allow for a total of 125°F temperature range and limit thermally induced bending stresses to 24,000 PSI or less.

- E. Header supports shall include a vertically adjustable header hold down locking mechanism mounted on a stainless steel supporting structure and shall be designed to resist all imposed uplifts without exceeding 24,000 PSI design stress.

2.04 AIR DIFFUSERS

- A. Provide diffusers as shown on Drawings. The arrangement and spacing shall not exceed the dimensions shown.
- B. Provide diffusers of proven non-clog design with no flexible or moving parts.
- C. Diffusers shall consist of a balancing nozzle with orifice insert if required an inverted air reservoir, air exit ports, cast end cap at inlet end and a full length deflector.
 - 1. Design diffusers to provide full wide band aeration. Release air uniformly along a minimum two foot band beyond each side of the header.
 - 2. The diffuser shall have a minimum air release perimeter of 48 inches.
 - 3. Locate exit ports discharging air into liquid on horizontal planes at two levels.
- D. Diffuser Deflector
 - 1. Provide deflector below each diffuser for its full length and width.
 - 2. Design deflector to direct the liquid being aerated along the diffuser reservoir walls so that the air exists through the ports and is sheared into small bubbles and distributed into the liquid.
 - 3. Design deflector to prevent stringy material from wrapping around or entering the bottom of the diffuser.
 - 4. Deflectors may be integral with diffuser and supported by diffuser end caps.
 - 5. Non-integral deflectors shall be securely bolted to the tank floor and have a mechanism to provide plus or minus two inches vertical adjustment for field leveling.
 - 6. Open bottom diffusers allowing liquids and debris to enter the bottom of the diffuser will NOT be permitted.
- E. Diffuser Capacity
 - 1. Air release shall be distributed along the 48 inch perimeter uniformly at air rates from 5 to 10 SCFM with no disproportionate air flow from any single point.
- F. Supply Stainless Steel Diffusers. Refer to Section 2.01 Materials.
 - 1. Cast the diffuser inlet end cap with an alloy equivalent to Type 304L stainless steel. Provide the inlet end cap with a Schedule 80, 3/4" NPT male pipe thread connection and integral hex head nut.
 - 2. Fabricate the diffuser bodies and outboard end cap from Type 304L stainless steel.

2.05 SPARE PARTS

- A. Provide five (5) additional diffusers and connectors.

2.06 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer.

PART THREE - EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 COORDINATION

- A. Coordinate as required with other trades to assured proper and adequate provision in the work of those trades for interface with the work of this Section.

3.03 INSTALLATION

- A. Install the work of this Section in strict accordance with the Manufacturer's recommendations and shop drawings as approved by the Engineer.
- B. Upon completion of the installation, carefully inspect each component and verify that all items have been installed in their proper location, adequately anchored, and adjusted to achieve optimum operation.

3.04 SERVICE

- A. Demonstrate to the Owner's operation and maintenance personnel the proper methods for operating and maintaining the equipment, and the contents of the operation and maintenance manual required to be submitted under Article 1.03 in this Section.
- B. The Contractor shall furnish to the Owner, through the Engineer, a written report prepared by the sludge pumping equipment manufacturer's filed service technician certifying that:
 - 1. The equipment has been properly installed and lubricated, in accordance with manufacturer's recommendations.
 - 2. The equipment check out and initial start-up activities have been completed in accordance with manufacturer's recommendations and under the technician's supervision.
 - 3. The equipment is in accurate alignment.
 - 4. The equipment is free from any undue stress imposed by connecting piping or anchor bolts.
 - 5. The equipment has been operated under full load and that it operates satisfactorily and in compliance with the requirements of this Section.
- C. The Contractor shall include with his bid the on-site services of the manufacturer's filed service technician for periods, not necessarily consecutive, of one (1) eight (8) hour day to be designated by the Engineer. This service shall be for the purpose of instruction of plant personnel.

PART FOUR – SPECIAL PROVISIONS

4.01 INSTALLATION, START-UP AND OPERATOR TRAINING

- A. Contractor shall verify all dimensions in the field to ensure compliance of equipment dimensions with the drawings. Contractor shall notify engineer of significant deviations.
- B. Supplier shall furnish the services of a factory-trained service engineer for one (1) trip to include a total of eight (8) workdays to inspect the installation, observe start up, and provide operator training.
- C. Secondary start up services shall be required on the items listed in this Section. Secondary Start Up services shall typically be provided between 30 to 60 days but no later than 90 days following initial start-up. Scheduling shall be coordinated with Village of Crestline plant superintendent. The cost for these services shall be included within the Contractors Bid prices under the appropriate bid items. The intent of the Secondary start up services is to provide the plant superintendent the opportunity to work with the manufacturer's representative after having working knowledge of the equipment. Each manufacturer's representative shall be available for a full eight (8) hour day.

END OF SECTION

PART ONE - GENERAL

1.01 DESCRIPTION

A. Work Included:

1. Provide and install valves and appurtenances complete as shown on the Drawings, specified, or required for a complete and proper installation.
2. Each value unit shall be furnished complete with valve; and where required, floor stand, gears, motor operator, hand wheel, chain operator, crank, lever, extension stem, guide bearing and support, brackets, gaskets, bolts, nuts, washers, and any other appurtenances necessary for the completion of this work. See Part Four for Valve Schedule and minimum specific requirements.
3. This section shall apply to and supplement all valves and appurtenances described in other Sections of these Specifications or on the Drawings.

B. Summary of **PART TWO - PRODUCTS**

Subsection 2.01:	General
Subsection 2.02:	Butterfly Valves – Air Service
Subsection 2.03:	Check Valves – Air Service
Subsection 2.04:	Gate Valves –
Subsection 2.05:	Plug Valves –
Subsection 2.06:	Pressure Relief Valves – Air
Subsection 2.07:	Mud Valves
Subsection 2.08:	Telescoping Valves
Subsection 2.09:	Pinch Valves
Subsection 2.10:	Check Valves – Swing Type
Subsection 2.11:	Check Valves – Rubber Flapper
Subsection 2.12:	Check Valves – Rubber “Duckbill”
Subsection 2.13:	Hopper Gates
Subsection 2.14:	Diverter Gates
Subsection 2.15:	Valve Boxes
Subsection 2.16:	Floor Boxes and Stands
Subsection 2.17:	Extension Stems and Stem Guide
Subsection 2.18:	Chain Wheels
Subsection 2.19:	Tee Wrenches
Subsection 2.20:	Operators
Subsection 2.21:	Painting and Fixtures

C. Related Work:

1. Documents affecting work of this Section include, but are not necessary limited to General Conditions, Supplementary Conditions, and sections in Division 1 of these Specifications; Section 02700: Underground Piping Installation; Section 15250: Piping Insulation; Section 11900: Process Piping System; Section 11910: Exposed Piping Installation; Section 09900 Painting; Section 01730 Operation and Maintenance Manual; Section 01350 Product Requirements and Handling; Section 01300 Submittals; Section 01300 Progress Schedule.

1.02 QUALITY ASSURANCE

- A. Qualifications of Manufacturers: Products used in the work of this Section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of satisfactory production acceptable to the Engineer.

- B. Qualifications of Installers: Use adequate number of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods needed for proper installation of the work in this Section.

1.03 SUBMITTALS AND SUBSTITUTIONS

- A. Comply with pertinent provisions of Section 01300 Construction Schedule.
- B. The following product data shall be submitted in accordance with the approved Construction Schedule required in Section 01300 of these Specifications:
 - 1. Shop Drawings in sufficient detail to show manufacturer, model, type, accessories, ratings or class, application or use, materials of construction, sizes, appurtenances, fabrication, installation, anchorage, and interface of the work of this Section with the work of adjacent trades.
 - 2. Manufacturer's recommended installation procedures which, when approved by the Engineer, will become the basis for accepting or rejecting actual installation procedures used on the work.
 - 3. Required test data.
- C. Upon completion of this portion of the Work, and as a condition of its acceptance, deliver to the Engineer three (3) copies of an operation and maintenance manual compiled in accordance with the provisions of Section 01730 of these Specifications.

1.04 PRODUCT HANDLING

- A. Comply with provisions of Section 01350.

