

# Invitation to Bid

**City of Canton, Ohio**  
Purchasing Department  
218 Cleveland Ave. SW, 6<sup>th</sup> floor  
Canton, Ohio 44702

GP 1142 Faircrest Sanitary Sewer Project

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**Item/Project**

Engineering Department

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**Responsible Department**

Friday, August 15, 2014 at 2:00 PM local time

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**Bid Opening Date and Time**

## Bid Proposal Submitted By:

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**Company Name**

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**Street Address**

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**City**

**State**

**Zip**

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**Contact Person**

**Phone No.**

**Email Address**

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The City of Canton Engineering Department**

**LEGAL NOTICE**

**Ordinance 144/2014**

The City of Canton, Ohio Service Director will accept sealed bids until 2:00 PM local time on **Friday, August 15, 2014** for the purpose of securing bids for the:

**GP 1142 Faircrest Sanitary Sewer Project**

Submit bid according to the specifications and bid documents at the City's Purchasing Department website at <https://cantonohio.gov/purchasing/?pg=showbids> or at the Engineering Department website at <https://cantonohio.gov/engineering/?pg=507>. Submit all bids to the City of Canton Purchasing Department, 218 Cleveland Avenue SW, Sixth Floor, Canton, Ohio 44702 on or before 2:00 p.m. on the day of the bid opening. The City will disqualify any bid not received on or before 2:00 PM on **Friday, August 15, 2014**.

The Sixth Floor Conference Room of Canton City Hall is the location for the bid opening. Contact Randy Dublikar at [randall.dublikar@cantonohio.gov](mailto:randall.dublikar@cantonohio.gov) with any questions.

Each bid must contain the full name of every person or company participating in the bid.

A certified check, cashier's check or surety bond, in accordance with Section 153.54 of the Ohio Revised Code, must accompany the bid. Draw this check or bond from a solvent bank or bonding company satisfactory to the Director as a guarantee the contract and its performance are properly secured if the bid is accepted. Said certified check or cashier's check shall be for ten percent (10%) of the total amount bid. Where a bid bond is used, it shall be in an amount of one hundred percent (100%) of the total amount of the bid. The City of Canton will only accept original checks and bid bonds. Therefore if any company and or bidder submits a copy of its security, the City will disqualify the bid. Bidders submitting a certified or cashier's check will be required to provide a surety bond in the amount of one hundred percent (100%) of the contract sum for faithful performance. The Director reserves the right to waive any technical defects in any bid bond submitted so long as the bond is in substantial compliance with state law. Should any bid not be awarded or be rejected, such check or bond will be returned to the bidder or bidders after the execution of the contract.

The Board of Control reserves the right to reject any or all bids and to accept the bid(s) deemed most beneficial to the City of Canton.

The successful bidder must comply with all State of Ohio prevailing wage rates. All companies must submit their Federal ID Number.

A Project Labor Agreement (PLA) will be required for this project.

The cost estimate for this project is **\$835,469.80**

The bidder is responsible for monitoring the City's website for any official addenda.

**By order of the Canton Service Director:** William Bartos  
**Published in the Canton Repository:** July 31 and August 7, 2014

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City of Canton, Ohio

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**Section I: Instructions to Bidders**

**A. Submitting Bids**

1. Bids are to be returned to:  
The City of Canton Purchasing Department  
218 Cleveland Avenue SW, 6<sup>th</sup> floor  
Canton, OH 44702
2. Bids should be enclosed in an opaque sealed envelope, box, or other suitable container, marked with the following:
  - a. Project title.
  - b. Office where bid is to be submitted.
  - c. The contract/project for which a proposal is being made.
  - e. The name and address of the bidder.
  - f. The date and time of the bid opening.
3. The following items should be submitted with a bid in order for it to be considered. Failure to submit one of these items may result in a disqualification of the bid.
  - a. Bid Title Page
  - b. Signature Page
  - c. Proposal Pages
  - d. Bid Form 1 – Authority of Signatory
  - e. Bid Form 2 – Bid Guarantee
  - f. Bid Form 3 – Bidder Information
  - g. Bid Form 4 – Project References
  - h. Bid Form 5 – Non-Collusion Affidavit
  - i. Bid Form 6 – Minority Business Enterprise Utilization Commitment
  - j. Bid Form 7 – Questionnaire in Determining Lowest and Best Bid
  - k. Bid Form 8 – Insurance Affidavit and Requirements
  - l. Project Labor Agreement Letter of Assent
3. Bids will not be accepted after 2:00 PM on **Friday, August 15, 2014**. The party submitting a bid is solely responsible for the delivery of the bid to the specified location prior to the deadline for the receipt of bids.
4. Bidders may withdraw their bids between the time they are submitted and opened if so desired. This must be done via written request submitted to the City of

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Canton Purchasing Department.

5. The bids shall be opened and publicly read at 2:00 PM on **Friday, August 15, 2014.**

**B. Pre-Bid Meeting**

1. There will not be a pre-bid meeting for this project.

**C. Questions and Addenda**

1. All questions should be submitted in writing at least five (5) business days prior to the bid opening. Answers to questions will be issued in writing as official addenda no later than seventy two (72) hours prior to the time of the bid opening. Said addenda will become a component of the official bid packet and must be acknowledged as received on the signature page. **Failure to acknowledge all official addenda in this manner may result in your bid being disqualified.**
2. Bidders are expected to and are responsible for monitoring the City's website for all official addenda.
3. Oral instructions or decisions, unless confirmed by addenda, will not be considered valid, legal or binding.
4. All questions pertaining to the project should be directed to:  
Mr. Steve Henderson  
City of Canton Engineering Department  
2436 30<sup>th</sup> Street N.E.  
Canton, OH 44705  
Email: [steve.henderson@cantonohio.gov](mailto:steve.henderson@cantonohio.gov)

**D. Bid Proposal Form and Proposal Page**

1. The proposal page is the only form upon which the proposed bid price can be offered. Bidder's quote sheets, letters, or other materials cannot be used in lieu of the proposal page. When descriptive literature is included with the bid submittal, they shall be considered only for informational purposes. Payment, warranty and other terms that may appear on such forms that vary from the terms of the contract documents shall be considered null and void.

**E. Contract Award**

1. The City of Canton Board of Control will evaluate the bids and award the contract on the basis of the lowest and best bid. The Board of Control reserves the right to

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reject any and all bids and to award the bid deemed in the best interests of the City.

2. One or more bidders may be required to submit information to the Owner or its representative to assist in the evaluation of the bid. A bidder may also be required to participate in an interview during which, among other things, the bidder would be requested to make a presentation regarding its organization, resources and its preliminary plan to perform the construction (schedule, means and methods, etc.).

**F. Notice of Award and Execution of Contract Documents**

1. The successful bidder will be notified in writing once the contract is awarded by the Board of Control.
2. At this time the contractor will be required to sign official contract documents and submit any remaining bid forms.
3. Once the completed contract is certified by the City of Canton Auditor, a copy of the contract, Purchase Order, and Notice to Proceed will be mailed to the contractor.

**G. Pre-Job Meeting**

1. A pre-construction meeting will be held prior to the start of this project. This meeting will include the Contractor and the Owner's representative. The condition of the project limits shall be recorded and the contractor shall be responsible for the correction and/or repair of any additional damage to the facilities resulting from the related work and in addition to the conditions noted at the pre-construction meeting.

**H. Completion Date and Liquidated Damages**

1. Completion Date: The Contractor shall not start the work embraced in this contract before the date of a written Notice to Proceed from the City. Work shall be completed as per applicable sections in the General Conditions.

If the work done under this contract conflicts with other work done for or by the City, or with its consent, the City shall determine the time and manner of the procedure of the operations carried on under this contract.

The Contractor is responsible for any additional costs due to weather-sensitive construction.

The permitting of the Contractor to complete the work or any part thereof, after

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the time fixed for its completion, shall in no way operate as a waiver on the part of the City of any of its rights under this contract.

2. Once started, the contractor is expected to work on a continual basis until the project is completed, this being normal working hours. The City is instructing the Contractor to base the project schedule upon a workweek starting on Monday at 7:30 am and concluding on Friday at 4:00 pm of the week, except to save life or property or in case of emergencies as authorized or directed by the City. The City shall review alternative scheduling such as a four-day workweek and continuous operations prior to acceptance. The City will base acceptance upon necessity to facilitate operations as determined by the City. Contractor must make special provisions if the contractor's operation start before 7:30 am, conclude after 4:00 pm each day, or anytime on Saturday's or Sunday's, City Holidays and require an inspector presence. Contractor will be required to pay for inspection fees for overtime including inspector's base rate times 1.5 plus any applicable benefits. The City shall determine method of payment when the need arises.
3. Liquidated Damages: See General Conditions Section 41.

**I. Non-Exclusivity**

1. The City reserves the right to contract for the same or similar services, or perform the same or similar work with City employees during the course of this contract, if found to be in the best interest of the City.

**J. City of Canton Income Tax**

1. Each bidder, by the act of submitting its bid, agrees to withhold all City Income Taxes due or payable under Chapter 181 of the Codified Ordinances of the City of Canton for wages, salaries, fees and commissions paid to its employees and further agrees that any of its subcontractors shall be required to agree to withhold any such City Income Taxes due for service performed under this contract.
2. Furthermore, any person, firm, or agency that has a contract or agreement with the City shall be subject to the City Income Tax whether the work being done is in the City or out of the City. In addition to the tax withheld for employees, the net profit on the contract shall be subject to the City Income Tax.
3. Questions regarding this matter shall be directed to the City of Canton, Income Tax Department at (330) 430-7900.

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**Section II: General Conditions**

(The headings of the various sections are for convenience in reference. Do not consider these part of the specifications.)

(1) **Definitions:** The term “City” wherever used in these specifications shall mean the City of Canton, acting through its Service Director, or his properly authorized agents, such agents acting severally within the scope of the particular duties entrusted to them.

The term “Director” wherever used shall mean the Service Director of the City of Canton, duly appointed and holding office at the same time the contract was executed or during the fulfillment thereof.

The term “Engineer” whenever used, shall mean the City Engineer of said City or his properly authorized agents to the extent of the powers invested in them.

The term “Contractor” wherever used, shall mean the party of the second part entering into contract with the City for the performance of the work herein specified, or his properly authorized agents.

In all cases when the term “days” as used in these specifications shall be held to mean calendar days, unless otherwise noted.

The term “Work” wherever used, shall mean the furnishing of all labor, tools, machinery and the furnishing of all materials, except as herein otherwise specified, necessary to performing and completing of all the work herein specified. The methods and appliances used therefor must be such as will produce a satisfactory quality of work and ensure safety to the workmen, the public and to property.

Wherever, in the specifications, or upon the drawings and plans, the words directed, required, permitted, ordered, designated, prescribed, or words of like import are used, it shall be understood that the direction, requirement, permission, order, designation or prescription of the City is understood, and similarly, the words approved, acceptable, satisfactory to, refer to the City unless otherwise expressly so stated.

(2) **Decisions:** Contractor will perform all the work under this contract to the satisfaction of the City. The City, in all cases, shall determine the amount, quality, acceptability, and fitness of the several kinds of work, and materials paid for hereunder. The City shall decide all questions that may arise for determining the fulfillment of this contract. The City’s determination and decision thereon shall be final and conclusive; and the City’s determination and decision in case

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of any question that may arise, shall be a condition precedent to the right of the Contractor to receive any money hereunder.

(3) **Orders to the Contractor and Failure to Execute:** The address given in the bid or proposal upon which this contract is founded is hereby designated as the place where all notices, letters and other communications to the Contractor shall be mailed or delivered. Such address may be changed at any time by a written notice from the Contractor and delivered to the City.

The Contractor must have on the work at all times, a foreman, superintendent or other competent representative, to whom orders and instructions may be given. Such orders and instructions shall have the same force and effect as if given directly to the Contractor.

Whenever instructions or orders which in the opinion of the Engineer require prompt or immediate attention, are neglected or ignored by the Contractor or his Superintendent, the Engineer shall have the power to place necessary men, machinery and materials on the work and charge the entire cost, including overhead expenses, to the Contractor, who shall either pay the entire cost and expenses into the City Treasury, or the amount thereof shall be deducted from money due the Contractor under the contract.

(4) **Subletting or assigning contract:** The Contractor shall give his personal attention to the faithful prosecution of the work, shall retain the same under his personal control and shall not assign by power of attorney or otherwise, nor sublet the work or any part thereof, without the previous written consent of the City, and shall not, either legally or equitably assign any of the money payable under this agreement, or his claim hereto except by and with the consent of the City.

Assigning or subletting of the whole or any portion of this contract shall not operate to release the Contractor or his bondsmen or surety hereunder from the contract obligations.

(5) **Subsidiary Contracts:** The Engineer may, when in his opinion, it becomes necessary, make alterations or modifications of the plans and specifications, or order additional materials and work, subject to the approval of the Director; and the Contractor shall be obliged to accept such alterations, modifications and additional work and materials not included in this contract. The price to be paid for the work under such altered or modified contract shall be agreed upon in writing, in a subsidiary contract for such portion of, or additional improvement and signed by the Director and Contractor, before such work is done; such additional work, alteration or modification shall be considered and treated as though originally contracted for and shall be subject to all the terms, conditions and provisions of the original contract, except that a material increase in the amount of work will be considered as a proper claim by the Contractor for an extension of the contract time for completion, by an amount to be determined by the City.

And it is expressly agreed and understood that such alterations, additions or modifications or omissions shall not, in any way, violate, or annul the original contract and the Contractor hereby agrees not to claim or bring suit for any damages, whether for loss of profits or otherwise, on account of such alterations, additions, modifications or omissions.



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(6) **Inspection:** No material of any kind shall be used in the work until it has been inspected and accepted by the City. The Contractor must furnish all labor necessary in handling such material for inspection. All materials rejected must be immediately removed from the vicinity of the work. Materials or workmanship found at any time to be defective shall be immediately remedied by the Contractor, regardless of previous inspection.

The Engineer, his assistants, inspectors and agents, together with other parties who may enter into contracts with the City for doing work within the territory covered by this contract, shall, for all purposes which may be required by their contracts, have access to the work and the premises used by the Contractor, and the Contractor shall provide safe and proper facilities therefor.

The Engineer, his assistants and agents shall at all times have immediate access to all places of manufacture where materials are being made for use under this contract, and shall have full facilities for inspecting the same.

No work shall be done except in the presence of the Engineer, his assistants, agents or inspectors. It shall be the duty of such agents or inspectors to see that all materials used and all work done shall be strictly in accordance with these specifications, but such agents and inspectors shall have no authority whatsoever to order any change in materials, manner of doing the work or quantity of work done.

The field inspection of the work, testing of materials, giving lines and grades, preparation of general and detail drawings, except as otherwise specified, will be done by the Engineer. The inspection and supervision by the Engineer is intended to aid the Contractor in supplying all materials and in doing all work in accordance with the drawings and specifications, but such inspection shall not operate to release him from any of his contract obligations.

(7) **Time for doing work:** The City is instructing the Contractor to base the project schedule upon a 5-day workweek, Monday through Friday from 8:00 am to 4:30 pm except on City recognized holidays; this is the “standard schedule”. The Engineer may direct the Contractor to work outside of the standard schedule to save life or property or in case of emergencies. If the Contractor wishes to work outside of the standard schedule, the Contractor must submit this request in writing to the Engineer. The Engineer will review nonstandard scheduling and approve/deny the request. The Engineer will base his approval/denial upon benefit to the project, benefit to the City, and necessity to facilitate Contractor operations. Contractor must make special provisions for project inspection for nonstandard schedules and will be required to pay for all costs associated with inspection for approved nonstandard schedules. This includes both City personnel as well as consultants representing the City. The Engineer shall determine method of payment when the need arises. (See also Section 40).

(8) **Working Season:** Work done under these specifications, such as grading of streets and placing foundation for paving, curb setting, brick or other roadway paving, sidewalk laying, shall cease from the first day of December until the first day of April of the following year, unless otherwise directed by the Engineer. (See also Section 40).

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(9) **Lines and grades:** All work done under this contract shall be done in accordance with the lines, grades and instructions as given by the City and as directed in the plans.

(10) **Order of procedure of work:** The Contractor shall proceed with the work at such points as the Engineer may direct, and not more than two adjoining blocks or squares in length, shall be torn up at the same time, unless otherwise directed by the Engineer; nor shall any block be closed to traffic, except where the Contractor is actually working.

Whenever, in the opinion of the City, it is necessary that certain portions of the work be done immediately, the Contractor upon written order from the Engineer, shall proceed with such work without delay. Should he fail to so proceed, the City may do, or cause to be done, such work, and the cost of the same will be deducted from any money due, or to become due the Contractor under this contract.

(11) **Incompetent workmen:** Any employee of or persons connected with the Contractor who shall use profane or abusive language to the inspector, or other employees of the City, or otherwise interfere with them in the performance of their duties, or who shall disobey or evade the instructions of such employees of the City, or who is careless or incompetent, or who is objectionable to the City authorities, shall be discharged at the request of the Engineer, and shall not again be employed, except with his consent. Skilled labor only shall be used in the cases where the same is required.

(12) **Suspending the work:** The City, on account of public necessity, adverse weather conditions, or for other reasons, may order any portion or all work suspended, and thereupon the Contractor shall neatly pile up all materials, provide and maintain board walks and crossings, and take other means to properly protect the public and the work and to facilitate traffic. In case of such suspension of work, the time allowed for the completion of the work shall be extended in an amount equal to that lost by the Contractor, but the Contractor shall be entitled to no additional claim for damages therefor.

(13) **Forfeiture of contract:** Should the work to be done under this contract be abandoned by the Contractor, or if this contract or any part thereof be assigned or the work sublet by him without the previous written consent of the City or if at any time any official of the City or employee thereof become directly or indirectly interested in this contract or in furnishing the supplies or performing the work hereunder, or in any portion thereof; or if at any time the City may be of the opinion that the performance of the contract is unnecessarily or unreasonably delayed, or that the Contractor is willfully violating any of the provisions of this contract; or if the work be not fully completed within the time named in the contract; then and in any such case the City may notify the Contractor in writing to discontinue all work or any part hereof as may be designated, and the City may thereupon, according to law, enter upon and take possession of the work or part thereof, complete, or cause the same to be completed, and charge the entire expense of so completing the work or part thereof to the Contractor; and for such completion, the City itself or for its Contractors, may take possession of and use or cause to be used any materials, machinery, or tools of every description provided by the Contractor for the purpose of

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this work, and may procure or cause to be procured other materials, machinery, or tools required for the completion of the work.

All cost and expenses, including those of re-letting, (and damages resulting from the non-completion of the work within the specified time) incurred under these clauses, or by virtue of this contract, shall be deducted and paid by the City out of any monies then due or to become due the Contractor under and by virtue of this contract or any part thereof. In case such cost and expenses shall exceed the amount which would have been payable under this contract if the same had been completed by the Contractor, the Contractor or his sureties shall pay the amount of such excess to the City; and should such expense be less than the amount payable under this contract had the same been completed by the Contractor, he shall receive the difference, after deducting the amount retained as hereinafter specified, but shall not be entitled to damages for not being allowed to complete the work himself.

In case of abandonment of the work by the contractor, or its termination by the City, the Director of Public Service shall at once cause the work already done under this contract to be measured. Five percent (5%) of the value of the amount thus shown will be set aside as a retainer under the provisions hereof. In such case no money, due or payable to the Contractor under this contract after the annulling of the same, shall be paid until the work is completed, accepted, and all claims and suits by reason of said work have been finally settled. The retained five percent (5%) shall be held for the full guaranty period, as specified herein and used as provided in other provisions hereof, for keeping in repair so much of the work as was done or completed under this contract.

**(14) Storing materials delivered on work:** All materials required in the work may be placed on the sides of the roadway, or parking area, or upon a portion of the sidewalk along the sides of the roadway to be improved and upon adjoining portions of intersecting streets, as directed by the Engineer; but all such materials shall be neatly and compactly piled in such a manner as to cause the least inconvenience to the property owners and the general public. All fire hydrants must at all times be kept free and unobstructed; water and gas shut off boxes must be left uncovered by such materials; and passageways must be left for store entrances, private driveways and street intersections.

No materials, tools or machinery shall be piled or placed against shade trees unless they be amply protected against injury therefrom, and all shade trees and other improvements must be protected from injury caused by the storing of materials or otherwise during the prosecution of the work.

All materials, tools, machinery, etc. stored upon public thoroughfares must be provided with red lights at night time, and danger signals by day, to warn the traffic of such obstructions.

**(15) Storage of materials, tools and machinery during suspension of work:** Upon the suspension, stoppage, or abandonment of the work, or any part thereof, all materials shall be neatly and compactly piled, and all tools and machinery so located as not to impede public traffic on roadways, sidewalks and crosswalks unnecessarily. All such stored materials, tools and

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machinery shall be provided with danger signals by day and red lights by night.

(16) **Ownership of old materials:** All old curbing, stone walk, paving brick, brick crosswalks, gutter paving bricks, gutter plates and culverts, sewer pipe, iron pipe and castings, are the property of the City and all such materials as are not ordered replaced, shall be removed by and at the expense of the Contractor, to such places as the Engineer may direct. If the Engineer chooses to not accept such materials, the Contractor must dispose of them at no cost to the City.

(17) **Plans, profiles, and specifications:** The plans, profiles and specifications are intended to be explanatory and supplementary of each other, but should any discrepancy appear or misunderstanding arise as to the import of anything contained in either, the explanation of the City shall be final and binding on the Contractor. Any correction of errors or omissions in the plans, profiles and specifications may be made when such corrections are necessary for the proper fulfillment of their intentions as construed by the City.

Any correction in the plans, drawings, and specifications made pursuant to the provisions of this paragraph shall not be retroactive, but shall take effect at the date of notification to the Contractor of such correction.

The City will furnish the Contractor with up to three (3) sets of additional copies of the plans (full size or half size, if available) as may be required, for the construction of the work herein specified.

(18) **Private rights of way:** Whenever it is required as a part of this contract to perform work within the limits of private property or private right of way, such work shall be done in conformity with the agreements between the City and such owners, and whether or not such a condition be a part of this agreement, care shall be taken to avoid injury to the premises entered, which premises must be left in a neat and orderly condition by the removal of rubbish and surplus materials and restoring vegetation to meet or exceed pre-contract condition.

(19) **Injunctions:** If legal obstructions to the prosecution of the work arise, the delay shall operate to extend the time allowed for the completion of the part or parts of the work obstructed, for the length of time obstruction continues and no longer, but no damages shall be claimed or allowed the Contractor for any such delay.

(20) **Attested accounts:** In case any person who has performed labor or has furnished materials, tools, or machinery for the work herein specified, he may file sworn itemized statement of the amount of value therein, as required by law, and if such claims be not disputed by the Contractor, or if the same are disputed, after the amount and validity have been determined by law, the City may pay the amount of such claims out of any money due the Contractor under this contract.

(21) **Claims for extra materials and work:** All claims for furnishing extra materials, or for doing extra work, for which the Contractor may consider himself entitled to receive extra

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compensation, must be presented to the Director of Public Service in writing, at the time the cause for such claim arises. Such statement must contain an itemized account of such materials and labor required, and unless such claim is so presented, it is expressly agreed, by the parties to this contract, that the Contractor has waived such claim, and that he shall not be entitled, subsequently to claim, or receive any pay for the same. No claim for extra labor and material shall be allowed, unless the necessity therefor has first been determined by the Director and the price to be paid therefor has been agreed upon, in writing, before such additional materials have been used, and such additional labor performed. See Change Order Policy in the Appendices for more information.

(22) **Claims for damage for omission or delays:** If any change or alteration involves the omission of any materials or work called for in the original plans and specifications, any claim for loss of profits, or any other cause growing out of any such omissions is hereby expressly waived by the Contractor.

No claims for prospective profits will be allowed, by reason of the inability of the City to proceed with all, or any part of the work provided for in this contract; nor for damages by reason of any delay on the part of the City, but any such delay shall entitle the Contractor to a corresponding extension of time for the completion of the work. See Claims Management Policy in the Appendices for more information.

(23) **Damages to property:** All damages to lawns, fences, trees, buildings, sidewalks, water, sewer or gas pipes, or other public or private property along or near the line of work, or the vicinity thereof, if the same are occasioned through neglect or failure on the part of the Contractor, or that of any person in his employ, to take all necessary precautions to prevent the same, must be replaced or made good by him, to the satisfaction of the owners of same and at his cost and expense whenever the Engineer may so direct.

(24) **Liability of contractor for injuries, patents, etc.:** It is expressly understood and is hereby agreed that the whole of the work to be done is at the Contractor's risk. The contractor assumes by bidding under these specifications, the full responsibility and risk of all damages to the work itself, the property along the line of the work, injury to persons or animals which may be occasioned by floods, stoppage of water in sewers or gutters, caving in of surface of grounds or trenches, neglect in properly protecting work by barricades, etc., or any manner whatsoever. He shall bear all losses resulting to him on account of character of the work, or because the nature of the ground in or on which the work is done, is different from what was estimated or expected, or as may have been indicated by borings or test pits, or on account of the weather, actions of the elements or other causes.

He shall assume the defense of any indemnity and save harmless the City and its individual officers and agents from all claims relating to labor and materials furnished for the work to inventions, patents and patent rights used in doing the work, to injuries to any person or corporation received or sustained by or from the Contractor and his agents and employees in doing the work, or in consequence of any improper materials, methods, implements or labor used therein, or by reason of any condition in the improvement created by the Contractor or for any

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other liability therefor.

The Contractor, if required at any time by the Director, shall furnish the City satisfactory evidence that all persons who have claims for labor performed or material furnished hereunder, or have suffered damages on account of his operations, have been fully paid or secured. And in case evidence be not furnished as aforesaid and such amounts as the Director may consider necessary to meet lawful claims of persons aforesaid, shall be retained from the monies otherwise due the Contractor hereunder, until the liabilities shall have been fully satisfied.

If the Contractor shall claim compensation for any damages sustained by reason of the acts of the City, he shall within five (5) days after the sustaining of such damages, present a written statement to the City of the nature of the damage sustained. On or before the fifteenth day of the month succeeding that in which any such damage shall have been sustained, he shall file with the City an itemized statement of the details and amount of such damage, and unless such statement shall have been filed as thus required, his claim for compensation shall be forfeited and invalidated, and he shall not be entitled to any payment on account of such damage.

The statement of any specific duty or liability of the Contractor in any part of the specifications shall not be construed as a limitation or restriction upon any general liability or duty imposed upon the Contractor by these specifications, said reference to any specific duty or liability being merely for the purpose of explanation.

**(25) Safety measures -- barricades:** The Contractor must provide and maintain barricades to properly protect persons, animals, vehicles and property against injury. He shall also provide, place and maintain sign boards, letter "STREET CLOSED" in plain legible type, upon the streets and alleys in which the work is in progress and upon each street and alley intersection therewith at a distance of one block therefrom, as may be directed by the Engineer.

**(26) Traffic regulations:** The Contractor is responsible for all traffic control on the project whether or not it is called out in the detailed specifications or plans. All traffic control must comply with appropriate City, State, and Federal rules, regulation, and guidelines. During the progress of the work, the Contractor shall accommodate both the vehicular and foot traffic and shall maintain free access to fire hydrants, water and gas valves. Gutters and water ways must be kept open and other provisions made for the removal of storm water.

During the construction of the sewer work and other ditches, only one-half of the street intersections may be blocked at one time and the Contractor shall provide and maintain temporary driveways, bridges, and crosswalks over sewer and other trenches, such as, in the opinion of the Engineer in charge of the work, are necessary to reasonably accommodate the public.

To accommodate pedestrians during the progress of the work, the Contractor shall provide and maintain crosswalks on that portion of the street being improved, both across the main roadway and at the street and alley intersections. The crosswalks shall be constructed of planks two (2) inches thick, and within the fire limits of the City, they shall be at least five (5) feet wide,

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and outside the fire limits at least three (3) feet wide.

When the City deems it advisable or necessary to divert traffic from the work or any portion thereof, the Contractor shall provide and maintain detour signs, letter “DETOUR” in plain and legible type, and indicating the direction to be taken by traffic as directed by the Engineer.