1.05 VERIFICATION OF CONTRACT DOCUMENTS

- A. The Contract Drawings indicate the required sizes and the general arrangement for all piping and equipment. Location shall be verified in the field by the Contractor. In the event it should become necessary in some cases to change the location of any of the work, the contractor shall consult with the Engineer before making any changes. Any such changes approved by the Engineer shall be made without added cost to the Owner. Under no circumstances shall the sizes indicated on the Contract Drawings be changed without first obtaining the written approval of the Engineer.
- B. The Contractor shall determine and be responsible for the proper location and installation of all required valve supports, frames, attachments, mountings, inserts, hangers, chases, sleeves, and other work required for the proper installation of valves, well in advance of the construction progress so as not to delay the work.
- C. The attention of the Contractor is directed to the possibility that this Project may include work of several trades. The final location of inserts, hangers, or other required appurtenances shall be coordinated with the work of the other trades to prevent omissions and interferences.
- D. The Contractor is especially cautioned to install no work that connects to equipment until all related shop drawings of such equipment have been approved by the Engineer. Any such work so installed by the Contractor prior to the approval of shop drawings will be at the Contractor's risk.

PART TWO - PRODUCTS

2.01 GENERAL

- A. All valves and appurtenances shall be of a well-known, experienced manufacturer approved by the Engineer and shall have the name, monogram, or initials of the manufacturer cast thereon. All valves shall be designed, equipped, and suitable for the type of operation shown by the Drawings, specified, or as directed by the Engineer.
- B. Unless otherwise specified in Part Four, valves with screw stems shall open by turning counter-clockwise, the direction being indicated by an arrow cast where easily visible to the operator.

- C. Valves shall be provided with hubs, spigots, flanges, mechanical grooves, screw ends, or other connections compatible with the pipe in which they are installed or scheduled.
- D. Unless otherwise specified, a stuffing box packed with O-ring or other approved seal shall be used to seal the stem of the valve. The seal system used shall be replaceable without removing the bonnet or rotating element. Gaskets shall be of rubber or other approved composition.
- E. All buried bolts-nuts-washers unless otherwise shown or specified shall be low alloy steel that are cathodic to the valve body and have 45,000 psi minimum yield strength. All bolts-nuts-washers installed within a structure, unless otherwise shown or specified shall be low carbon steel conforming to the mechanical and chemical requirements of ASTM A-307, Grade B.
- F. All valves shall be tested at the point of manufacture, and be watertight under operating conditions. After the valves are set in place and are ready to operate, the Contractor shall test them under working pressure and conditions herein specified and any valve found to leak shall be made watertight or replaced by the Contractor.
- G. The Contractor shall be responsible for all patents and claims pertaining to the materials, equipment and appurtenances incorporated in the performance of work under this specification and shall indemnify the Owner from all claims pertaining thereto in accordance with the General Conditions.
- H. The Contractor shall coordinate the performance of this Section with the other items involved with this Contract and/or connecting Contracts.
- I. All products referenced by manufacturer's or supplier's names or models are subject to "or equal" substitution procedures outlined in Section 01350 Submittals and Substitutions.

2.02 BUTTERFLY VALVES - AIR SERVICE

- A. Valves shall be specifically suited for air service.
- B. Butterfly valves shall meet the latest revision of AWWA C-504, Class 25 service, unless otherwise noted for another Class. Valves shall be either of a fully lugged wafer type or a flanged type design as indicated on the Contract Drawings, and have an ASTM A-126, Class B cast iron body; valve discs shall be ASTM A-126 Class B cast iron, ASTM A-48 Class 40 cast iron, or ASTM A-536 ductile iron. Seating edge of disc shall be 316 stainless steel. Valve shafts shall be stainless steel conforming to ASTM A-276. Valve bearings shall be self-lubricating, corrosion resistant sleeve type. Shaft seals shall be O-ring or standard self-adjusting split V packing and be replaceable without removing the valve shaft; Valves shall have an elastomeric seat in the body. An elastomeric seat on the disc edge is not acceptable. Seats shall be of EPDM, and be field replaceable without special tools. Elastomer thickness, not inclusive of backing rings or stiffeners, shall be a minimum of 3/8 inch for valves 6 inches and smaller, and 1/2 inch for valves 8 inches and larger. All external surfaces shall be covered with a minimum 6-mil polyamide cured epoxy coating applied over an abrasive blasted near white metal surface.
- C. Discharge butterfly valve shall have locking lever operators unless otherwise noted in PART FOUR.
- D. The valves shall be the product of Keystone, Dresser, Dezurik/BIF, or equal.

2.03 CHECK VALVES - AIR SERVICE

- A. The body, of wafer type construction, shall be designed for 25-psi air pressure.
- B. Valves shall have an EPDM sealing member suitable for continuous duty operation at 250°F.
- C. Check valves shall have cast iron bodies, ASTM A126, Class B and aluminum bronze plates. The valve shall be drilled to match standard ANSI-125 flanges.
- D. Check valves shall be Mission "Duo-Check II", Techno Check Valve, or equal.

2.04 GATE VALVES

- A. The valves, described in this section shall be resilient seated gate valves manufactured to meet or exceed AWWA C509. Valves shall be of compression type seal design, providing bubble tight shut-off with bidirectional seating ability for pressures up to 200 psi.
- B. The valve shall have a smooth, unobstructed waterway free from any sedimentation pockets. Valve shall provide a 100% port of nominal pipe size when full open. Tapping valve port shall be sized to permit a full pipe port tap.
- C. Body style shall be mechanical joint type for buried service, flange joint type for exposed service and when required, to include special end connections for tapping requirements of otherwise if indicated on the contract drawings.
- D. Stuffing boxes shall be O-ring seal type with two (2) rings located in stem above thrust collar.
- E. Thrust bearings shall be of the low friction torque reduction type, located both above and below the stem collar.
- F. Valves shall be as manufactured by American-Darling, Clow, M & H, U.S. Pipe or an approved equal.

2.05 PLUG VALVES

- A. Unless otherwise shown on the Drawings called for in PART FOUR, plug valves shall be the non-lubricated, eccentric type providing water tight shutoff to the full valve rating of 175 psig differential for valves 12-in. and smaller, and 150 psig differential for valves 14-in. and larger, with flow in either direction.
- B. Port area of valves 20-in. and smaller shall be not less than 80% of the nominal pipe area. Valves 24-in. and larger shall have port area of not less than 70% of the nominal pipe area.
- C. The valve body, bonnet, and rotating element shall be ASTM A126 Class B semi-steel. The bonnet shall be held in position with bolts and designed with either a recessed tongue and groove or two dowel pins connecting the valve body to insure proper alignment of the body and bonnet bushings.
- D. Valve bearing system shall be corrosion-resistant bushings of the permanently lubricated type provided in the body and the bonnet to support the rotating element trunnions. The bearings shall be stainless steel suitable for sewage service. Tape, sprayed, or roll-on bushings or sleeves are not acceptable.
- E. The valve body seat contacting the rotating element shall be either a welded-in overlay of not less than 90% nickel, or a corrosion resistant non-metallic fusion bonded Nylon 11, in compliance with AWWA C507, AWWA C550, and AWWA C509, latest revisions. The seating surface of the rotating element shall be Buna-N rubber (nitrile rubber), or other material recommended by the manufacturer for the liquid handled.
- F. Valves and actuators shall have seals on all shafts and gaskets on covers to prevent leakage of liquid out of, or the entry of dirt or liquid into the valve. Valves shall be designed so they can be repacked under service pressure without removing the bonnet.
- G. Packing shall be one of the following:
 - 1. Multiple split V-ring compression type with a definite packing gland, or
 - 2. Permanent non-adjustable triple lobe Buna-N (Buna-V for buried and submerged installations) O-ring shaft seal with integral cartridges through 24 inch sizes conforming to AWWA C504 and AWWA C507, latest revision.
- H. To prevent entry of dirt or liquid for buried or submerged service, all such valves shall include totally enclosed gear operator and mounting bracket. All necessary valve assembly nuts and bolts shall be 316 stainless steel.
- I. All valves 6 inches and larger, and all buried or submerged valves shall include an enclosed gear operator.
- J. Valves shall be DeZurik series 100, or approved equal.

2.06 PRESSURE RELIEF VALVES - AIR

- A. Weighted pressure relief valves shall be provided and installed where shown on the Drawings or specified in other Sections.
- B. The weight loaded pressure relief valves shall be cast iron body with cast iron weights. The cast iron weights shall be easily added or subtracted so that an adjustment can be made to accommodate the required pressure capabilities.
- C. The weighted pressure relief valves shall be as manufactured by Fuller Company, Roots Type PW, or equal.