In the event of the Contractor’s failure to comply with the above provisions relative to traffic regulations, the City may cause said provisions to be carried out and the cost and expense of such work shall be deducted from any money due the Contractor under this contract, but the performance of any such work by the City, or at its insistence or request, shall in no way release the Contractor from his general or particular liability for the failure to provide for the safety of the public or the work under this contract.

The Contractor shall not place any material on any sidewalk so as to interfere with the free access to any crosswalk by pedestrians.

No additional compensation will be paid the Contractor by the provision and maintenance of bridges, crosswalks, etc., as above specified, but the cost and expense of maintaining the same shall be considered as part of the general contract and shall be included by the Contractor in the prices bid by him upon the several items as named upon the proposal therefor.

(27) **Hauling materials on paved streets:** During the progress of the work and in the cleaning up thereof, the Contractor shall provide and use vehicles in which the excavated or other materials are hauled over paved streets in the City, with tight bodies for transportation of fine materials and shall not overload the same so as to allow such materials to fall off the tops thereof upon the streets. The paved streets over which such material is hauled must be kept free from dirt and other materials in accordance with the provisions of City Ordinance regulating same.

(28) **Cleaning up during the progress and completion of work:** During the progress of the work the Contractor shall remove all surplus excavated materials, obstructions, old materials not used, trees, stumps, filth or rubbish of any kind that may be encountered in the execution of the work, at his own cost and expense except when the removal and transplanting of trees be specified and bids therefor are required upon the blank proposal attached thereto.

As fast as any portion of the work, such as the construction of sewers or drains not located in the street or streets to be improved under the contract is completed, the backfilling of trenches and the repaving over the same shall be done as soon as possible, as herein specified.

As fast as the roadway pavement is completed, the Contractor shall remove all rubbish and surplus materials which have accumulated during the progress of the work provided herein, from the new or existing sewers, the roadway, sidewalk space and intersecting streets and shall render the streets suitable, safe and convenient for traffic.

Upon the completion of the improvement and before the final acceptance thereof, the

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Contractor shall remove all machinery, tools, temporary building and shall clean the pavement, curb and sidewalks in such a thorough and effective manner by hand sweeping, scraping or by flushing, according to kind of pavement or condition of the street, as will be determined by the Engineer, so as to leave the entire surface of the pavement, curbs and sidewalks so exposed that the quality and texture of the materials used and workmanship may be readily determined. He shall also remove all centering, scaffolding and accumulations of sand, earth, materials, and rubbish of all kinds from the sewers, manholes, inlets, and catch basins. If the improvement is completed too late in the fall to permit all of the cleaning up as herein specified, that portion not completed shall be done the following spring within ten (10) days after written notice to do so from the Engineer.

All such cleaning and removal of cleanings shall be done by the Contractor and the cost and expense thereof shall be included in his price for furnishing of materials and laying of pavement.

In case the Contractor shall fail or neglect to do any cleaning within forty-eight (48) hours after the receipt of notice to do so, or in the manner specified, the Director of Public Service may and is hereby authorized to cause the same to be done and charge the cost and expense thereof to said Contractor and deduct the amount of such cost and expense from any estimate due him at any time thereafter.

**(29) Existing surface fixtures and structures:** At least forty-eight (48) hours before breaking ground, the Contractor shall notify all the City Departments and public service corporations, whose tracks, wires, pipes, conduit or other structures may be affected by his operations. He shall likewise notify the Chief of the Fire Department of the temporary blocking of any street.

Existing surface structures which may be encountered in the work shall be removed and replaced or maintained by the Contractor at his cost and expense, or by the parties interested, and in such a manner as to secure the safety of the public and structure. The use of pipes, conduits, etc. shall not be interrupted without the consent of the parties owning or controlling the same.

**(30) Existing sub-surface fixtures and structures:** Existing sub-surface structures encountered in the work shall be protected and maintained in complete operation, unless permission is given for their removal. Existing substructures, including old sewers, abandoned sewers, abandoned drains, etc., which may appear within the limits of the excavating, shall be removed, if required by the City, but such removal will not be paid for separately, except when expressly specified, being paid for in the price for excavation or other items including excavation.

In case the uncovering of sub-surface structures necessitates a change in the alignment of grade of the proposed work, the Contractor shall give immediate notice of such obstruction to the Engineer, and shall cease work at such points until ordered to proceed.

And in case any change of grade or alignment shall delay the work, the time allowed for the completion of the contract will be extended to the extent which the delay shall have operated, the



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decision of the Engineer upon this point being final.

(31) **City may construct sewers, drains, etc.:** The City reserves the right to suspend or stop the work on all or any part of the progressing improvement, for the purpose of laying, relaying or allowing to be laid, or re-laid, any sewers, drains, gas pipes, water pipes, conduits or appurtenances thereto, which, in the opinion of the Director of Public Service are necessary or expedient, or for any other reason, and at any stage of the work, and the Contractor shall not interfere with or place any impediment in the way of any person or persons engaged in such work; and in such cases the Contractor shall not be entitled to any damages or recompense, either for digging up the street, or delay or hindrance, but the time of completion shall be extended as many days as the delay shall have operated.

It is the intention of the City to require all property owners to have water and sewer connections made to all lots, and to cause to be laid all water mains, gas mains, sewers and sewer connections, and other pipes, conduits, etc., not included in the contract hereunder, in advance of the improvement, except when in the opinion of the Director of Public Service such procedure be impracticable and the Contractor shall not be entitled to damages or recompense by reason of delay or hindrance, but he shall be granted an extension of time equal to that in which the delay shall have operated, as determined by the Director of Public Service.

If the Contractor hereunder finds that the trenches are not properly backfilled, he shall so notify the Engineer in writing, allowing ample time to have the defects remedied before proceeding with the improvement.

The Contractor may exercise the right to such supervision of the work, as he may deem necessary to insure good material and workmanship, in order that he may properly protect himself from defects in the finished pavement for which he will be responsible under his guaranty. The Contractor will be allowed and paid for any additional materials, the use of which is made necessary on his part by reason of the above specified work, such reasonable sum (not to exceed contract price) as may be agreed upon in writing between himself and the Director before such additional materials be used, and in the manner specified for subsidiary contracts.

(32) **Special repairs:** The City reserves the right, whenever in its judgment, to take up or permit the taking up of any part of the improvement during the progress of the work, or subsequent to the completion thereof and during the period of guaranty for the purpose of constructing, repairing, or renewal of any sewers, drains, water or gas pipes, or other improvements. Whenever any part of the improvement is taken up as herein specified, all the work of restoring the same will be done by or under the direction of the City and the Contractor hereunder will be relieved of any maintenance requirements on that portion of the completed improvement so disturbed.

(33) **Use of city water supply:** The City will furnish water at the hydrants for the purpose of puddling trenches, construction purposes, operation of machinery, mixing concrete, mortar, etc., but the cost of water and the proper facilities for conveying the same from the hydrants must be included by the Contractor in the unit prices bid for the various items of work wherein water will be used. All water used must pass through meters installed by the Water Department at its

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hydrants and subject to its regulation and paid for at the builder's rate per one thousand (1,000) cubic feet of water consumed, as established by said Department, plus the cost of meters and installation of same. A deposit will be required covering the cost of meter and installation thereof, which deposit of cost of meter will be refunded on return of meter in good condition.

The Contractor must notify the Water Department at least forty-eight (48) hours in advance of the time such installation is required.

(34) **Use of sewer:** At any time during the progress of the work the City may, by written notice to the Contractor, take over and utilize the whole or part of any sewer, drain or appurtenance thereof which has been completed, giving if desired, permits to tap and connect therewith. In such event, the Contractor shall be relieved from the maintenance of such part as may be used except as provided under the section "Guaranty" and such will be deemed as final acceptance by the City of the part or parts used, subject to the responsibility of the Contractor for all defects in workmanship, etc., as provided under the "Guaranty" section of these specifications.

(35) **Sanitary regulations:** Necessary sanitary conveniences for the use of the laborers on the work, properly secluded from public observation, shall be constructed and maintained in a sanitary condition by the Contractor in such manner and at such points as shall be approved, and their use shall be strictly enforced.

(36) **OSHA standards:** It is the City's requirement, under OSHA Regulations, that all outside contractors hired by the City of Canton are and will be in full compliance with all OSHA standards and perform said work in accordance with all applicable OSHA standards.

(37) **Laws and ordinances:** The Contractor shall keep himself fully informed of all laws, municipal ordinances and regulations that in any manner affect the persons engaged in or employed upon the work, or the materials used in the work, or any way affecting the conduct of the work, and of the decrees of the bodies or tribunals having jurisdiction or authority over the same. He shall also himself observe and comply with and shall cause all of his agents and employees to observe and comply with all such existing and subsequent laws and ordinances, regulations, orders and decrees, and to protect and indemnify the City against claim or liability arising from or based upon the violation of such laws, ordinances, regulations, orders or decrees by himself or by his agents or employees.

References to special laws and ordinances in other sections of this contract shall in no way relieve the Contractor from compliance with all the provisions of this section.

(38) **Monuments and landmarks:** The Contractor shall preserve intact all City monuments, benchmarks and landmarks, as shown upon the plans or encountered in the excavation. In such case that such monument, benchmark or landmark not shown on the drawings be encountered in opening the excavation, the Contractor shall stop work at such point, immediately notify the Engineer of such findings and not disturb same until directed to do so by the Engineer.

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(39) **Prices:** The City shall pay and the Contractor shall receive the prices hereafter stipulated as full compensation for everything furnished and done by the Contractor under this contract. This shall include all incidental work required but not specifically mentioned, and also for all loss or damage arising out of the nature of the work, or from the action of the weather, floods, or from unforeseen obstruction or difficulty encountered in the prosecution of the work, and for the expenses incurred by or in consequence of the suspension or discontinuance of the work as herein specified, and for well and faithfully completing the work and the whole thereof, as herein provided, together with the remedying of all defects developing during the prosecution of the work and during the period for which the work is guaranteed.

(40) **Starting and completing the work (Contract Duration):** The Contractor shall not start the work embraced in this contract before the date of a written notification from the Engineer, and shall commence at such points as the City may direct.

If the work done under this contract conflicts with other work done for or by the City, or with its consent, the City shall determine the time and manner of procedure of the operations carried on under this contract.

The duration of this agreement for the completion of the work embraced in this contract shall be 8 Calendar Months from the Notice to Proceed date.

Contractor is responsible for any additional costs due to weather-sensitive construction, such as, but not limited to, protecting concrete from freezing, heating of water as needed, etc. as well as insuring that all materials used satisfy appropriate specifications such as, but not limited to, asphalt temperature specifications, non-frozen backfill material, etc.

The permitting of the Contractor to complete the work or any part thereof, after the time fixed for its completion, shall in no way operate as a waiver on the part of the City of any of its rights under this contract.

(41) **Defaulted provisions for delay:** The Contractor guarantees that he can and will complete the work on or before the time affixed in his bid, or on or before the extended time as provided for in the contract. The payment to the City for such delay and failure on the part of the Contractor shall be defaulted amount of One Thousand Dollars (\$1,000.00) for each day by which the Contractor shall fail to complete the work, or any part (including Interim) thereof, in accordance with the provisions of the contract. The City will deduct and retain, from any money due or any money to become due under the contract, the amount of the liquidated damages. The Contractor shall be liable for the payment of the difference upon demand of the City.

(42) **Samples:** Each bidder shall submit samples of materials, or refer to samples of materials furnished by the Manufacturer or Producer, at the time of submitting the bid, as required in detail specifications under each item, for which bids are received. Whenever samples of any material or workmanship have been filed by the Contractor, or are on file as specimen of the work to be done or materials to be furnished for the work herein specified, such samples shall be the standard by which that kind and class of work shall be judged.

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(43) **Measurements:** The contract will not use extra or customary measurements of any kind, unless specially noted, in measuring the work under these specifications; the length, area, solid contents or number only, are considered as a basis for payment as hereinafter specified.

The measurements as made by the City of the amount of the work done shall be final and conclusive.

Payments will be made upon the work done within the lines prescribed by the plans, drawings or specifications, and in accordance with the unit prices for the items under which the work is done. Nothing therein contained depriving the City of any remedy or defense it may have under the same, for violation of the terms or conditions of this agreement.

(44) **Partial payments:** The Contractor shall, on a day of each calendar month as is mutually agreeable to the Contractor and the City, make an approximate estimate of the quantities and prices of the labor furnished and the materials incorporated into the project during the previous calendar month and forward such estimate to the Engineer for approval. More frequent estimate submission, at the option of the City, may be made at any time during the progress of the project.

Partial payments to the Contractor for work performed for a lump sum price shall be based on a well-balanced schedule prepared by the Contractor and approved by the Engineer which schedule shall apportion the lump sum price to the principal features entering into or forming a part of the work covered thereby.

Partial payments to the Contractor for labor performed and materials furnished shall be made at the rate of ninety-two (92) percent of the estimate submitted by the Contractor and approved by the Engineer until the project is fifty (50) percent completed. The reimbursement rate will be one hundred (100) percent of such estimates after the project is fifty (50) percent completed. **The City will not make payment for materials stored on site.**

The City shall pay the Contractor monthly, not less than the difference between the amount of each monthly estimate which has been approved by the Engineer and the sum of Retainage stipulated below and any other amounts which the City is authorized by the contract to withhold. The making of any monthly payment shall not be taken or construed as approval or acceptance by the City of any work included in the estimate upon which such payment is based.

If the City fails to make payment within sixty (60) days after approval by the Engineer, in addition to other remedies available to the Contractor, there shall be added to each such payment interest at the average of the prime rate established at the commercial banks in the city of over one hundred thousand population nearest the construction project, commencing on the first day after said payment is due and continuing until the payment is received by the Contractor.

To aid in determining quantities of materials for pay, the Contractor shall, whenever requested by the Engineer, provide scales, equipment and assistance for weighing or for measuring such materials.

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For estimating quantities in which computation of areas by geometric methods would be comparatively laborious, the City agrees that a planimeter or other agreed upon method may be used.

(45) (46) **Pre-final and final estimates and payments:** As soon as practicable after the completion of work under the contract, the Engineer will perform a formal inspection of the project. If the project appears to be acceptable, the Engineer will recommend tentative acceptance thereof and make a pre-final estimate of the amount of the work done by the Contractor based on quantities and prices submitted by the Contractor. Upon such certified pre-final estimate, the City will pay the Contractor all of the monies owing him under the contract, except the Retainage, which the City will hold for sixty-day (60) period after the date of the pre-final estimate.