2.07 MUD VALVES

- A. Mud Valves
 - 1. Unless otherwise noted, mud valves shall be of the rising stem type. Mud valves shall have 125 lb standard drilling, bronze mounting with machined disc and disc seat for accurate fit and tight shutoff.
 - 2. The valve body shall be cast iron.
 - 3. The stem, stem nut, disc ring, and seat ring shall be bronze.
 - 4. Extension stems, operating nut, and hand wheel shall be provided as listed in the Valve Schedule in PART FOUR or shown on the Drawings.

2.08 TELESCOPING VALVES

- A. Valves shall be capable of giving an infinitely variable discharge rate.
- B. Unless otherwise noted, telescoping valves shall be of the non-rising stem type.
- C. General contractor shall provide normal bolted, cast iron flange at elevation shown on the drawing and shall be responsible to provide sufficient straight pipe below the valve to allow for full travel of the tube inside.
- D. Each valve shall consist of an offset, cast iron, floor stand, with cut tooth pinion, and suitable guides for the operating rack. The pinion will be mounted in the head of the stand, on a shaft, and provided with a ductile iron pawl to lock the unit in any desired position, with palm pressure release. Pinion shaft is operated by a 12-inch diameter cast aluminum spoke hand wheel with rotating crank handle.
- E. The decant tube is to be of PVC pipe, smooth, stiff, concentric, connected on upper end with steel bail, threaded adjustable rod, to steel bar rack assembly.
- F. Special flange and gasket shall be provided by the equipment manufacturer for lower location with watertight ring to bolt to pipe flange by Contractor. Clearance in this seal will be only sufficient to allow tube to slip without excessive pressure. Foundation bolts for operating stand will be galvanized steel furnished with the equipment.
- G. Telescoping valves shall be of the size shown on the Drawings or listed in the Valve Schedule in PART FOUR.

2.09 PINCH VALVES

- A. VALVE CONSTRUCTION: Pinch valves shall consist of the valve body, elastomer sleeve, pinch bars, pull bars, actuator shaft, actuator base plate, actuator and assembly hardware. The valves shall be opened and closed with two mechanical pinch bars that constrict the sleeve between the bars for center-line closure. The pinch bars shall be enclosed inside the valve body. The top pinch bar shall be raised and lowered by a center actuator shaft with a polished, non-threaded surface. The lower pinch bar shall be raised and lowered with two pull bars anchored to the actuator base plate and extending through the valve body. Valves shall provide 100 percent of the port area of the joining pipe at the valve ends and, unless otherwise specified, through the entire length of the valve. Valves shall be capable of closing bubble tight against the maximum working pressure specified.
- B. VALVE BODY: Pinch valves shall be enclosed, split body design and conform to industry standard

ASME/ANSI B-16.10 dimensions, ANSI #150 flanges. Bushings shall be provided through the valve body to protect actuator shaft and pull bars.

- C. ELASTOMER SLEEVE: Pinch valves shall be equipped with a one piece, seamless flange-to-flange elastomer sleeve specifically designed for the specified service conditions. The sleeve shall also be fabricated with polyester or stronger ply cords and folds. Sleeve flanges shall also contain an internal stainless steel ring without bolt holes to allow in-line sleeve replacement by removal of the lower valve body half. Where specified, pull tabs coming from the cord ply and extending through the exterior elastomer coating shall be furnished for attachment to the pinch bars to ensure positive opening force under negative pipeline pressure. A wear monitor sensor wire shall be imbedded between the inner elastomer lining and the reinforcing cords for use with a wear monitoring alarm system. Supplier must demonstrate a minimum 5 years field experience with its' wear sensor wire. Elastomer material shall be [Select: Natural Rubber, Butyl, Nitrile (Buna N), Neoprene, EPDM, Hypalon®, or Viton®].
- D. SHOP PAINTING: All interior and exterior ferrous metal surfaces of valves and accessories shall be shop painted for corrosion protection. The valve manufacturer's standard coating will be acceptable, provided it is functionally equivalent to the specified coating and is compatible with the specified field painting.
- E. MATERIALS: Materials used in the manufacture of pinch valves shall be as follows:

Body

1" through 8" valves	Cast Iron
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10" and larger valves	Carbon steel
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Elastomer Sleeve	PGR, NR, N, IIR, NBR, CSM, EPDM or FPM
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Pull Bars	Stainless steel, AISI Type 316
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Pinch Bars	Stainless steel, AISI Type 316
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Actuator Stem/ Shaft	Stainless steel, AISI Type 316
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Assembly Hardware	Stainless steel, AISI Type 316
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Shop Coatings

Exterior/Interior valve body surfaces	Epoxy or TGIC Powder Coating
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- F. AUTOMATIC ACTUATION: Valves shall be actuated **electrically** by multi-turn electro-mechanical actuator [manufactured by EIM, AUMA, Rotork, Limitorque, etc.] or **pneumatically** with double-acting pneumatic cylinder, with 4-way solenoid valve. Pneumatic cylinder shall be supplied have 316 stainless steel tie rods and shaft.
1. Modulating Electro-mechanical actuators shall be supplied with 4-20mA throttling capability
 2. Modulating Pneumatic actuators: valves shall be supplied with linear positioners [3-15 psi] or [4-20mA] signal input, gauge block, manufactured by PosiFlex, PMV, ABB Bailey, Fisher, or Valtek.
- G. MANUAL ACTUATION: Valves 1 inch ID to 6 inch ID shall be supplied with hand wheel operated with a lubricated and sealed stainless steel stem screw, housing and threaded nut. Valves 6 inch ID [150 psi. service] and larger shall be provided with sealed and lubricated hand wheel or chain wheel mechanism with a gear reducer and stainless steel stem cover. Unless otherwise specified by the Owner, the direction of rotation of the wheel shall be counter-clockwise to open the valve. Manual actuators shall produce the required torque with a maximum pull of 80 pounds on the hand wheel or chain. Actuator components shall withstand, without damage, a pull of 200 pounds on the hand wheel or chain.

Chain wheels: Unless specifically required otherwise, all valves with center lines more than 7'-6" above the floor shall be provided with chain wheels and operating chains. Each chain wheel operated valve shall be equipped with a chain guide which will permit rapid handing of the operating chain without "gagging" of the

wheel and will also permit reasonable side pull on the chain. Suitable extensions shall be provided, if necessary, to prevent interference of the chain with adjacent piping or equipment. Operating chains shall be hot dipped galvanized carbon steel and shall be looped to extend to within 4 feet of the floor below the valve.

Position Indicators: Unless otherwise specified, each valve shall be provided with a position indicator to display the position of the pinch bars relative to fully open. The position indicator shall be mounted on the valve on the same side as the hand wheel

- H. ACCESSORIES [Optional]: Wear Monitoring System: Valve shall come equipped with a complete wear monitoring system to include an indicator control box to accept signal from the internal wear monitor sensor. Alarm box shall be equipped with power and alarm LED and a push-to-test button.
- I. ACCEPTABLE PRODUCTS: Valves shall be manufactured by RF Technologies, Inc., of Jessup, Maryland or pre-approved equal.

2.10 CHECK VALVES –SWING-TYPE

- A. Type: Full opening, swing-type check valve conforming to AWWA C508 standards. Suitable for potable or non-potable water. All working parts shall be accessible through the top of valve.
- B. Body: Cast iron; ASTM A126 Class B.
- C. Ends: Flanged ends ANSI Class 125.
- D. Seat: Bronze B62. Shall be replaceable.
- E. Disc: Cast iron, rubber faced. Cast iron ASTM A126, Class B, rubber-Buna N.
- F. Hinge Pin: Stainless steel type 304.
- G. Operator: Outside lever and adjustable weight.
- H. Manufacturer:
 - 1. M & H
 - 2. Clow
 - 3. Or Equal

2.11 CHECK VALVES – RUBBER FLAPPER

- A. Where rubber flapper Check Valves are called for, the body shall be heavy cast iron. The flapper shall be one piece Buna-N compression molded to satisfy bubble tight shut off at low pressures. The flapper shall be of steel reinforced but with no metal exposed to the media. A back flow device shall be provided to open the check valve flapper without removing the check valve. The area throughout the valve body shall be equal to the pipe area as a minimum. The area through the seat section shall be larger than the inlet and outlet of the valve. Bodies shall be cast iron ASTM A126 Grade B; Exterior paint shall be universal metal primer. Interior shall be epoxy coated or rubber lined. Valves shall be APCO Series 100 Swing Check Valve, Val-Matic Model Swing Flex or approved equal.

2.12 CHECK VALVES – RUBBER “DUCKBILL”

- A. Check Valves are to be all rubber and the flow operated check type with slip-in cuff connection. The port area shall contour down to a duckbill which shall allow passage of flow in one direction while preventing reverse flow. The flexible duckbill sleeve shall be one piece rubber construction with nylon reinforcement.
- B. The outside diameter of the “cuff” portion of the valve shall be manufactured to fit snugly within the inside diameter of the thimble. The bill height shall also fit within the thimble I.D.

- C. A stainless steel band shall be installed inside the cuff portion of the valve. The band shall expand outwards by means of a turnbuckle to hold the valve in place. The band shall be pre-drilled to allow pins to be installed through the valve and into the thimble.
- D. Manufacturer must have available flow test data from an accredited hydraulics laboratory to confirm pressure drop data. Company name, plant location, valve size and serial number shall be bonded to the check valve. Valves shall be manufactured in the USA.
- E. Thimble insert shall be carbon steel epoxy coated per AWWA C-550. Thimble ends shall be plain and 125 pound flange.
- F. When line pressure inside the valve exceeds the backpressure outside the valve by a certain amount, the line pressure forces the bills of the valve open, allowing flow to pass. When the backpressure exceeds the line pressure by the same amount, the bills of the valve are forced closed.
- G. All valves shall be of the Series 37-G as manufactured by Tideflex Technologies, Inc. of Carnegie, PA 15106 or approved equal.

2.13 HOPPER GATES

- A. General: The gate shall be complete with all necessary appurtenances that are required for proper operation and completion of the work included under this section. Each motorized gate shall consist of a gate body, adjustable labyrinth seal, wedge gate blade design, wheels, travel assembly with electric actuator, fasteners, and structural steel frame. The gate shall be drip less and direct all seepage to a single drain.
- B. The bin gate shall be fabricated and contain components adequate to meet the following capacity and service:
 - 1. Material: Sludge removed from domestic sewage
 - 2. Maximum Bulk Density: 120 lbs per cubic foot
 - 3. Maximum Static head: 3 ft.
 - 4. Running Hours per day: 1
 - 5. Speed of travel: 1 inch per second
- C. Gate shall provide an open area at least as large as the opening of the hopper (per drawings), and be designed to operate when the hopper is full. The contractor shall verify the dimensions of the hopper and shall be fully responsible for the proper interface between the gate and hopper.
- D. Bin gate shall be as manufactured by American Bulk Conveying, Inc., or approved equal.
- E. Design: Calculations with full hopper loads, blade breakaway and running force shall be provided to confirm blade thickness and Operator selection with a safety factor of 1.5x.
- F. Frame:
 - 1. Frame shall be type 304 stainless steel of the general shapes indicated on the drawings. Frame shall be designated for maximum rigidity, and shall extend in one continuous piece for the total travel of the blade. Lifting lugs, two on each side, shall be provided.
 - 2. Frame shall be designed to be compatible with the support system shown on the drawings and shall include any reinforcement needed to support the motorized operator entirely from the frame. Design calculations shall demonstrate that the full load, breakaway force and running force can be supported by the frame, blade and actuator.
 - 3. Regreasable Rollers with needle bearings and seals with an L-10 rating of 10,000 hours shall provide and maintain positive blade/seal contact on all four sides and shall be located out of the material flow.

4. Frame shall provide a flanged connection with bolt holes drilled to match the bottom of the hopper. Nuts shall be self-locking, 304/316 Stainless Steel. A 1/4-inch closed cell neoprene gasket shall be provided around the entire frame to seal the frame and bin/hopper connection.
5. Frame shall provide a displacement pocket so that material on the end of the blade does not interfere with closing.
6. The displacement pocket area shall include a sloped drain trough to direct leakage from the top of the blade to a drain. Gates for Screenings shall also have drain rails on the other three sides sloping toward the end pocket drain to catch any seepage around the gate when closed.
7. A 1-inch male NPT flushing port and a minimum 6-inch flanged male drain fitting shall be provided on the closed end of the frame.

G. Seals & Blade (Labyrinth Design):

1. Blade and seal arrangement shall be of an adjustable labyrinth design to prevent direct flow through the seal and with stainless steel vertical sidewalls on three sides to restrict and direct seepage to the drainage trough.
2. The gate shall be equipped with heavy-duty 1/2" wide minimum one-piece hot vulcanized molded neoprene rubber seals with 1/2" diameter contact area and anti-friction Teflon coating on the surface in contact with the blade along the full perimeter. The Seals shall be retained by bolted 304 Stainless Steel bars.
3. The blade shall be of a wedge design so that the seal is not in full sliding contact with the blade during travel and shall "wedge" against the seal only at full closure.
4. The blade (sliding member) shall be one-piece minimum 1/4" thick type 304 stainless steel plate. Thickness shall be sufficient to; prevent jamming due to deflection and design calculations shall demonstrate that maximum deflection shall be 1/360 under all operating conditions.

H. Gate Operators:

1. The bin gate shall be provided with a non-raising stem (or rack & pinion) motorized operator assembly with a manual override. Motorized operator shall be ANDCO, AUMA, Limitorque or approved equal and be sized for 1.5x calculated breakaway force.
2. Motorized operator shall be completely supported by the gate frame.
3. Motorized operator shall permit the gate to be stopped or reversed at any partially open position.
4. Motor shall be squirrel-cage, TEFC, minimum, and shall operate from a 480 volt, 3 phase, 60 hertz power supply and be capable of producing not less than 1-1/2 times the required operating torque.
5. Manual override shall be provided by a chain wheel operator and de-clutching Lever. Chain shall extend to within 3 feet of the floor.

I. Electrical:

1. The gate manufacturer shall furnish and assemble all electrical equipment on the gate including motor, limit switches and conduit
2. Electrical equipment shall be furnished in accordance with the applicable requirements of Article 610 of the National Electrical Code, and the installation and wiring shall be made in accordance with Division 16, ELECTRICAL.
3. Motorized operator shall be provided with a single pole, double-throw limit switch rated at 5 amps at 120 volts AC, for remote indication of fully open and fully closed positions.

2.14 DIVERTER GATES

- A. General: The gate shall be complete with all necessary appurtenances that are required for proper operation and completion of the work included under this section. Each gate shall consist of a gate body, diverter gate, tilt bar, control shaft with bronze bearings, fasteners, and structural steel frame. The gate shall be drip less.
- B. The diverter gate shall be fabricated and contain components adequate to meet the following capacity and service:
 - 1. Material: Sludge removed from domestic sewage
 - 2. Maximum Bulk Density: 120 lbs per cubic foot
 - 3. Maximum Static head: 3 ft
 - 4. Running Hours per day: 8
- C. Gate shall provide an open area at least as large as the opening of the hopper (per drawings), and be designed to operate when the hopper is full. The contractor shall verify the dimensions of the hopper and shall be fully responsible for the proper interface between the gate and hopper.
- D. Diverter gate shall be as manufactured by American Bulk Conveying, Inc., or approved equal.
- E. Design: Calculations with full hopper loads, blade breakaway and running force shall be provided to confirm blade thickness and Operator selection with a safety factor of 1.5x.
- F. Frame:
 - 1. Frame shall be type 304 stainless steel of the general shapes indicated on the drawings. Frame shall be designated for maximum rigidity, and shall extend in one continuous piece for the total travel of the blade. Lifting lugs, two on each side, shall be provided.
 - 2. Frame shall be designed to be compatible with the support system shown on the drawings and shall include any reinforcement needed to support the tilt bar entirely from the frame. Design calculations shall demonstrate that the full load, breakaway force and running force can be supported by the frame, blade and actuator.
 - 3. Frame shall provide a flanged connection with bolt holes drilled to match the bottom of the hopper. Nuts shall be self-locking, 304/316 Stainless Steel. A 1/4-inch closed cell neoprene gasket shall be provided around the entire frame to seal the frame and bin/hopper connection.
- G. Blade: The blade (tilting member) shall be one-piece minimum 1/4" thick type 304 stainless steel plate. Thickness shall be sufficient to prevent jamming due to deflection and design calculations shall demonstrate that maximum deflection shall be 1/360 under all operating conditions.
- H. Gate Operators:
 - 1. The bin gate shall be provided with a manual tilt bar and control shaft, operator assembly.
 - 2. Manual operator shall be completely supported by the gate frame.