Upon the expiration of such sixty (60)-day period, provided that it appears upon further inspection and certification by the Engineer that the contract has been faithfully performed, the City will pay to the Contractor the whole sum retained or such part thereof as remains after deducting expenses of correcting any deficiencies in the work as determined by the Engineer. Such final inspection and payment will not discharge the liability of the Contractor under the contract or of the surety under the contract bond, but such liabilities and all guarantees shall remain in effect for the period fixed by law.

(47) **Additional contract:** It must be distinctly understood that should more than one contract be awarded to the same Contractor, he may be required to prosecute the work upon all of them at one and the same time. At the option of the Director, and he shall not be permitted to transfer men, tools, or machinery from one job to another without the consent of the Engineer. The contractor shall at all times have a competent foreman and a sufficient number of men, tools, and machinery upon each job, at the same time, as well, in the opinion of the Engineer, be sufficient for the proper prosecution of the work.

(48) **Insurance:** The Contractor shall at all times during the progress of the work, comply with all the provisions of the laws of Ohio relating to workmen's compensation and State insurance fund for the benefit of injured and the dependents of killed employees. The Contractor shall at all times during the progress of the work carry accident liability insurance in an amount sufficient to reasonably indemnify himself against loss from claims for personal injuries or fatal accidents occurring upon the work or caused thereby including injuries and accidents to employees of the Contractor, persons engaged on the work under another contractor, employees of any sub-contractor or other engaged on or about the work and the public. The City reserves the right to annul this contract at any time upon receiving evidence of the Contractor's failure to comply with the statutes as described above.

(49) **Last payment to terminate liability of City:** No person or corporation, other than the signer of this contract as Contractor, has now any interest hereunder, and no claim shall be made or be valid, and neither the City nor its agents shall be liable for, or be held to pay any money, except that provided in this contract. The acceptance by the Contractor of the last payment made

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as aforesaid shall operate as and shall be a release to the City and agents thereof, from all claims and liability to the Contractor for anything done or furnished for, or relating to the work, or for any act or neglect of the City or of any person relating to or affecting the work, except the claim against the City for the remainder, if there be any, of the amount kept or retained.

(50) **Guaranty:** The Contractor, for and in consideration of the monies received and to be received by him, hereby agrees that the repairs of all defects in the work done and completed under this contract arising, in the opinion of the Director, out of the use of defective materials, settlements of sewers, structures, and foundations or improper workmanship in the construction thereof, and which repairs from such causes may become necessary during the period of years, as set forth below, after the date of the approval by the Director of the Engineer's certificate of the "FINAL COST", shall be made by him without cost and expense to the City, and the Contractor agrees to make such repairs when, and as ordered by the Director, by written notice served upon him and if after having received such notice, the Contractor fails to make such repairs within the number of days stated in such notice, from the date of receipt thereof, the Director shall thereupon have the power to cause said repairs to be made and charge the cost and expense thereof to the Contractor or his surety.

The failure of the Director to give notice within the specified period shall not preclude the operation of this section.

The guaranty periods referred to above in this section shall be as follows:

C.I.P.P. Rehabilitated Sewers, 2 years (for more information, see page 40, section 3.07, Post Installation)

Concrete curbing, 1 year

Concrete sidewalks, 1 year

Concrete masonry, 1 year

Brick masonry, 1 year

Sewers, manholes, catch basins, 1 year

Asphaltic concrete pavement, 1 year

Concrete foundation, 1 year

(51) **No estoppel:** The City shall not be precluded or estopped by any return or certificate made or given it, from showing at any time, either before or after the final completion and acceptance of the work and payment therefor pursuant to any such return or certificate, the true and correct amount and character of the work done and materials furnished by the Contractor or any other person under this agreement, or from showing at any time that any such return or

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certificate is untrue and incorrect or improperly made in any particular, or that the work and materials, or any part thereof, do not in fact conform to the specifications; and the City shall not be precluded or estopped, notwithstanding any such return or certificate and payment in accordance therewith, from demanding and recovering from the Contractor such damages as it may sustain by reason of his failure to comply with the specifications.

Neither the acceptance by the City, nor any order, measurement, or certificate, by the City, nor any order for payment of money, nor any payment for, nor acceptance of the whole or any part of the work by the City, nor any extension of time, nor any possession taken by the City, or its employees, shall operate as a waiver of any portion of this contract or of any power herein reversed to the City, or any rights to damages herein provided; nor shall any waiver of any breach of this contract be held to be a waiver of any other or subsequent breach.

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**(52) SUPPLEMENTAL SPECIFICATIONS**

**Supplemental Specification 01-00**

**PROJECT DOCUMENTATION AND SUBMITTAL REQUIREMENTS  
FOR  
ALL PUBLIC WORK PROJECTS AND SUBDIVISION DEVELOPMENTS**

September, 2000

\* Revised August, 2009

**Project Submittals:** The following listed items are the full responsibility of the Contractor. These items become part of the administrative duties imposed upon this Contract. The Contractor shall be responsible for submitting all detail items prior to the contract Notice of Commencement, or as directed by the City's Project Manager. A typewritten letter shall accompany all items, on Company letterhead; clearly describe each item submitted. If Contractor elects to fax any documentation due to expediency, the Contractor will be responsible for submitting hard copy for project documentation. The City will reject any information not clearly legible. **Submit four copies of the project submittals.**

Contractor will clearly affix a label or stamp identifying the submittal and its status for project review. All actions other than "no exception taken" will require supporting notation or information for project review.

Allow at least 10 business days for City's review and execution. The City Project Manager shall assist the Contractor with any questions or clarification during this process to ensure timely response to the Contractor.

The City will not pay directly for the performance of the work listed. This work is a subsidiary obligation of the Contractor.

1. Shop Drawings
2. Preconstruction Video
3. Progress Schedule
4. Release Statement for Disposal of Excavated Material
5. Traffic Control Plan
6. Contractor and Subcontractor Emergency Contact List
7. Statements of Final Compliance

**1. Shop Drawings**

- a) Upon written request from the Engineer, the Contractor shall submit detailed drawings, acceptable catalog data, specification and material certifications for all materials and/or equipment specialized or required for the proper completion of the work.
- b) Contractor shall submit shop drawings in not less than four (4) copies to the Engineer.



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- c) Contractor shall submit shop drawings in proper sequence of construction to cause no delay in the work. The Engineer will have ten (10) business days to review submittals. The Contractor's failure to transmit appropriate submittals to the Engineer sufficiently in advance of work shall not be grounds for time extension. No work shall be performed requiring shop drawings until same the Engineer has approved these shop drawings.
  - d) Label each shop drawing with the following:
    - 1. Project Name Main Ct. Sanitary Sewer
    - 2. General Project Number (G.P. 1202)
    - 3. Name of Contractor
    - 4. Name of Subcontractor (if applicable)
    - 5. Name and Address of Supplier and/or Manufacturer
    - 6. Log Reference Number
  - e) The Contractor is responsible for reviewing and approving all shop drawings prior to submittal. The Engineer's review does not make him responsible for the accuracy of said drawings.
2. **Preconstruction Video:** Prior to actual construction, the Contractor shall take video recording of the entire length and width of the work site.
- a) The Contractor shall notify the Engineering Department prior to scheduling the video recording of the site. A representative of the Engineering Department shall be present when the recording this video.
  - b) The video and audio recordings shall be on DVD or pre-approved alternative for replay. Contractor must submit alternative medium to the Engineer and approval received prior to scheduling.
  - c) The video portion shall have continuous time and date incorporated into it, locations and person(s) doing the work.
  - d) Audio comments during the recording must address each item in the field of view as it may pertain to the project construction. The recording technician will need to become familiar with the project plans to know what subject matter is pertinent. Further, contractor must incorporate a post recording review and audio comments into the recording.
  - e) Submitted copies of all recordings are the property of the Engineer. Contractor must submit the recording and be accepted in full by the Engineering Department prior to the start of construction.
3. **Progress Schedule:** The Contractor shall provide to the City, as mutually agreed upon at the Contract's Preconstruction meeting, a graphic progress schedule, which shall include the following:
- a) Progress schedule as a minimum to be prepared in **CRITICAL PATH METHOD FORMAT (CPM)**. The schedule shall be submitted, as a minimum, on 11" x 17" format for clarity and any necessary notations. Progress schedule shall include all work activities relative to the project, as further described in the Contract. Activities and rate of expected progress to secure completion as set forth in the Contract shall be shown on the schedule. Contractor to annotate any milestones that may be indicated in the Contract.

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Project completion date shall be clearly defined on the original schedule and all ensuing schedules provided.

- b) Schedules shall be updated, as a minimum, every 30 days, or as agreed to by the City's Project Manager.

**4. Release Statement for Disposal of Excavated Materials**

- (a) The Contractor shall provide to the City a written consent statement from all property owners whose property is a landfill depository for all surplus or unsuitable excavated material from the project site.
- (b) The Contractor shall follow ODOT 105.16 for specific guidelines and name the "City of Canton" in lieu of "the Department" on all forwarded documents. The City requires a contract or permit that contains the language stating that the City is not party to the contract or permit, the material is not the City's, and that the contractor and the property owner will hold the City harmless from claims that may arise from this contract or permit.

- 5. Traffic Control Plan:** Contractor shall submit a graphical presentation or written document detailing the signage to be used and its location for maintenance of traffic. If traffic control will be performed in stages, submit a plan for each stage. Any proposed detours should be approved by the Engineer prior to plan submission.

- 6. Contractor and Subcontractor Emergency Contact List:** Contractor shall submit to the Engineer, prior to commencing construction, a complete list of the Contractor's personnel associated with the project. List should include name, title, and emergency contact phone numbers for each individual.

- 7. Statements of Final Compliance:** The Contractor shall submit to the City the following documentation, in addition to the Project's General Conditions. All submittals shall be completed and approved prior to the release of the final retainer.

- a) Certificates of Substantial and Final Completion. Contractor shall submit in writing, the date on which work is substantially completed and upon Final Completion. Any deviation from the stated contract completion date to what is being submitted shall be explained further by the Contractor. The City, at their discretion, will further review this subject, as needed.

- b) Final Waiver of Lien

Contractor shall furnish a written report indicating the resolution of any and all property damage claims filed with Contractor by any party during the contract period. The information shall include the name of claimant; date filed with Contractor; name of Insurance Company and/or Adjustor handling the claim; how the claim was resolved; if claim was not resolved for the full amount, a statement indicating the reason for such action. If there were no damage claims filed with the Contractor, then this shall be so stated in the report.

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**Section III: Additional Requirements and/or Conditions**

- A. Notwithstanding any provisions to contrary, Ohio Law shall govern this Agreement.
- B. Contractor agrees that Canton's specifications and bid documents shall incorporate and be made part of any subsequent contract entered by the parties. Further, the terms, conditions and provisions found in Canton's specifications and bid documents shall supersede and control any subsequent contract provisions to the contrary.
- C. Once both parties have fully executed the contract, said contract shall be binding upon the parties' heirs, successors and assigns.
- D. Contractor shall not assign or transfer any interest under this agreement without the express written consent of Canton.
- E. Contractor agrees to indemnify and hold harmless the City of Canton, Ohio, its employees and agents from and against all demands, claims, causes of action, or judgments or omissions by Contractor, its agents, employees or subcontractors. Nothing herein shall be construed to hold Contractor liable for Canton's negligence.
- F. Contractor's liability to the City of Canton for default shall not be limited and the City of Canton shall be entitled to all damages permitted under Ohio law upon Contractor's breach, default or non-performance under this Agreement.
- G. A waiver of a breach of any of the terms or conditions of the contract will not be construed as a waiver of any subsequent breach. Any consent to delay in the performance of contractor of any obligation shall be applicable only to the particular transaction to which it relates, and it shall not be applicable to any other obligation or transaction. Delay in the enforcement of any remedy in the event of a breach of any term or condition of the contract or in the exercise by either party of any right under the contract shall not be construed as a waiver.
- H. When, during the course of construction, it appears to the contractor that any work does not conform to the provisions of the contract documents, it will make necessary corrections so that such work will conform. Additionally, the Contractor will correct any defects caused by faulty materials, equipment or workmanship in work supervised by the Contractor or by a subcontractor. This shall apply to the Contractor or any subcontractor appearing within one year from the date of issuance of a certificate of substantial completion or within such longer periods as prescribed by law or by applicable special guarantees or warranties in the contract documents.
- I. The owner reserves the right to order work changes in the nature of additions, deletions, or modifications, without invalidating the contract, and agrees to make corresponding adjustments in the contract price and time of termination if necessary. The Owner will authorize all changes by a written change order signed by the owner, or the architect of other

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designee of the owner. The change order will include conforming changes in the contract and termination time.

- J. Work changed, and the contract price and termination time modified can be modified only as set out in the written change order. Any adjustment in the contract sum resulting in a credit or a charge to the owner will be determined by mutual agreement of the parties before starting any work involved in the change order.

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**Section IV: City of Canton Codified Ordinances**

Bidders shall take notice that they are to comply with the Codified Ordinances of the City of Canton, including but not limited to, the following:

- 1. Chapter 105.03 – U.S. steel usage required; exception.**  
All City contracts shall stipulate or provide that all steel necessary in the construction of any work performed under such contracts shall be steel that is produced in the United States unless a specific product which is required is not produced by manufacturers in the United States in which event this prohibition does not apply. This section shall apply to only contracts awarded by the Board of Control of the City. (Ord. 224-77. Passed 6-27-77.)
- 2. Chapter 105.05 – Materials to be purchased locally.**  
In all future contracts for the construction of buildings, structures, or other improvements under the Capital Improvement Budget, the following clause shall be printed or typewritten on each contract:  
It is the desire of the City of Canton that all materials used in the construction covered by this contract shall be purchased in the Canton area except such materials which are unavailable in the Canton area. (Res. 49-77. Passed 2-7-77.)
- 3. Chapter 105.06 – Minority Contract Provision.**  
a. All contracts with the City shall include the following clause:  
The bidder agrees to expend at least \$\_\_\_\_\_ of the Contract in the event the contract is awarded to such bidder for minority/women's business enterprises. For purposes of this pledge, the term "minority/women's business enterprise" means a bona fide business established as a sole proprietorship, partnership or corporation owned, operated and controlled by one or more minority persons or women who have at least fifty-one percent (51%) ownership. "Minority" includes African Americans, Asian/Pacific Islanders, Hispanic/Latino Americans and Native American Indians. The minority or woman must have operational and managerial control, interest in capital, and earnings commensurate with the percentage of ownership. Minority/women's business enterprises may be employed as construction contractors, subcontractors, vendors or suppliers.  
(Ord.185-2011. Passed 10-31-11.)
- 4. Chapter 105.12 – Local Bidder Preference.**  
a. The Board of Control, in determining the lowest and best bidder in the award of contracts to which this section is applicable, is authorized to award contracts to local bidders as hereinafter defined, whose bid is not more than five percent (5%) higher, subject to a maximum amount of twenty thousand dollars (\$20,000.00), than the lowest dollar bid submitted by non-local bidders. The Board of Control's decision in making such an award shall be final.