2.15 VALVE BOXES

- A. All buried valves shall be provided with valve boxes. Valve boxes shall be standard, three-piece screw type, cast iron adjustable boxes, with tops of boxes set flush to finished grade. Valve boxes shall not be less than 5 in. in diameter and shall have a minimum thickness at any point of 3/16 in. The cover shall have cast thereon an appropriate name for the kind of service for which the valve is used.
- B. A valve box shall be provided for each curb stop. A key shall be furnished to operate curb stops.
- C. All parts of valve boxes, bases, and covers shall be coated by dipping in a bituminous varnish.

2.16 FLOOR BOXES AND STANDS

- A. Each valve operator projecting through a floor shall be equipped with a floor box or floor stand, as shown on the Drawings or listed in the Valve Schedule in PART FOUR.
- B. Floor boxes for access to operating nuts of valves and sluice or slide gates shall be cast iron cover and body with bronze bushings, of length equal to the thickness of the concrete slab in which they are installed.
- C. Floor stands shall be made of cast iron and shall extend to a level where a hand wheel or other operator is easily operated. Floor stands shall be shop primed and field painted according to the Painting Specifications. Stands shall be anchored to the concrete slab with stainless steel bolts.
- D. Boxes and stands shall be fitted with bronze bushings to maintain proper stem alignment.

2.17 EXTENSION STEMS AND STEM GUIDES

- A. Each valve shall be provided with extension stem, when required for ease of operation. Unless otherwise specified, each extension stem shall be made of cold rolled steel, the same size as the valve stem of the valve it operates. If the extension is more than 8 feet long, intermediate stem guides shall be installed and supported from the wall by suitable brackets at a maximum spacing of 8 feet. Brackets and stem guides shall be made of cast iron and be fully adjustable. The guide block shall be bronze bushed where it contacts the extension stem. Stem guides shall be as manufactured by the Eddy Valve Co., Rodney Hunt, or equal. Secure stem guides to walls with stainless steel 5/8-inch expansion bolts.
- B. All valves that are to be operated by a T-wrench shall have a 2-inch square-operating nut at the top of the extension stem.
- C. Tee wrenches shall be supplied as required or specified. Handle shall extend to 3 feet 0 inches above finish grade.
- D. Stems for operating plug valves shall not be less than 7/8-inch diameter solid steel pipe, ASTM A36 with intermediate steady guides. Weld socket for 2 inch valve nuts to bottom of extension stems and pin sockets to nut with cadmium plated 3/8-inch bolts. Provide a permanent lever or a 2-inch square operating nut at the top of stems, in accordance with the Valve Schedule or Drawings.

2.18 CHAIN WHEELS

- A. Each valve with a manual operator within a building which is more than 5 feet 6 inches above the floor to the rim of the manual operator shall have a chain wheel with cadmium plated chain looping 3 feet 6 inches from the floor. The valve shall be oriented to permit chain-wheel operation or intermediate pulleys shall be oriented to permit chain-wheel operation.

2.19 TEE WRENCHES

- A. Two (2) tee wrenches 3 feet in length shall be supplied by the Contractor. All tee wrenches supplied shall be capable of engaging a 2-inch square-operating nut.

2.20 OPERATORS

- A. Manual Operation
 - 1. Valves shall be equipped with nut, hand-wheel, crank, chain, gears, floor stand, and other appurtenances as required for manual operation as specified, showed on the Drawings, or Scheduled. If not otherwise indicated, as a minimum, buried valves shall be equipped with a 2-in. operating nut, and valves in structures shall have hand wheels.
 - 2. Operation shall be designed so that the effort required to operate the hand wheel, lever, or chain shall not exceed 25 lbs. applied at the extremity of the lever or chain, or a 25 lb couple applied to a hand wheel. The hand wheels on valves 4 inches and larger shall not be less than 12 inches in diameter.

B. All valves 6 inches and larger, and all buried, submerged, or chain operated valves shall be gear operated. Gears of valve operation shall be sized for the working pressure and installed in such a manner that the stuffing box will be accessible for packing.

C. Electric Valve Operators

1. The operator shall be the helical and worm gear type driven by an electric motor. Operators shall be designed for either on-off or for modulating service as indicated in the Valve Schedule or as noted on the Drawings. All power gearing shall be grease lubricated. The actuator shall be in conformance with AWWA C-504. The valve manufacturer shall furnish the value of the maximum operating torque required to operate the valve as defined the Appendix to AWWA C-504. The operator manufacturer shall furnish evidence that the operator is designed to equal or exceed the torque requirements.
2. Unless otherwise noted, the operator shall be geared to operate the valve from the fully open position to the fully closed position or vice versa in approximately 60 seconds. It shall be possible to change this cycle time by substituting suitable gear trains. The operator shall be equipped with a declutchable hand-wheel for manual operation. The operator shall be designed to hold the valve in any intermediate position between fully open and fully closed without creeping or fluttering.
3. Suitable reduction gearing shall be provided off the main shaft of the gearing, turning approximately 270 degrees while the valve performs full travel. The reduction gearing shall be equipped with the following position indicating devices for each operator:
 - a. A mechanical position indicator dial
4. Each operator shall be equipped with adjustable torque switches for overload protection in both opening and closing directions with torque switch bypass for unseating.
5. Each operator shall be equipped with four adjustable train gear limit switches. Each limit switch shall include a switch and counter gear. The setting accuracy shall be less than 1/10 turn of the operator output shaft. Two gear limit switches are for remote indication of end positions.
6. Each motor shall be 480 volts, 60 Hz, three phase, induction type as recommended by the operator manufacturer.
7. Three thermostats in series placed in the winding shall provide the motor with thermal protection. They shall interrupt the control circuit as soon as the temperature goes beyond the permissible winding temperature.
8. Each operator shall be equipped with a reversing magnetic starter. The starter shall be capable of receiving contact closures from remote sources to actuate the operator in either direction.
9. Control voltage shall be 120 volts supplied by a transformer included in the control enclosure. Each operator shall include a local OPEN-STOP-CLOSE control switch and a pad lockable LOCAL-OFF-REMOTE selector switch. Local/Remote contact shall be available for remote indication of the switch position. Remote open/stop/close capability shall be provided.
10. All electrical components shall be integral with the operator, housed in a watertight NEMA 4X enclosure and completely wired. A minimum 2-watt strip heater shall provide condensation protection.
11. A circuit breaker disconnect shall be provided with the operator.
12. Easily identifiable terminal blocks shall be provided for all external power, control, and signal connections.
13. Operators, located outdoors, shall include thermostats and space heaters in the motor and control compartments.
14. The operator shall be as manufactured by Limitorque, EIM, or equal.

2.21 PAINTING AND FINISHES

A. All iron parts shall be painted before leaving the shop.

- B. Unless otherwise specified, all internal ferrous surfaces of each valve except finished or bearing surfaces shall be shop painted with two coats of an asphalt varnish.
- C. Unless otherwise specified, all exterior ferrous surfaces of each valve except finished or bearing surfaces shall be shop painted with two coats of a universally compatible primer, or in the case of valves buried or submerged, with two coats of an asphalt varnish.

PART THREE - EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 IDENTIFICATION OF VALVES

- A. Each valve installed in exposed process piping systems, shall be provided with a 1-1/2 inch minimum diameter heavy brass tag. Each tag shall bear the identifying number of the valve and an identifying letter symbol of the service line.
- B. The tags shall be attached to the valve by split-key rings soldered so that ring and tag cannot be removed. The numbers and letters shall be of block type, with 1/2-inch high numbers and 1/4-inch high letters stamped thereon and filled with black enamel.

3.03 VALVE DIRECTORIES

- A. The Contractor shall furnish schematic pipe diagrams and valve directories for each process piping system installed. Each schematic pipe diagram shall be single line showing the relative position of valves, valve numbers and the direction of flow. Each directory shall show each valve number and the location of each valve. Each diagram and directory shall be on an approved material and framed in a glazed frame with screw eyes and wires for hanging and shall be located as directed by the Engineer.

3.04 COORDINATION

- A. Coordinate shall be provided as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

3.05 INSTALLATION

- A. Install the work of this Section in strict accordance with the manufacturer's recommendations and shop drawings as approved by the Engineer.
- B. Stem guides shall be accurately aligned.
- C. Upon completion of the installation, carefully inspect each component and verify that all items have been installed in their proper location, adequately anchored, and adjusted to achieve optimum operation.

3.06 TESTING

- A. Each check, gate, butterfly, and ball valve shall be submitted to operation and hydrostatic tests at the manufacturer's plant as specified in applicable AWWA Standards.
- B. Other valves shall be tested in conformance with applicable specifications.
- C. All valves shall be tested in place by the Contractor, as far as practicable under conditions for the pipelines in which they are placed, and defects revealed in valves or connections under test shall be corrected at the expense of the Contractor to the satisfaction of the Project Field Representative.

3.07 SERVICE

- A. Demonstrate to the Owner's operation and maintenance personnel the proper methods for operating and maintaining the equipment, and the contents of the operation and maintenance manual if required to be submitted under Article 1.03 of this Section.
- B. The Contractor shall furnish to the Owner, through the Engineer, a written report prepared by the equipment manufacturer's field service technician certifying that the equipment:
 - 1. Has been properly installed and lubricated.
 - 2. Is in accurate alignment.
 - 3. Is free from any undue stress imposed by connecting piping or anchor bolts.
 - 4. Has been operated under full load and that it operates satisfactorily and in compliance with the requirements of this Section.

PART FOUR - SPECIAL PROVISIONS

END OF SECTION

DIVISION 14

WATER & WASTEWATER EQUIPMENT

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PART ONE - GENERAL

1.01 DESCRIPTION

- A. Requirements specified in the Conditions of Contract and General Requirements form a part of this section. Provide a shafted screw conveyor system as shown on the contract drawings and as specified herein. Conveyor to be complete with drive unit, support, inlet, discharge, interconnecting chutework and all appurtenances specified and required for a complete conveying unit, ready for installation.

1.02 QUALITY ASSURANCE

- A. Unit shall be the product of a manufacturer engaged in the design and manufacture of similar equipment in successful operation in similar applications. The manufacturer shall have a minimum ten years of municipal wastewater experience in the design and manufacturing of shafted screws of sizes specified or larger.

1.03 SUBMITTALS

- A. General. Comply with requirements specified in Section 01300. Submit shop drawings showing fabrication, assembly, foundation support and installation drawings, together with detailed specifications and data covering performance and materials of construction, equipment weights, electric motor data, motor enclosures, motor sizes, motor mounting details, power drive assembly, parts, and devices. Submit instruction manuals in accordance with Section.

PART TWO - PRODUCTS

2.01 MANUFACTURER

- A. The screw conveyor shall be as supplied and manufactured by Huber Technology (Model Ro8t), or approved equal.
- 304L Stainless Steel Construction , including shafted screw
 - Required all supports along the conveyor for install as shown on plans. Any support using the canopy roof shall be coordinated within the Metal Building design.
 - One (1) feed trough for feed from screw presses
 - One (1) discharge chute into Dumpster
 - Constant speed type motor, 460 VAC, 2-HP, 3 phase, Class 1 Division 1

PART THREE - EXECUTION

3.01 INSTALLATION

- A. Equipment Inspection. Examine all equipment delivered to the site and ensure that it is undamaged, and in conformance with the approved shop drawings
- B. Installation. Install in conformance with manufacturer's recommendations. Arrange to have the equipment supplier furnish for one (1) day the services of competent factory trained personnel to inspect the installation and initial operation
- C. Instruction. After the equipment has been installed, tested, adjusted and placed in satisfactory operating condition, provide the services of a representative of the manufacturer to instruct owner's operating personnel in the use and maintenance of the equipment. Schedule the instruction which shall be for a minimum of one working day with the owner.

PART FOUR – SPECIAL PROVISIONS

4.01 INSTALLATION, START-UP AND OPERATOR TRAINING

- A. Contractor shall verify all dimensions in the field to ensure compliance of equipment dimensions with the drawings. Contractor shall notify engineer of significant deviations.
- B. Supplier shall furnish the services of a factory-trained service engineer for one (1) trip to include a total of eight (8) workdays to inspect the installation, observe start up, and provide operator training.
- C. Secondary start up services shall be required on the items listed in this Section. Secondary Start Up services shall typically be provided between 30 to 60 days but no later than 90 days following initial start-up. Scheduling shall be coordinated with Village of Crestline plant superintendent. The cost for these services shall be included within the Contractors Bid prices under the appropriate bid items. The intent of the Secondary start up services is to provide the plant superintendent the opportunity to work with the manufacturer's representative after having working knowledge of the equipment. Each manufacturer's representative shall be available for a full eight (8) hour day.

END OF SECTION

Sludge Dewatering Screw Press

Part One – General

1.01 SCOPE

- A. Contractor shall furnish and install one (1) sludge dewatering screw press as indicated on the drawings. The screw press shall be manufactured from AISI 304L stainless steel shapes. Fabrication and assembly shall be in conformance with these specifications and drawings.
- B. Contractor shall furnished a complete dewatering system including screw press, drive motors, gear reducers, support legs, anchor bolts, polymer station, piping and wiring, controls, and all accessories and appurtenances specified or otherwise required for a complete and properly operating installation.
- C. Contractor shall coordinate all details of the equipment with other related parts of the work. He shall verify that all structures, piping, wiring, and equipment components are compatible. Contractor shall be responsible for all structural and other alterations required to accommodate equipment differing in dimensions or other characteristics from these specifications and drawings.
- D. Contractor shall install the equipment according to instructions and recommendations of the equipment manufacturer.
- E. Power supply for main control panel is 460 Volts, 60 Hz, 3-phase. The polymer make down system needs a separate 120 VAC, 60 Hz, single phase power supply.

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM) Publications:
 - 1. Section A322: Carbon and Alloy Steel Bar Specifications.
 - 2. Section A507-10: Standard Specification for Drawing Alloy Steel, Sheet and Strip, Hot-Rolled and Cold Rolled
- B. Anti-Friction Bearing Manufacturers Association (AFBMA) Publications:
 - 1. Standard 9-90 Load Ratings and Fatigue Life for Ball Bearings.
 - 2. Standard 11-90 Load Ratings and Fatigue Life for Roller Bearings.
- C. American Institute of Steel Construction (AISC) Publications
- D. American Welding Society (AWS) Publications
- E. American Structures Painting Council (ASPC) Publications

1.03 SUBMITTALS

- A. The following information shall be submitted to the engineer. In accordance with Section 01300, copies of all materials required to establish compliance with this Section. Submittals shall include the following:
- B. Product Data: Include the following:
 - 1. Descriptive literature, brochures, catalogs, cut-sheets and other detailed descriptive material of the equipment.
 - 2. Motor characteristics and performance information.
 - 3. Gear reducer data including service factor, efficiency, torque rating, and materials.

4. Parts list including a list of recommended spare parts.
- C. Shop Drawings: Include the following:
1. Manufacturer's installation drawings.
 2. Wiring and schematic diagrams.
- D. Operations and maintenance manual: See Section 01300.
- E. Detailed installation instructions, with clear step-by-step points on the correct mechanical and electrical installation procedures.
- F. Equipment weights and lifting points.
- G. Recommendations for short and long term storage.
- H. A copy of the manufacturer's warranty.
- I. A copy of documents proving certification of the Manufacturer's Quality Management System according to ISO 9001 and Environmental Protection Management System according to ISO 14001.
- J. Failure to include all drawings applicable to the equipment specified in this section will result in rejection of the entire submittal with no further review.