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b. For purposes of this section, "local bidder" means an individual or business entity which at the time of the award of the contract has a headquarters, division, sales office, sales outlet, manufacturing facility, or similar significant business-related location in Stark County, Ohio.

c. All contract specifications and/or bid documents that are distributed by Canton for the purpose of soliciting bids for goods and/or services shall contain the following notice:

Prospective bidders will take notice that the City of Canton, in determining the lowest and best bidder in the award of this contract, may award a local bidder preference to any qualified bidder pursuant to Section 105.12 of the Codified Ordinances of the City of Canton. The determination of whether a bidder qualifies for the local preference shall be made by Board of Control. The Board's decision shall be final. A copy of Section 105.12 is attached.

d. This section shall be applicable to all contracts for equipment, goods, machinery, materials, supplies, vehicles and/or services, which are purchased, leased and/or constructed at a cost in excess of twenty thousand dollars (\$20,000.00) and which require bidding pursuant to Ohio R.C. 735.05 through 735.09 and Ohio R.C. 737.03.

(Ord. 95-2014. Passed 5-5-14.)

**5. Chapter 507.03 – Equal Employment Opportunity Clause.**

b. During the performance of this contract, the contractor agrees as follows:

1. The contractor shall not discriminate against any employee or applicant for employment because of race, age, handicap, religion, color, sex, national origin, sexual orientation or gender identity. The contractor shall take affirmative action to insure that applicants are employed and that employees are treated during employment without regard to race, religion, color, sex, national origin, military status, sexual orientation or gender identity. As used herein, the word "treated" shall mean and include without limitation the following: recruited, whether by advertising or other means; compensation, whether in the form of rates or pay or other forms of compensation; selected for training, including apprenticeship; promoted; demoted; upgraded; downgraded; transferred; laid off; and terminated. The contractor agrees to and shall post in conspicuous places available to employees and applicants for employment notices to be provided by the contracting officers setting forth the provisions of this nondiscrimination clause.
2. The contractor shall, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, age, handicap, religion, color, sex, national origin, military status, sexual orientation or gender identity.

(Ord. 153-2012. Passed 9-24-12.)

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3. The contractor shall send to each labor union or representative of workers, with which he has a collective bargaining agreement or other contract or understanding, a notice advising the labor union or workers' representative of the contractor's commitments under the equal opportunity clause of the City; and he shall post copies of the notice in conspicuous places available to employees and applicants for employment.
4. The contractor shall submit in writing to the City his affirmative action plan, and each subcontractor and supplier of equipment or supplies shall submit to the general contractor his affirmative action plan. The responsibility for securing these affirmative action plans falls upon the general contractor and shall be on file at the office of the general contractor. The contractor shall furnish all information and reports required by the City or its representative pursuant to this chapter, and shall permit access to his books, records, and accounts by the contracting agency and by the Executive Secretary for purposes of investigation to ascertain compliance with the program.
5. The contractor shall take such action with respect to any subcontractor as the City may direct as a means of enforcing the provisions of this equal opportunity clause, including penalties and sanctions for noncompliance; provided, however, that in the event the contractor becomes involved in or is threatened with litigation as the result of such direction by the City, the City will enter into such litigation as is necessary to protect the interests of the City and to effectuate the City's equal opportunity program and, in the case of contracts receiving Federal assistance, the contractor or the City may request the United States to enter into such litigation to protect the interests of the United States.
6. The contractor shall file and shall cause his subcontractors, if any, to file compliance reports with the City in the form and to the extent prescribed by the City or its representative. Compliance reports filed at such times as directed shall contain information as to the employment practices, policies, programs and statistics of the contractor and his subcontractors.
7. The contractor shall include the provisions of this equal employment opportunity clause in every subcontract or purchase order, so that such provisions will be binding upon each subcontractor or vendor.
8. Refusal by the contractor or subcontractor to comply with any portion of this program as herein stated and described will subject the offending party to any or all of the following penalties:
  - A. Withholding of all future payments under the involved public contract to the contractor in violation, until it is determined that the contractor or subcontractor is in compliance with the provisions of this contract.
  - B. Refusal of all future bids for any public contract with the City or any of its departments or divisions, until such time as the contractor or subcontractor demonstrates that he has established and shall carry out the policies of the program as herein outlined.
  - C. Cancellation of the public contract and declaration of forfeiture of the performance bond.

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- D. In cases in which there is substantial or material violation or the threat of substantial or material violation of the compliance procedure or as may be provided by contract, appropriate proceedings may be brought to enforce these provisions, including the enjoining within applicable laws of contractors, subcontractors or other organizations, individuals or groups who prevent, directly or indirectly, or seek to prevent, directly or indirectly, compliance with the policy as herein outlined.  
(Ord. 179-74. Passed 6-17-74.)



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**Section V: Bid Forms and Instructions**

Failure to submit Bid forms 1 through 8 with the bid may cause the bid to be deemed non-responsive, and therefore it may not be considered.

Bid forms 9 through 14 will be required of the successful bidder but may be submitted after the awarding of the contract.

Bid form 15 must be submitted weekly as work progresses.

Bid form 16 must be submitted to the owner (public authority) before the surety is released or the final payment due under the terms of the contract is made.

**\*\*\*The City of Canton does encourage bidders to submit all bid forms with their bids\*\*\***

**BID FORM 1 – AUTHORITY OF SIGNATORY**

The authority of the bid signatory must be established. Bid Form 1 provides the means by which the bidder can identify the type of business organization it is (corporation, partnership, etc.) and provides instructions as to how signature authority is commonly established.

**BID FORM 2 – BID GUARANTY**

Each proposal shall be accompanied by a bid guarantee which shall consist of one of the following:

1. Ohio Statutory Bid Guaranty and Contract Bond, substantially in the form prescribed by ORC 153.571. The 153.571 statutory bond form requires that the penal amount be an amount not less than the bid price. It is a bid error to write in an amount equal to ten percent (10%) of the amount bid.
2. A certified check or cashier's check in an amount not less than ten percent (10%) of the total amount bid for all items upon which the proposal is made. Such a bid guarantee check shall be made payable to the OWNER without condition. A contractor using a bid check will be required to furnish a performance bond in the amount of one hundred percent (100%) of the total bid within ten (10) days of notice of the award.

Bidders using the Ohio Statutory Bid Guaranty and Contract Bond Form can leave the penal amount blank, if such is acceptable to the bidder and the surety. The statutory bond form, per ORC 153.571, is read as having a penal amount equal to the price bid, if no amount is written.

In the case where a bidder to whom a contract award is made fails to execute and secure a contract within ten (10) days after the issuance of the notice of award in writing, the award may be vacated and the bid guarantee, in an amount not to exceed ten percent (10%) of the amount bid, forfeited.

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The Bid Bond must be provided by an approved surety company authorized to transact business in the State of Ohio and with a local agent. Agents of bonding companies which write the Bid Bond for this contract shall be licensed to conduct business in the State of Ohio and have a local (Ohio) agent. Each bid shall contain the power of attorney, bearing the seal of the company and evidencing such agent's authority to execute the documents furnished. Identification of the local agent is to accompany each Bond.

The surety used for the bid bond shall be listed in the current edition of the U.S. Treasury Circular 570 and the Penal Sums shall be within the maximum specified for such company in said Circular 570.

**BID FORM 3 – BIDDER INFORMATION**

The bidder shall submit the required information on the included form and shall supplement the information there given as may be required by the Owner after the receipt of bids. Low bidders may be interviewed by the OWNER and shall furnish such information as the Owner may deem necessary to consider prior to making an award.

**BID FORM 4 – PROJECT REFERENCES**

Each bidder shall provide references as set forth on Bid Form 4.

**BID FORM 5 – NON-COLLUSION AFFIDAVIT**

Each bidder is required to submit with the bid an affidavit stating that neither he nor his agents, nor any other party for him, has paid or agreed to pay, directly or indirectly, any person, firm or corporation any money or valuable consideration for assistance in procuring or attempting to procure the contract herein referred to, and further agreeing that no such money or reward will be hereafter paid. This affidavit must be on the form provided in this document.

**BID FORM 6 – MINORITY BUSINESS ENTERPRISE UTILIZATION COMMITMENT**

This form is for the bidder to identify how much he is willing and able to expend if the contract is awarded to his company for minority business enterprises.

**BID FORM 7 – QUESTIONNAIRE IN DETERMINING LOWEST AND BEST BID**

This form identifies a series of factors to be considered by the Board of Control in determining whether a bid is not only the lowest bid, but the best bid.

**BID FORM 8 – INSURANCE AFFIDAVIT AND REQUIREMENTS**

The successful bidder will be required to submit the required insurance as outlined in Bid Form 8.

All bidders would be well advised to consult their insurance agent as soon as possible so that all questions and concerns can be given due consideration.

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**BID FORM 9 – AFFIDAVIT FOR FOREIGN CORPORATIONS**

A successful bidder who is a foreign corporation, (a **corporation not chartered in the State of Ohio**), will be required to submit an affidavit duly executed by the authorized bid signatory stating in said affidavit that said foreign corporation has, in accordance with the provisions of the laws of the State of Ohio, obtained a certificate authorizing it to do business in the State of Ohio.

**BID FORM 10 – LISTING OF SUBCONTRACTORS**

The successful bidder shall provide the name, type of work to be performed and value of each subcontract. Note that subcontractors are distinguishable from suppliers.

**BID FORM 11 – BID AND CONTRACTOR EMPLOYMENT PRACTICES REPORT**

This form is designed to provide an evaluation of your policies and practices relating to the extension of equal employment opportunity to all persons without regard to race, religion, color, sex or national origin. The successful bidder will be required to complete and submit the Bidder and Contractor Employment Practices Report. Additionally, the successful bidder will be required to submit an “affirmative action plan” and/or “EEO policy.” If the successful bidder does not have a formal EEO policy, he/she will be required to complete and submit the provided EEO policy statement.

**BID FORM 12 – PERSONAL PROPERTY TAX CERTIFICATION (ORC 5719.042)**

This form and/or certification must be retyped on the bidder’s letterhead and notarized utilizing either paragraph (A) or (B) as it applies to the successful bidder’s company.

**BID FORM 13 – CERTIFICATION – AUDITOR OF THE STATE OF OHIO**

This form is to be completed in which to certify that the bidder does not have outstanding unresolved finding for the recovery issued by the Auditor of the State of Ohio.

**BID FORM 14 – ARTICLES OF INCORPORATION**

The successful bidder will be required to submit a copy of the company’s articles of incorporation.

**BID FORM 15 – WEEKLY PAYROLLS**

The successful bidder will be required to submit weekly payrolls and required attachments stipulated therein as work progresses.

**BID FORM 16 – PREVAILING WAGE AFFIDAVIT OF COMPLIANCE**

This project will utilize Ohio Prevailing Wage Rates. This affidavit must be submitted to the owner (public authority) before the surety is released or final payment due under the terms of the contract is made.

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**Bid Form 1: Authority of Bid Signatory**

The bidder shall indicate which of the following is the source of the bid signatory's authority to sign the bid on behalf of the bidder. The bidder shall follow the instructions noted.

- \_\_\_\_\_ The party bidding is a sole partnership.
  
- \_\_\_\_\_ The party bidding is a partnership and the party signing is one of the partners.
  
- \_\_\_\_\_ The party is a corporation. The party signing is authorized to sign on behalf of the corporation. A copy of the resolution of the corporation's board of directors which delegates signatory authority to the individual signing is to be attached to this bid form. This resolution can be a general delegation of authority for signing bids or can be a specific authorization for this project. The secretary of the corporation shall authenticate the resolution as currently being in full force and effect.
  
- \_\_\_\_\_ Signatory authority is evidenced by other means noted below:

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**Bid Form 2: Bid Guarantee and Performance Bond Affidavit**

If a Bid Bond is supplied, the Ohio Statutory Bid Guaranty and Contract Bond, as set forth in ORC 153.571 is to be used.

**\*\*\*Please include your bid bond or bid check at the front of your submitted bid packet\*\*\***

**PERFORMANCE BOND AFFIDAVIT**

Unless Bidder submits, with its bid, a Bid and Contract Bond per ORC. 153.571, Canton may request that the Bidder obtain, from its insurance representative, a performance bond affidavit that contains the representations noted below. The affidavit shall be made on the insurance agency's letterhead, reference this project by name and state at least the following:

- (1) The representative certifies that, should the contract be awarded to the contractor on whose behalf the certificate is being provided, the performance bond specified will be provided.
- (2) The name and A.M. Best Company ratings of companies which are expected to provide the required performance bond.

**THE PERFORMANCE BOND AFFIDAVIT SHALL BE NOTARIZED**

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**Bid Form 3: Bidder Information**

**Bidder Information Page 1 of 3**

1. The Bidder shall provide the following information as part of its bid.

a. Name of Bidder \_\_\_\_\_

b. Business Address \_\_\_\_\_

\_\_\_\_\_ City                      \_\_\_\_\_ State      \_\_\_\_\_ Zip

c. Business Telephone Number      ( \_\_\_\_ ) \_\_\_\_\_

d. Person, address, email and telephone to whom official notices are to be sent  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

e. Person, address, email and telephone for further information regarding this proposal  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

f. State(s) of incorporation (w/dates of incorporation)  
\_\_\_\_\_  
\_\_\_\_\_

g. Principal place of business \_\_\_\_\_

h. Working days necessary to complete project                      \_\_\_\_\_ days

i. Federal I.D. Number                      # \_\_\_\_\_

j. Amount of Certified Check, Cashier's Check, Bid Bond                      \$ \_\_\_\_\_

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**Bidder Information Page 2 of 3**

2. Form of Business Organization.

\_\_\_\_ Corporation                      \_\_\_\_ Partnership                      \_\_\_\_ Other

3. The bidder shall provide the names and addresses of all persons interested as principals (officers, partners, and associates) in this proposal. Write first name in full, and give titles for offices.


All of the above, including the signatory to this bid, are citizens of the United States, except the following. (Provide names and addresses of those not a citizen of the United States.)


4. Name and address of other person, firms or companies interested in this contract.


5. Local Bidder Preference Information: Does your company have a headquarters, division, sales office, sales outlet, manufacturing facility, or similar significant business-related location in Stark County, Ohio? If yes, please provide the name and address of the location below.


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**Bidder Information Page 3 of 3**

The undersigned certifies that the bidder has the facilities, ability and financial resources available for the fulfillment of the contract if such be awarded to said bidder.

Upon request, the bidder will be expected to amplify the foregoing statements as necessary to satisfy the OWNER concerning his ability to successfully perform the work in a satisfactory manner.

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_

\_\_\_\_\_

Contractor

By \_\_\_\_\_

(Signature of individual, partner or officer signing the proposal.)

**Please have this page notarized**

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**Bid Form 4: Project References**

Each bidder shall provide a list of comparable projects performed over the last three (3) years (maximum of 10) indicating the following:

- Owner (with name, address and telephone number of Owner's project manager).
- General description of work, and size and type of project. Also indicate whether participation was as a prime or subcontractor. If the bidder's participation on the project was as a subcontractor, identify prime contractor with information requested above for the OWNER.

All previous work for the OWNER over the last five (5) years should be identified.

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**Bid Form 5: Page 2**

statements contained in said proposal or bid are true; that such bidder has not, directly or indirectly submitted this bid, or the contents thereof, or divulged information or data relative thereto any association or to any member or agent thereof; and further says that all the statements made by him in said proposal or bid are true.

\_\_\_\_\_  
Affiant

Sworn to and subscribed before me this \_\_\_\_\_ day of  
\_\_\_\_\_, 20 \_\_\_\_.

Notary Public in and for

\_\_\_\_\_ County,

My Commission Expires:

\_\_\_\_\_, 20 \_\_\_\_.



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**Bid Form 6: Minority Contract Provisions: Minority Business Enterprise Utilization Commitment, Page 1**

- A. The bidder agrees to expend at least \$\_\_\_\_\_ of the Contract in the event the contract is awarded to such bidder for minority/women's business enterprises. For purposes of this pledge, the term "minority/women's business enterprise" means a bona fide business established as a sole proprietorship, partnership or corporation owned, operated and controlled by one or more minority persons or women who have at least fifty-one percent (51%) ownership. "Minority" includes African Americans, Asian/Pacific Islanders, Hispanic/Latino Americans and Native American Indians. The minority or woman must have operational and managerial control, interest in capital, and earnings commensurate with the percentage of ownership. Minority/women's business enterprises may be employed as construction contractors, subcontractors, vendors or suppliers.

The Bidder must indicate the minority business enterprises it intends to utilize in this document as follows:

NAME AND ADDRESS OF MINORITY FIRMS	NATURE OF PARTICIPATION	DOLLAR VALUE OF PARTICIPATION
_____	_____	_____
_____	_____	_____
_____	_____	_____

Total Bid Amount: \_\_\_\_\_ Total: \_\_\_\_\_

Percentage of Minority Participation \_\_\_\_\_%

- A. The Bidder agrees to furnish implementation reports to indicate the minority business enterprises which it has or intends to utilize. The first report is due five (5) days after notification to the lowest and best bidder. The second report is due at 40% completion.
- C. It is the goal of the City of Canton that at least ten percent (10%) of the total of all contracts be expended for bonafide minority business enterprises.
- D. If the ten percent (10%) minority business utilization cannot be met, a waiver can be granted by the Board of Control upon recommendation of the Director of Public Service and/or Safety. To justify a waiver, it must be shown that every feasible attempt has been made to comply, and it must be demonstrated that sufficient, relevant, qualified minority business enterprises (which can perform subcontracts or furnish supplies) are unavailable in the market area of the project to enable meeting the ten percent (10%) minority business enterprise goal.

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**Bid Form 6: Page 2**

- E. Failure to comply with the Minority Business Enterprise Utilization Commitment will not be grounds for the forfeiture of a bid bond so long as a "best effort" approach to comply with such commitment can be demonstrated. If such compliance cannot be obtained, the bidder shall furnish written evidence to justify that he has made "best efforts" to comply with the Minority Business Enterprise Assistance Program. A representative of the City of Canton will monitor and determine whether or not a good faith effort to comply with the Minority Business Enterprise Commitment has been made.
  
- F. In light of the above, the Board of Control will still award the contract to the lowest and best bidder. Breach of this commitment constitutes breach of the Bidder's contract, if awarded.
  
- G. For information regarding the City's Minority Business Enterprise Utilization Requirement, please contact the City of Canton's Compliance Office.
  
- H. The undersigned hereby certifies that he or she has read the terms of the commitment and is authorized to bind the Bidder to the commitment herein set forth.

\_\_\_\_\_  
Name/Title of Authorized Officer

\_\_\_\_\_  
Signature of Authorized

\_\_\_\_\_  
Date

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**Bid Form 7: Factors to Be Used When Determining Lowest and Best Bid,  
Page 1**

**NOTICE**

All bidders shall hereby take notice of the factors to be considered by the Board of Control in determining whether a bid is not only the lowest bid, but the best bid. Said factors are contained in Canton Ordinance 86/2009, Chapter 105.01.

**QUESTIONNAIRE**

**When completing Bid Form #7, please submit your answers, separately, on your company letterhead and attach to Bid Form #7.**

In accordance with Canton Ordinance 86/2009, Chapter 105.01, Section (c), each bidder must complete the following questionnaire. This questionnaire is to be completed in a truthful and responsible manner by the bidder. The City reserves the right to consider the bidder in default for any false or misleading information supplied per this questionnaire. If the bid is made by a corporation, then this questionnaire is to be completed by its properly authorized agent.

1. Please describe the work, supplies and materials covered by the bidder's bid.
2. Please state the identification of all work to be subcontracted. **All subcontractors are also subject to the approval of the Board of Control based on the criteria contained in this section.**
3. Please provide the descriptions of the bidder's experience with projects of comparative size, complexity and cost within recent years, demonstrating the bidder's ability and capacity to perform a substantial portion of the project with its own forces.
4. Please provide documentation from previous, similar projects regarding timeliness of performance, quality of work, extension requests, fines and penalties imposed and payments thereof, liens filed, explanations of the same.
5. Please state the number of years the bidder has been actively engaged as a contractor in the construction industry.
6. Please provide your recent experience record in the construction industry, including the original contract price for each construction job undertaken by the bidder, the amount of any change orders or cost overruns on each job, the reasons for the change orders or cost overruns, and the bidder's record for complying with and meeting completion deadlines on construction projects.
7. Please identify any project(s) within the previous five years that the bidder was determined by a public entity not to be a responsible bidder, the reasons given by the public entity, together with an explanation thereof.

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**Bid Form 7: Page 2**

8. Please identify your financial responsibility to assure that the bidder processes adequate resources and availability of credit, the means and ability to procure insurance and acceptable performance bonds required for the project and whether any claims have been made against performance bonds secured by the bidder on other construction projects.
9. Please describe any suspension or revocations of any professional license of any director, officer, owner, or managerial employees of the bidder, to the extent that any work to be performed is within the field of such licensed professional.
10. Please describe any and all OSHA violations within the previous three years, as well as all notices of OSHA citations filed against the bidder in the same three year period, together with an explanation of remediation or other steps taken regarding such violations and notices of violation.
11. Please describe any and all violations within the previous five years pertaining to unlawful intimidation or discrimination against any employee by reason race, creed, color, disability, gender or national origin and/or violations of an employee's civil or labor rights or equal employment opportunities.
12. Please describe any litigation (including copies of pleadings) in which the bidder has been named as a defendant or third party defendant in an action involving a claim for personal injury or wrongful death arising from performance of work related to any project in which it has been engaged within the previous five years.
13. Please describe any allegations of violations of the prevailing wage law and any other state or federal labor law, including, but not limited to, child labor violations, failure to pay wages, or unemployment insurance tax delinquencies or unfair practices within the past five years.
14. Please describe any violations of the worker compensation law.
15. Please describe any criminal convictions or criminal indictments, involving the bidder, its officers, directors, owners, and/or managers within the past five years.
16. Please describe any violation within the past five years or pending charges concerning federal, state, or municipal environmental and/or health laws, codes, rules and/or regulations.
17. Please provide documentation that the bidder provides health insurance and pension benefits to its employees.
18. Please state the experience and the continuity of the bidder's work force.

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**Bid Form 7: Page 3**

19. Please submit the identity of the bidder’s permanent work force that will be employed on the public contract, to include the number of employees (or contract labor) to be assigned to the contract, their city and state of residence, and their job descriptions or trade specialties.
20. Please provide the identity of any temporary work force that will be employed on the public contract, to include the number of employees (or contract labor) to be assigned to the contract, their city and state of residence, and their job descriptions or trade specialties.
21. Please state whether the bidder’s work force is drawn mainly from local employees as defined below. The number of local employees, and their job descriptions or trade specialties that the bidder will employ on the public contract.  
Local Employee Definition
  - A. A person residing within the City of Canton or Stark County,
  - B. A person working for a contractor or from a pool of labor located within the City of Canton or Stark County; or
  - C. Due to the specialty nature of the employment to be performed, where a suitable person meeting either subsection A or B hereof is not available, a person residing or working within a location as close to Canton as is available. A “suitable person” means a person who is qualified to perform the work or trainable within a reasonable period of time.
22. If the bidder claims that non-local employees (or non-local contract labor) are to be assigned to the public contract instead of local employees, please state in detail the reasons therefore.
23. If the bidder claims that local employees are not intended to be used by the bidder on the public contract because they are not available, qualified or trainable within a reasonable period of time, please state in detail the reasons therefore.
24. State whether the bidder participates in a bona fide apprenticeship program that is approved by the Ohio State Apprenticeship Council and the United States Department of Labor.
25. State whether the bidder has adopted and implemented a comprehensive drug and alcohol testing program for its employees.
26. State whether the bidder’s employees are OSHA-10 and/or OSHA-30 certified.

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**Bid Form 8: Insurance Affidavit and Requirements**

**Insurance Requirements**

A. The following standard indemnity agreement and minimum insurance requirements are incorporated in the Specifications for all work performed by the Contractor for the Owner, its affiliated and associated organizations or subsidiaries, hereinafter referred to as Owner.

I. The Contractor agrees to indemnify and save the Owner harmless from and against any and all costs, loss and expense, liability damages, or claims for damages, including cost for defending any action, on account of any injury to persons (including death) or damage to or destruction of property of the Owner, arising or resulting from the work provided for or performed, or from any act, omission, or negligence of the Contractor, Subcontractor and his or their agents or employees. The foregoing provisions shall in no way be deemed released, waived or modified in any respect by reason of any insurance or surety provided by the Contractor.

II. The Contractor shall maintain insurance of the kinds and in amounts specified in the attached schedule and furnish the Director with Certificates of Insurance as evidence thereof in the prescribed form. If any work provided for or to be performed under any Specifications is sublet (as otherwise permitted by the terms of such Specifications), the Contractor shall require the sub-contractors to maintain and furnish him with satisfactory evidence of Workmen's Compensation, Employers' Liability and such other forms and amounts of insurance which Contractor deems reasonably adequate.

III. In accordance with Item II, the Contractor shall maintain the following insurance:

1. Worker's Compensation and Employer's Liability

Insurance affording,

(a) Protection under the Workmen's Compensation Law in the State of Ohio.

(b) Employer's Liability protection subject to a minimum limit of \$100,000.00.

2. Commercial General Liability Insurance in amounts not less than:

General Aggregate Limit \$2,000,000.00

Products - Completed Operations

Aggregate Limit \$2,000,000.00

Personal and Advertising Injury

Limit \$1,000,000.00

Each Occurrence Limit \$1,000,000.00

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Fire Damage Limit	\$50,000.00
Medical Expense Limit	\$5,000.00

This insurance shall:

- a. include coverage for the liability assumed by Contractor under Item I (Indemnity);
- b. not to be subject to any of the special property damage liability exclusions commonly referred to as the XCU exclusions pertaining to blasting or explosion, collapse or structural damage and underground property;
- c. not be subject to any exclusion of property used by the insured or property in the care, custody or control of the insured or property as to which the insured for any purpose is exercising physical control unless the required Builders Risk or Installation Floater coverage is indicated on the required Certificate of Insurance (Item III.4);
- d. and the Certificates of Insurance furnished by the Contractor shall show by specific reference that each of the foregoing items have been provided for.
- e. **INCLUDE THE CITY OF CANTON, OHIO AND ITS AGENTS, AS ADDITIONAL INSURED FOR PURPOSES OF COVERAGE UNDER THE SUBJECT POLICY.**

3. Comprehensive Automobile Liability Insurance in the following minimum amounts:

Bodily Injury and Property Damage any one accident or loss:	\$1,000,000.00
--	----------------

4. The contractor will provide and maintain Installation/Builders Risk Insurance to protect the interests of both the contractor and the owner for materials transported to the job, stored or installed on the premises, or stored at any temporary location off premises. Such insurance shall be written on an "All Risk" form to include the perils of Fire, Extended Coverage, Vandalism, Malicious Mischief, Theft, Collapse and Water Damage. The amount of Insurance shall be 100% of the insurable value of the work to be performed including all items of labor and materials incorporated therein, materials in storage on or off the job site to be used in completing the work, and such other supplies and equipment incidental to the work as are not owned or rented by the contractor, the cost of which is included in the direct cost of the work.



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This Insurance shall not cover any tools, derricks, machinery, tar buckets, ladders, engines, workmen's quarters, boilers, pumps, wagons, scaffolds, forms, compressors, shanties or other items owned or rented by the Contractor, the cost of which is not included in the direct cost of the work.