1.04 QUALITY ASSURANCE

- A. To ensure quality, conformance, and reliability with regard to the manufacturing and production of the machinery described in this section, the equipment manufacturer shall meet the requirements listed in this section
- B. Manufacturer shall have established an ISO 9001 certified quality management system.
- C. Manufacturer shall have established an ISO 14001 certified environmental protection management system.
- D. All stainless steel components and structures shall be submersed in a chemical bath of nitric acid and hydrofluoric acid (pickling bath) to remove any residues that may be present on the material as a result of forming, manufacture, or handling. After removal from the pickling bath, the equipment must be washed with a high-pressure wash of cold water to remove any remaining surface debris and promote the formation of an oxidized passive layer which is critical to the long life of the stainless steel. No stainless steel components may be fabricated or assembled in a factory where carbon steel products are also fabricated, in order to prevent contamination by rust.
- E. Screw Press shall be manufacturer's standard product and only be modified as necessary to comply with the drawings, specifications, and specified service conditions.
- F. All welding is performed in accordance with American Welding Society (AWS) D1.1 Structural Welding Code, or equivalent.
- G. Manufacturer shall provide screw press, polymer system, motors, gear reducers, controls, control panels, and lifting attachments as a complete integrated package to ensure proper coordination, compatibility, and operation of the system.
- H. Manufacturer shall provide services by a factory-trained service engineer, specifically trained on the type of equipment specified. Service engineer requirements include, but are not limited to the following:
1. Service engineer shall be present during initial energizing of equipment to determine directional testing as described in Section 4.01 C (Installation).
 2. Service engineer shall inspect and verify location of anchor bolts, placement, leveling, alignment and field erection of equipment, as well as control panel operation and electrical connections.

3. Service engineer shall provide classroom and/or field training on the operation and maintenance of the equipment to operator personnel.
4. Manufacturer shall state field service rates for a service engineer to owner and contractor. In the event that the field service time required by this section should not be sufficient to properly place the equipment into operation, additional time shall be purchased by contractor to correct deficiencies in installation, equipment, or material without additional cost to owner.
- L. Contractor shall guarantee all equipment against faulty or inadequate design, improper assembly or installation, defective workmanship or materials, and breakage or other failure. Materials shall be suitable for service conditions.
- M. All equipment shall be designed, fabricated, and assembled in accordance with recognized and acceptable engineering and shop practice. Individual parts shall be manufactured to standard sizes and thicknesses so that repair parts can be installed in the field. Like parts of duplicate units shall be interchangeable. Equipment shall not have been in service prior to delivery, except as required by testing.
- N. Each major component of equipment shall have the manufacturer's name, address and product identification on a nameplate securely affixed to the equipment.

1.05 DELIVERY, STORAGE, AND HANDLING OF EQUIPMENT

- A. Equipment shall be shipped and delivered fully assembled, except where partial disassembly is required in order to conform to transportation regulations or for the protection of components.
- B. Contractor shall be responsible for unloading and shall have equipment on-site at the time of delivery permitting proper hoisting of the equipment.

Part Two - Products

2.01 ACCEPTABLE MANUFACTURERS

- A. ROTAMAT® Sludge Dewatering System Model RoS3 Q440 from Huber Technology, Inc., FKC Co., Ltd, or approved Equal
- B. Liquid polymer blending system: Veloblend VM-P from Velocity Dynamics, Inc or approved equal
- C. Pre-approved alternate manufacturer(s), as per chapter 1.06. Alternates shall not be acceptable unless they have been pre-approved.

2.02 PERFORMANCE AND DESIGN REQUIREMENTS

- A. Sludge to be dewatered shall be well-mixed and well blended having the following characteristics:
 1. Sludge :
 - a) Sludge type: Aerobically Digested
 - b) Solids concentration: 2-3%
- B. Each dewatering screw press shall be capable of dewatering 30 Gallons per Minute (GPM) of the specified municipal wastewater sludge to a final solids content of 18%. The solids capture rate shall be a minimum of 95 %.
- C. The sludge dewatering plant consists of the following major parts:
 - a) Screw Press incl. support legs
 - b) Polymer dosing system
- D. All parts of the dewatering press shall be designed and appropriate for the service specified and indicated and for continuous operation.

- E. Sufficient room for inspection, maintenance, repair and adjustment shall be provided. Contractor shall provide hoisting equipment to facilitate installation and maintenance work.
- F. The physical layout shown on the drawings is based on the Huber ROTAMAT®RoS3 Q440. If equipment by another manufacturer is to be supplied, contractor shall include in the bid all necessary modifications to the piping, electrical, structural, and mechanical layouts to accommodate the equipment proposed. Contractor shall pay engineer for all modifications of drawings.
- G. All parts shall be designed and manufactured to handle the forces that may be exerted on the screw press during fabrication, shipping, erection, and proper operation according to the O&M manual.
- H. All components shall be so arranged that they can be serviced from the operating floor.
- I. All components shall be balanced so that jamming at any point will not result in structural failure, but will cause the drive motor to stall. All components, including the gear reducer, shall be designed to withstand, without damage or permanent distortion, the full stalling torque of the drive motor.

2.03 SLUDGE DEWATERING PRESS DESIGN SPECIFICATIONS

A. MATERIALS

- 1. Sludge dewatering press shall be manufactured from AISI 304L stainless steel shapes (rods, angles, and channels), pipes, and sheets. In particular, wedge wire basket, screw, shaft, covers; support legs, fasteners and anchor bolts shall be made of this material.
- 2. Brushes for helical screw flights shall be of wear resistant plastic material. The brush is held in place by stainless steel clamps and bolts which can be easily removed.
- 3. Bearings shall be anti-friction, and without the need for grease lubrication.

B. DESIGN

- 1. The screw press shall be installed inclined (at 15°). Dewatering of the sludge takes place in a basket, which consists of three sections of wedge wire baskets. The first wedge section basket shall have a bar spacing of 0.01 in (0.25 mm) and the second wedge section basket 0.01 in (0.25 mm). The third basket section shall have openings of 0.006 in (0.1 mm). The overall basket length shall be 86 in (2,250mm). The basket diameter shall be 17 in (440 mm).
- 2. The screw press shall be completely enclosed to prevent odor emission. The whole dewatering section and basket area shall be easily accessible through an inspection lid, which is mounted via two hinges on the side of the machine.
- 3. A screw shall be installed inside of the screen basket. The screw transports the sludge from the inlet to the discharge area at the end of the pressure zone. Its shaft diameter shall be conical towards the discharge section of the machine. The flights of the helical screw shall be provided with brushes to clean the wedge wire screen from the inside.
- 4. The screw shall be shafted and shall be made of stainless steel. A shaft-less screw is not acceptable. A bearing shall support the discharge end of the screw shaft. Wear strips are not acceptable.
- 5. A screw drive shall be provided at the sludge feed side of the press. The nominal motor power shall be 2.0 HP. The motor speed shall be controlled with a VFD. The drive unit shall be directly coupled to the screw shaft through a gearbox.
- 6. The cleaning of the wedge wire screen from the outside shall be performed with a stationary spray bar washing system made of stainless steel piping and spray nozzles. The spray area shall run the entire length of the screen. One solenoid valve shall control the flow to the spray bar washing system. If a cleaning cycle is initiated, the screw press motor reverses and rotates the basket, until has completed a 360 degree rotation ensuring the entire surface area of the screen is cleaned. Contractor shall provide 1 in female threaded connection for the water supply piping to the manifold of the spray system.

7. Spray water supply shall be designed for a minimum flow of 36 GPM (can be filtered non-potable water, allowed particle size 500 microns at maximum 200 ppm) at a minimum pressure of 72 PSI. Water pressure shall be a minimum of 70 PSIG. Average spray water consumption shall not exceed 27 Gallons at 70 PSIG per wash cycle. The basket shall rotate with maximum speed as mentioned in section 2.05 below.
8. A pneumatically actuated cone that serves for adjusting the pressure in the pressure zone shall be provided at the discharge end of the screening basket. The pressurized air supply shall be provided by the contractor.
9. Sludge cake shall be automatically discharged through a rectangular sludge discharge opening. The discharge height shall be 37.5 in above floor level.
10. Contractor shall provide a 4 in diameter drain line for the filtrate and connect it to the bottom drain connection of the screw press. The drain line shall also be provided with a 1.5 in flush connection with manual ball valve.

2.04 INTERNAL PIPING

- A. Contractor shall provide and install a sludge feed pump. The sludge feed pump shall be controlled through a variable frequency controller (VFD) to be supplied by the manufacturer of the screw press.
- B. Contractor shall provide a 1.5 in diameter sludge feed pipe from the sludge feed pump (with VFD) through a magnetic-inductive flow meter through a polymer-dosing ring, polymer mixing valve and flocculation pipe reactor provided by the screw press manufacturer.