- B. The Certificates of Insurance furnished by the Contractor as evidence of the Insurance maintained by him shall include a clause obligating the Insurer to give the Director ten (10) days prior written notice for cancellation or any material change in the insurance.

**Insurance Affidavit**

Each bidder shall obtain from its insurance representative and include in the bid submittal an insurance affidavit that contains the representations noted below. Make the affidavit on the insurance agency's letterhead, reference this project by name, and state at least the following:

1. The representative has reviewed and understands the insurance requirements (including the cancellation/non-renewal provisions) set forth in Bid Form 8.
2. The representative certifies that the company will provide the specified insurance should the contract be awarded to the contractor on whose behalf the certificate is being provided.
3. The names and A.M. Best Company ratings of companies required to provide the required insurance.

**You must have the insurance affidavit notarized.**

The successful bidder will be required to provide evidence of the required insurance as outlined in this bid form. This must include:

1. Certificate of Liability Insurance with the City of Canton listed as an additional insured
2. Ohio Workers' Compensation Certificate

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**Bid Form 9: Bidder’s Affidavit: Foreign Corporation**

**\*Any corporation that is not incorporated in the State of Ohio is a foreign corporation.**

The undersigned certifies that \_\_\_\_\_ is a foreign corporation incorporated in the State of \_\_\_\_\_, whose principal place of business is \_\_\_\_\_ and is required to obtain authorization to transact business in the State of Ohio.

The undersigned bidder further certifies that said authorization has been obtained and is in effect and the bidder has a designated statutory agent upon whom process against bidder corporation may be served within the State of Ohio. The designated

statutory agent is \_\_\_\_\_  
(name and address)

\_\_\_\_\_  
Process served upon the designated statutory agent named above shall be effective service, unless the Owner has been informed, by certified mail or its equivalent (return receipt), of a change in the agent upon whom process can be served.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signed

\_\_\_\_\_  
Title

**Note: This statement is to be reproduced on the bidder's letterhead, signed by the authorized bid signatory, notarized and submitted with the bid.**

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**Bid Form 10: Listing of Subcontractors**

The Bidder shall set forth the name, location of principal place of business, proposed amount of subcontract and type of work to be performed of each subcontractor who will perform work or labor or render service, as listed, to the bidder in or about the construction of the work or improvement to be performed under the Contract for which the attached Bid is submitted, and where the portion of the work which will be performed by each subcontractor will be. Note that subcontractors are distinguishable from suppliers.

**Subcontractor - An individual or entity having a direct contract with CONTRACTOR or with any other Subcontractor for the performance of a part of the work at the site.**

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

The Bidder understands that if he fails to specify a subcontractor for any portion of the work to be performed under the Contract, he shall be deemed to have agreed to perform such portion itself.

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**Bid Form 11: Bid and Contractor Employment Practices Report**

PLEASE FILL OUT THIS FORM AND RETURN PROMPTLY TO THE ADDRESS BELOW

BIDDER AND CONTRACTOR EMPLOYMENT PRACTICES REPORT

Minority Coordinator  
218 Cleveland Avenue SW  
Canton, Ohio 44702

**I. INSTRUCTIONS**

- A. **EQUAL EMPLOYMENT OPPORTUNITY REQUIREMENT:** This form is designed to provide an evaluation of your policies and practices relating to the extension of equal employment opportunity to all persons without regard to race, religion, color, sex or national origin.

Ordinance No. 179-74 of the City of Canton and the rules and regulations pursuant thereto provide for a contract compliance inspection of personnel policies and practices related to any contract with the City including contracts for work, labor, services, supplies, equipment, materials, leases, concession agreements, and permits.

- B. **CONTRACTOR AND BIDDER PERFORMANCE:** Completion of this Contractor and Bidder Employment Practices Report is one of the steps which demonstrates compliance with the City's Equal Employment Opportunity Program. Responsibility for demonstrating compliance with the Program by the contractor and his subcontractors rests with the contractor or subcontractor. Such demonstration is a prerequisite for continued eligibility for bidding on city contracts, or for continuing in contract with the City.

**II. CONTRACTOR AND BIDDER INFORMATION**

<b>1. REPORTING STATUS</b> <input type="checkbox"/> a. Prime Contractor <input type="checkbox"/> b. Prime Subcontractor <input type="checkbox"/> c. Supplier <input type="checkbox"/> d. Other (Specify)
<b>2. NAME, ADDRESS AND TELEPHONE NUMBER OF BIDDER COVERED BY THIS REPORT</b>
<b>3. NAME, ADDRESS AND TELEPHONE NUMBER OF PRINCIPAL OFFICIAL OR MANAGER OF BIDDER</b>
<b>4. NAME, ADDRESS AND TELEPHONE NUMBER OF PRINCIPAL OFFICE OF BIDDER</b>
<b>5. CONTRACTING CITY AGENCY (OR AGENCIES)</b>
<b>6. SIGNATURE AND TITLE OF AUTHORIZED EQUAL EMPLOYMENT OPPORTUNITY REPRESENTATIVE   DATE</b>

EVALUATION (level blank)

- Compliance  
 Non-Compliance       Follow-up \_\_\_\_\_





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**IV. EMPLOYMENT DATA**

Please note that this data may be obtained by visual survey or post-employment records. Neither visual surveys nor post-employment records are prohibited by any Federal, State or local law. All specified data are required to be filled in by law.

JOB CATEGORIES	ALL EMPLOYEES			MINORITY GROUP EMPLOYEES								
	TOTAL MALE & FEMALE	MALE	FEMALE	MALE				FEMALE				
				African American	Asian American	Native American	Hispanic	African American	Asian American	Native American	Hispanic	
Officials, Mgrs and Supervisors												
Professionals												
Technicians												
Part-Time Seasonal												
Office and Clerical												
Craftsmen (Skilled)												
Operatives (Semi-skilled)												
Laborers (Unskilled)												
Service Workers												
<b>TOTAL</b>												
Total employment from previous report (if any)												

**REMARKS** Use this space to give any identification data appearing on last report which differs from that given above, explain major changes in employment, changes in composition of reporting units, and other pertinent information.

The undersigned certifies that he is legally authorized by the bidder to make the statements and representations contained in this report. That he has read all of the foregoing statements and representations and that they are true and correct to the best of his knowledge and belief. The undersigned, understands that if any of the statements and representations are made knowing them to be false or there is a failure to implement any of the stated intentions or objectives, set forth herein, without prior notice to the Office of Contract Compliance, the bidder will be subject to the loss of all future awards.

FIRM OR CORPORATE NAME \_\_\_\_\_

DATE OF SIGNING \_\_\_\_\_

SIGNATURE \_\_\_\_\_

TITLE \_\_\_\_\_

SIGNATURE \_\_\_\_\_

TITLE \_\_\_\_\_

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V. ADDITIONAL INFORMATION (OPTIONAL)

Describe any other actions taken which show that all employees are recruited, hired, trained, and promoted without regard to their race, religion, color, sex, or national origin. Use separate sheet if additional space is required.

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DESCRIPTION OF OCCUPATIONAL CATEGORIES

Officials, managers and supervisors - Occupations requiring administrative personnel who set broad policies, exercise over-all responsibility for execution of these policies, and direct individual departments or special phases of a firm's operations. Includes officials, executives, middle management, plant managers, department managers and superintendents, salaried foremen who are members of management, purchasing agents and buyers, and kindred workers.

Professionals - Occupations requiring either college graduation or experience of such kind and amount as to provide a comparable background. Includes accountants and auditors, airplane pilots and navigators, architects, artists, chemists, designers, dietitians, editors, engineers, lawyers, librarians, mathematicians, natural scientists, physicians, social scientists, teachers, and kindred workers.

Technicians - Occupations requiring a combination of basic scientific knowledge and manual skill which can be obtained through about 2 years of post high school education, such as is offered in many technical institutes and junior colleges, or through equivalent on-the-job training. Includes draftsmen, engineering aids, junior engineers, mathematical aids, nurses, photographers, radio operators, scientific assistants, surveyors, technical illustrators, technicians, (medical, dental, electronic physical sciences), and kindred workers.

Sales workers - Occupations engaging wholly or primarily in direct selling. Includes advertising agents and salesmen, insurance agents and brokers, stock and bond salesmen, demonstrators, salesmen and sales clerks and kindred workers.

Office and clerical - Includes all clerical type work regardless of level of difficulty, where the activities are predominantly nonmanual though some manual work not directly involved with altering or transporting the products is included. Includes bookkeepers, cashiers, collectors (bills and accounts), messengers and office boys, office machine operators, shipping and receiving clerks, stenographers, typists and secretaries, telegraph and telephone operators, and kindred workers.

Craftsmen (Skilled) - Manual workers of relatively high skill level having a thorough and comprehensive knowledge of the processes involved in their work. Exercise considerable independent judgement and usually receive an extensive period of training. Includes the building trades hourly paid foremen and leadmen who are not members of management, mechanics and repairmen, skilled machining occupations, compositors and typesetters, electricians, engravers, job setters (metal), motion picture projectionists, pattern and model makers, stationary engineers, tailors and tailresses, and kindred workers.

Operatives - (Semi-Skilled) - Workers who operate machine or processing equipment or perform other factory-type duties of intermediate skill level which can be mastered in a few weeks and require only limited training.

Laborers (Unskilled) - Workers in manual occupations which generally require no special training. Perform elementary duties that may be learned in a few days and require no independent judgement. Includes garage laborers, car washers and greasers, gardeners (except farm) and groundskeepers, longshoremen and stevedores, lumbermen, raftsmen and wood choppers, laborers performing lifting, digging, mixing, loading, and pulling operations, and kindred workers.

Service workers - Workers in both protective and nonprotective service occupations. Includes attendants (hospital and other institution, professional and personal service), barbers, charwomen and cleaners, cooks (except household), counter and fountain workers, elevator operators, firemen and fire protection, guards, watchmen, and doorkeepers, stewards, janitors, policemen and detectives, porters, waiters and waitresses, and kindred workers.

Apprentices - Persons employed in a program including work training and related instruction to learn a trade or craft which is traditionally considered an apprenticeship, regardless of whether the program is registered with federal or State agency.

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THE CITY OF CANTON, OHIO IN CONFORMANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS REQUIRE EACH EMPLOYER, CONTRACTOR, AND MATERIAL SUPPLIERS WORKING CITY PROJECTS TO BE SIGNATURES OF THE FOLLOWING STATEMENTS:

1. IT IS THE POLICY OF \_\_\_\_\_ THAT EQUAL EMPLOYMENT OPPORTUNITY BE AFORDED TO ALL QUALIFIED PERSONS WITHOUT REGARD TO RACE, RELIGION, SEX OR NATIONAL ORIGIN.
  
2. IN SUPPORT OF THIS DOCUMENT \_\_\_\_\_ WILL NOT DISCRIMINATE AGAINST ANY EMPLOYEE OR APPLICANT BECAUSE OF RACE, RELIGION, COLOR, SEX OR NATIONAL ORGIN.
  
3. \_\_\_\_\_ WILL TAKE AFFIRMATIVE ACTION TO INSURE THAT APPLICANTS ARE EMPLOYED AND THAT EMPLOYEES ARE TREATED DURING EMPLOYMENT WITHOUT REGARD TO THEIR RACE, RELIGION, COLOR SEX OR NATIONAL ORIGIN. SUCH ACTION WILL INCLUDE BUT NOT BE LIMITED TO:  
  
RECRUITMENT, ADVERTISING OR SOLICITATION FOR EMPLOYMENT, HIRING, PLACEMENT, UPGRADING, TRANSFER OR DEMOTION, SELECTION FOR TRAINING INCLUDING APPRENTICESHIP RATES OF PAY OR OTHER FORMS OF COMPENSATION, LAYOFFS OR TERMINATION.
  
4. \_\_\_\_\_ WILL MAKE EVERY EFFORT TO COMPLY WITH MINORITY UTILIZATION GOALS AS FOLLOWS: (9%) NINE PERCENT MINORITIES IN WORKFORCE ON THIS JOB, (6.9%) SIX POINT NINE PERCENT FEMALE UTILIZATION ON THIS JOB, (10%) TEN PERCENT OF CONTRACT AMOUNT EXPENDED WITH MINORITY BUSINESS ENTERPRISES.
  
5. \_\_\_\_\_ SHALL REQUIRE EACH SUB-CONTRACTOR WE HIRE ON THIS PROJECT TO ADHERE TO, SIGN, AND RETURN THIS STATEMENT TO THE CITY.

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
(Name of Company)

\_\_\_\_\_

(Signature and Title of Company Officer)

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**Bid Form 12: Personal Property Tax Certification (ORC 5719.042)**

Office of the Auditor  
City of Canton  
City Hall 218 Cleveland Avenue S.W.  
Canton, Ohio 44702

Dear Sir or Madame:

(A) The undersigned hereby certifies that the party to whom contract award is being considered was not charged with any delinquent personal property tax at the time of the bid opening the project nor is said party currently charged with such a delinquency on the general tax list of personal property for Stark County, Ohio.

or

(B) The undersigned hereby certifies that the party to whom contract award is being considered has been charged with a delinquency regarding personal property tax on the general tax list of personal property for Stark County, Ohio, either currently, or at the time of bid opening the project. The amount of the due and unpaid delinquent taxes, including any due and unpaid penalties and interest thereon is \_\_\_\_\_.

and

It is understood that, by law, this statement is to be signed by the party whose bid has been tentatively accepted, and must be affirmed under oath. The law also requires that his statement is to be submitted to the City Auditor and this statement must be incorporated into the pending contract before any payment can be made under the subject contract.

\_\_\_\_\_  
Name of Corporation

\_\_\_\_\_  
President

\_\_\_\_\_  
Secretary

**NOTE: This form and/or certification must be retyped on the bidder's letterhead and notarized utilizing either paragraph (A) or (B) as it applies to your company.**

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**Bid Form 13: Certification: Auditor of the State of Ohio**

I, \_\_\_\_\_  
(Name of person signing affidavit) (Title)

do hereby certify that \_\_\_\_\_ does not have an  
(Company or Individual Name)

outstanding unresolved finding for recovery issued by the Auditor of the  
State of Ohio as defined by Ohio Revised Code (ORC) Section 9.24 as of

\_\_\_\_\_.  
(Current date)

\_\_\_\_\_  
Signature of Officer or Agent

\_\_\_\_\_  
Name (Print)

Sworn to and subscribed in my presence this \_\_\_\_\_ day of

\_\_\_\_\_, 20 \_\_\_\_\_

\_\_\_\_\_  
(Notary Public)

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**Bid Form 14: Articles of Incorporation**

Please provide a copy of the company's articles of incorporation. The City of Canton may request this information if it is not provided.