2.05 DRIVE

- A. The press screw shall be driven by a shaft mounted gearbox and motor assembly. The gear reducer shall be bolted to a machined flange welded to the lower end of the press.
- B. The gear reducer shall be driven by a 1,680 rpm, 3-phase, 60 Hertz, 230/460 volt, Class 1, Division 2 continuous-duty motor with a conduit box suitable for outdoor operation. The motor power shall be 2hp.
- C. Chain-drives, belt drives, hydraulic drives or a separate upper bearing for the transport screw will not be acceptable for this project.

2.06 POLYMER DOSING SYSTEM FOR LIQUID POLYMER

- A. System shall be designed for the preparation, aging and dosing of up to 10 GPM of polymer solution having an active polymer concentration between 0.05 and 0.15 %.
- B. The polymer station shall be self contained with pumps, piping, fittings, and accessories, and shall be factory assembled and tested to eliminate field assembly work and therefore to minimize installation and start up time. The frame shall be 304 stainless steel and the piping SCH.80 PVC.
- C. A polymer mixing chamber shall be provided. A high energy, multi zoned, hydro-mechanical mixing device shall be provided. The mixing chamber shall have a translucent front cover.
- D. The hydro mechanical impeller shall be designed to produce variable intensity, back flow mixing action to optimize polymer performance without damaging polymer molecular structure.
- E. The motors shall be 0.5hp, 1750rpm, 90 V, 60Hz, wash down duty with keyless shaft and left hand impeller mounting screw.
- F. Materials: Impeller - PVC; body of mixing device - PVC; cover - clear lexan; fastener - 316 SS; seals - viton; pressure rating - 150 PSI.
- G. Contractor shall provide a drinking water connection for the dilution of the polymer in the polymer tank. The water piping to the polymer blend system shall include a 0.75 in inlet (NPT female), an UL listed solenoid valve (rated IP65), and a flow meter with a rate adjusting valve (flow 1 - 10 GPM) and low pressure alarm switch.

- H. A neat polymer metering pump with hose connector shall be provided and connected through a 0.625 in barbed hose to the polymer mixing device. The neat polymer pump shall be a progressive cavity type pump.
- I. Control Panel: NEMA 4X FRP enclosure, 120 VAC, 60 Hz, 1 PH service.
 - 1. Operator interface – discrete selector switch (system ON/OFF/REMOTE); mechanical mixer speed adjust potentiometer; stroke length / stroke speed adjustment at metering pump
 - 2. Status / Alarm indicators: system running indication; LCD display of metering pump rate (on metering pump); low pressure switch alarm
 - 3. Inputs: remote start / stop (discrete dry contact); pacing signal from main control panel (4-20mA)
 - 4. Outputs: system running (discrete dry contact); remote mode (discrete dry contact); low pressure alarm (discrete dry contact)
- J. The pressure side of the polymer system shall be connected through a 0.75 in diameter PVC pipeline and a magnetic inductive flow meter to the polymer injection ring.
- K. The injection ring is the place where the polymer is added to the sludge. A mixing valve with adjustable weight follows to ensure optimum mixing conditions and creating the right size and strength of flocks. The retention time between the mixing valve and the dewatering machine shall be a minimum of 30 seconds.

2.07 CONTROLS AND INSTRUMENTATION

- A. The entire control system shall be provided by the Manufacturer of the Screw Press.
- B. The contractor shall provide wiring between all system components as required.
- C. The contractor shall provide 460 V, 60 Hz, 3 phase power supply to the main control panel and also a 120 V, 60 Hz, single phase power supply to the control panel for the polymer system.
- D. The dewatering system shall be full-automatic and shall include the following:
 - 1. Main control panel for screw press
 - 2. Polymer system control panel
 - 3. Magnetic-inductive flow meter for thin sludge feed and polymer
 - 4. Automatic control for the pneumatic pressure cone
- E. A 460-volt main control panel shall be provided in a NEMA 4X rated stainless steel enclosure. The enclosure shall be suitable for wall mounting, shall have hinged covers which swing horizontally and shall be held closed with mechanical spring loaded fasteners, and shall include the following:
 - 1. Main power disconnect switch (pad-lockable)
 - 2. Control power transformer
 - 3. Surge arrester
 - 4. H-O-A control switches (screw drive including F/R selector switch, thin sludge pump, wash water solenoid valve)
 - 5. 2.0 hp Variable Frequency Controller (VFD) including over-current and over-heat protection for screw press main drive
 - 6. 3.0 hp Variable Frequency Controller (VFD) including over-current and over-heat protection for the thin sludge pump (positive displacement type)

7. Programmable logic controller (PLC) Allen Bradley Compactlogic with on-board Ethernet.
8. Operator Interface (OIU), Allen Bradley Panelview 600 with color touch screen and ethernet communication.
9. Running time meter for screw press, and feed pump
10. Text messages displayed on touch screen:
 - a) Over-current indications
 - b) Spray bar washing system on
 - c) Polymer dosing station status
11. Operating and warning lights for the following:
 - a) Power on
 - b) Dewatering system in operation
 - c) Malfunction indication
 - d) Reset button
12. Laminated plastic nametags shall be provided for the name of the control panel and all disconnects, switches, lights, and meters.
13. Spare terminals (control- and power voltage) shall be provided to accommodate for remote control operation and to interface with other equipment components such as the polymer dosing system, thin sludge pumps etc.
14. Control panel (120VAC, single phase) for polymer dosing station shall be furnished by polymer dosing station supplier, to guarantee always a constant concentration in the dosing chamber, with the following features:
 - a) connection terminals and control and safety devices:
 - i. polymer make down system run signal
 - ii. flow control neat polymer pump (accepting 4 – 20 mA signal)
 - b) signals to main control panel:
 - i. system run signal
 - ii. malfunction polymer station
 - c) Control panels shall be factory wired and pre-tested.

Part Three – Spare Parts

- A. The following Spare Parts shall be included and supplied together with the equipment:
 1. One (1) set of brushes with mounting hardware (clips) - (brushes are wear parts)
 2. One (1) bearing assembly for shaft
 3. One (1) solenoid valve 1-inch, 110V, Cl.1/ Div.2 for spray bar washing system
 4. Ten (10) nozzles for spray bar washing system
 5. One (1) spare part kit for neat polymer pump
- B. Spare parts shall be packaged with labels indicating the contents of each package, and shall be delivered to Owner as directed.

Part Four – Execution

4.01 INSTALLATION, START-UP AND OPERATOR TRAINING

- A. Contractor shall verify all dimensions in the field to ensure compliance of equipment dimensions with the drawings. Contractor shall notify engineer of significant deviations.
- B. Installation of the equipment shall be in strict accordance with the contract documents and the manufacturer's instructions and shop drawings. Manufacturer shall supply anchor bolts for the equipment. Contractors shall install the anchor bolts in accordance with the manufacturer's recommendations.

- C. After Installation touch-up paint shall be applied to all scratched, abraded and damaged shop painted surfaces. Coating type and color shall match shop painting. Contractor shall passivate all field welds.
- D. Supplier shall furnish the services of a factory-trained service engineer for two (2) trips including a total of eight (8) workdays to inspect the installation, observe start up, and provide operator training.
 - 1. Equipment shall not be energized, or "bumped" to check the electrical connection for motor rotation without the service engineer present.
 - 2. The service engineer shall make all necessary adjustments and settings to the controls.
 - 3. The service engineer shall demonstrate proper and sequential operation of the dewatering system. The dewatering system shall be able to operate fully automatically.
- E. Secondary start up services shall be required on the items listed in this Section. Secondary Start Up services shall typically be provided between 30 to 60 days but no later than 90 days following initial start-up. Scheduling shall be coordinated with Village of Crestline plant superintendent. The cost for these services shall be included within the Contractors Bid prices under the appropriate bid items. The intent of the Secondary start up services is to provide the plant superintendent the opportunity to work with the manufacturer's representative after having working knowledge of the equipment. Each manufacturer's representative shall be available for a full eight (8) hour day.

4.02 WARRANTY

- A. The manufacturer will warrant against any defects in material or workmanship to the screw press and framework. This warranty will commence upon delivery of the products and will expire on the earlier to occur of one (1) year from initial operation of the product or 18 months from delivery thereof (the "Warranty Period").

End of Section