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**Bid Form 15: Weekly Payrolls**

Each week as work progresses the Contractor must submit to the Owner a copy of all weekly payrolls and required attachments stipulated therein.

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 Department of Industrial Relations, Prevailing Wage Rate Division, State of Ohio, and that the classifications set forth for each laborer or mechanic conform with the work he performs."

---

(SIGNATURE)

---

(TITLE)

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**Bid Form 16: Prevailing Wage Affidavit of Compliance**

I \_\_\_\_\_, \_\_\_\_\_,  
(Name of person signing affidavit) (Title)

Do hereby certify that the wages paid to all employees of \_\_\_\_\_  
(Company Name)

for all hours worked on the \_\_\_\_\_  
(Project and Location)

project, during the period from \_\_\_\_\_ to \_\_\_\_\_  
(Project Dates)

are in compliance with State prevailing wage requirements.

I further certify that no rebates or deductions have been or will be made, directly or indirectly,  
from any wages paid in connection with this project, other than those provided by law.

\_\_\_\_\_  
(Signature of Officer or Agent)

Sworn to and subscribed in my presence this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
(Notary Public)

The above affidavit must be executed and sworn to by the officer or agent of the Contractor or Subcontractor who supervises the payment of employees. This affidavit must be submitted to the owner (public authority) before the surety is released or final payment due under the terms of the contract is made.

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**Section VI: Detailed Specifications**

**Lift Station Site (Electrical)**

**The Contractor's electrician must be registered to work in the city of Canton and have their Canton-licensed journeyman acquire a no-fee permit from the Canton Building Department prior to commencing electrical work. Faircrest Lift Station plans have been provided to the Building Dept. by the City Engineer.**

**The Contractor and/or their electrician are responsible for coordinating with American Electric Power(AEP), and procuring necessary permit and work to make a point of service connection to the AEP electric distribution system.**

**All costs associated with the above shall be inclusive with the lump sum bid item, Faircrest Lift Station Electrical, Complete.**

**See the following pages for additional Detailed Specifications. The original page numbering has been maintained for this section.**

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**TECHNICAL SPECIFICATIONS  
TABLE OF CONTENTS  
FOR  
CITY OF CANTON  
FAIRCREST ST SW LIFT STATION AND  
SANITARY SEWER EXTENSION  
G.P. #1142**

DIVISION 1 - PROJECT REQUIREMENTS

1. 01380            Preconstruction Photography

DIVISION 2 - SITE WORK

1. 02110            Site Clearing
2. 02200            Earthwork
3. 02270            Slope Protection and Erosion Control
4. 02485            Seeding
5. 02234            Compacted Backfill
6. 02500            New and Replacement Paving
7. 02560            Precast Manholes and Covers
8. 02567            Manhole Sealing with a Protective Polymer Lining
9. 02570            Monolithic or Sectional Precast Concrete Vault Structures
10. 02620           High Density Polyethylene Piping
11. 02630           Polyvinyl Chloride Pipe for Gravity Sewers
12. 02830           Chain Link Fencing

DIVISION 3 – CONCRETE

1. 03300            Cast-in-Place Concrete

DIVISION 4 – MASONRY

DIVISION 5 – METALS

1. 05500            Metal Fabrications

DIVISION 6 - WOOD AND PLASTICS

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

DIVISION 8 – DOORS

1. 08305            Access Doors

DIVISION 9 – FINISHES

1. 09900 Painting

DIVISION 10 – SPECIALTIES

DIVISION 11 – EQUIPMENT

1. 11261 Chemical Feed System
2. 11280 Process Valves and Gates
3. 11313 Submersible Non-clog Pump Station

DIVISION 12 – FURNISHINGS

DIVISION 13 - SPECIAL CONSTRUCTION

1. 13324 Flow Metering Equipment

DIVISION 14 - CONVEYING SYSTEMS

DIVISION 15 – MECHANICAL

1. 15010 Mechanical General Provisions
2. 15050 Basic Materials and Methods
3. 15051 Process Piping Testing
4. 15062 Ductile Iron Pipe and Fittings
5. 15090 Pipe Couplings and Expansion Joints
6. 15095 Pipe Supports and Hangers

DIVISION 16 – ELECTRICAL

1. 16010 Electrical General Provisions
2. 16111 Conduit
3. 16123 Building Wire and Cable
4. 16130 Boxes
5. 16140 Wiring Devices
6. 16170 Grounding and Bonding
7. 16180 Equipment Wiring Systems
8. 16190 Supporting Devices
9. 16195 Electrical Identification
10. 16441 Enclosed Switches
11. 16461 Dry Type Transformers
12. 16470 Panelboards
13. 16510 Lighting Fixtures
14. 16902 Electric Controls and Relays

APPENDICES

Appendix A Subsurface Investigation Information

**SECTION 01380  
PRECONSTRUCTION PHOTOGRAPHY**

**PART - GENERAL**

**1.1 SUMMARY**

- A. Prior to the delivery of any equipment, materials or supplies to any work site, or to the beginning of any construction activity, the Contractor shall provide preconstruction photography for the purpose of establishing the existing surface conditions in all of the areas of construction or of intended use by the Contractor.
- B. The preconstruction photography shall be performed by an independent company that has had previous experience in similar type work. The name of the company must be submitted to the Engineer for approval prior to engaging in the work.

**1.2 SCOPE OF WORK**

- A. Ground photography shall consist of taking a color audio-video recording of the surface features along the entire length of the project. All work and storage areas and all intersecting roadways shall also be taped. Prior to audio-video recording the project, all areas to be inventoried shall be investigated visually with notations made of items not readily visible by recording methods.
- B. The purpose of obtaining a color audio-video recording of the project is to provide a record of the preconstruction conditions for proper restoration of surface features after completion of the project. The recording will assist in restoring areas affected by construction to their original condition with as little controversy as possible.

**1.3 QUALIFICATIONS**

- A. The color audio-video recording must be prepared by a professional electrographer that is actively engaged in making color audio-video recordings of similar projects for municipal agencies. The name of the company must be submitted to the Engineer and be approved prior to the start of any recording.

**PART 2 - PRODUCTS**

**2.1 EQUIPMENT**

- A. Color audio-video digital recordings shall be standard DVD Format, and compatible with all commercially available DVD player/recorders.

- B. The digital color camera used for video recording shall be a commercially available camera and shall produce color signals equal to or better than the recognized, published industry standards. It shall be capable of providing a video signal-to-noise ratio of at least 40 DB and a horizontal focal length lens (i.e., Zoom) that will allow clear images to be recorded at varying distances. It shall have multi-axis mobility, (Pan and Tilt). The camera must be capable of producing an acceptable quality color picture as determined by the Owner or Engineer while operating under the recording conditions specified.

## 2.2 OWNERSHIP OF RECORDINGS

- A. All recordings produced will become the permanent property of the Owner. The Contractor shall delivery all recordings to the Owner at least seven (7) days prior to the start of any construction work.
- B. Any portion of the recording coverage deemed unacceptable by the Owner or the Engineer must be re-recorded by the Contractor prior to the start of construction work at no additional charge. The new recording shall be delivered to the Owner prior to the start of any construction work.

## PART 3 - EXECUTION

### 3.1 COVERAGE OF RECORDING

- A. Color audio-video recording coverage shall include, but is not limited to, all existing driveways, sidewalks, curbs, streets, signs, landscaping, trees, catch basins, fences, visible utilities, and all buildings located within the zone of influence. It is imperative that existing surface features which have faults, fractures, defects, or other imperfections be included on the video tape record. Audio descriptions shall be made simultaneously with the video coverage to support the visual record.
  - 1. Streets shall be recorded on audio-video media for the full width of the right-of-way, except where specifically noted otherwise by the Engineer.
  - 2. Work agreement easement, or temporary construction areas shall be recorded on audio-video media and include all adjacent areas lying within the zone of influence of construction.
  - 3. Building Exteriors - The Contractor shall furnish color audio-video recordings of the exterior surfaces of all buildings within the zone of influence of construction as well as those specifically designated by the Engineer. Buildings identified for audio-video coverage may include houses, garages, and other structures. Coverage shall include, but is not limited to, walls, visible foundations, chimney, porches, and trim.

### 3.2 LOCATION INFORMATION

- A. All recordings (media and cases) shall be properly identified by media number, locations, and project name in a manner acceptable to the Owner.
- B. A record of the contents of each recording shall be supplied on a run sheet identifying each segment in the recording by location, i.e., street viewing side, traveling direction, engineering stationing, and all referenced by counter numbers.
- C. A brief report and inventory of all recordings completed, referenced by location and recording number, shall be furnished to the Owner when the recordings are delivered.
- D. All video recordings shall begin with the date and time of recording, the project name, the sheet numbers or engineering stationing as shown on the plans, the name of the street, the side of the street, area or building being recorded, the compass direction of travel, and the counter at the beginning and end of each segment.
- E. Houses and buildings shall be identified visually by house or building number, when possible, in such a manner that the progress of the recording and the proposed system may be located by reference to the houses and buildings.
- F. Provide a brief, but accurate, description of lawn areas, landscaping, driveways, aprons, sidewalks, culverts, trees, roadways, etc. which depicts the condition(s) of these features.
- G. The engineering stationing numbers must be continuous and correspond to the project stationing and include the standard engineering symbols (i.e., 37+38). This information must appear in the lower left half of the viewing screen. Below the engineering stationing the name of the project, name of the area covered, direction of travel, viewing side, etc. shall also appear.
- H. All recordings shall be accompanied by a notarized statement verifying the original unedited quality of the recordings.

### 3.3 ACCESS

- A. If it becomes necessary to enter onto private property, the owner of the property shall be notified by the Contractor at least twenty-four (24) hours in advance of the planned entry in order to obtain their permission to do so. If the owner of the property refuses to give permission, the Contractor shall notify the Engineer.

- B. The Contractor shall not enter onto any private property without permission of the property owner or notification from the Engineer that he has the legal right to do so. The Contractor shall be held liable for entry made other than stated above.

### 3.4 SITE RECORDING CONDITIONS

- A. All recording shall be done during times of good visibility. Recording outside shall not be done during periods of visible precipitation or when the ground area is covered with snow, leaves, or debris unless otherwise authorized by the Engineer.
- B. In order to record the proper detail and perspective on the media, adequate auxiliary lighting will be required to fill in shadow areas caused by trees, utility poles, road signs, etc. as well as other conditions which require artificial illumination.
- C. The average rate of speed in the general direction of travel of the conveyance used during recording shall not exceed sixty feet (60') per minute. Panning rates and zoom-in zoom-out rates shall be controlled so that during playback adequate clarity of the objects being viewed will be maintained.
- D. When describing features, stop moving, and hold camera on the feature while describing, then resume moving.
- E. When conventional wheeled vehicles are used as the conveyance for the video camera, the distance from the camera lens to the ground shall be maintained in a manner to insure proper perspective at all times. In instances where media coverage will be required in areas not accessible to conventional wheeled vehicles, coverage shall be obtained by walking or other special means of conveyance approved by the Engineer. Regardless of the method of conveyance the same requirements for media quality and content remain in effect as specified except as may be specifically exempted in writing by the Engineer.

END OF SECTION

## SECTION 02110

### SITE CLEARING

#### PART 1 - GENERAL

##### 1.1 WORK INCLUDED

- A. This section includes the following:
  - 1. Protection of existing trees.
  - 2. Removal of trees and other vegetation.
  - 3. Topsoil stripping.
  - 4. Clearing and grubbing.
  - 5. Removing above-grade improvements.
  - 6. Removing below-grade improvements.

##### 1.2 PROJECT CONDITIONS

- A. Traffic. Conduct site clearing operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks or other occupied or used facilities without permission from authorities having jurisdiction.
- B. Protection of Existing Improvements. Provide protections necessary to prevent damage to existing improvements indicated to remain in place or to remain in operation during construction.
  - 1. Protect improvements on adjoining properties and on Owner's property.
  - 2. Restore damaged improvements to their original condition, as acceptable to property owners.
- C. Protection of Existing Trees and Vegetation. Protect existing trees and other vegetation indicated to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning or bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line. Provide temporary guards to protect trees and vegetation to be left standing.

##### 1.3 MEASUREMENT AND PAYMENT

- A. Payment for this work will include all equipment, materials and labor necessary to perform the work under this specification as shown on the Drawings and specified herein and included in the Contract. The payment for this work shall be included in the lump sum price for Site Clearing.

#### PART 2 - PRODUCTS (NOT USED)

## PART 3 - EXECUTION

### 3.1 SITE CLEARING

- A. General. Remove trees, shrubs, grass and other vegetation, improvements, or obstructions as required to permit installation of new construction. Remove similar items elsewhere on site or premises as specifically indicated. "Removal" includes digging out and disposing of stumps and roots.
  - 1. Cut minor roots and branches of trees indicated to remain in a clean and careful manner, where such roots and branches obstruct installation of new construction.
  
- B. Topsoil. Topsoil is defined as friable clay loam surface soil found in a depth of not less than 4 inches. Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones, and other objects over 2 inches in diameter, and without weeds, roots, and other objectionable material.
  - 1. Strip topsoil to whatever depths encountered in a manner to prevent intermingling with underlying subsoil or other objectionable material.
    - a. Remove heavy growths of grass from areas before stripping.
    - b. Where existing trees are indicated to remain, leave existing top-soil in place within drip lines to prevent damage to root system.
  - 2. Stockpile topsoil in storage piles in areas indicated or directed. Construct storage piles to provide free drainage of surface water. Cover storage piles, if required, to prevent wind erosion.
  
- C. Clearing and Grubbing. Clear site of trees, shrubs and other vegetation, except for those indicated to be left standing.
  - 1. Completely remove stumps, roots, and other debris protruding through ground surface.
  - 2. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.
    - a. Place fill material in horizontal layers not exceeding 6 inches loose depth, and thoroughly compact to a density equal to adjacent original ground.

END OF SECTION



## SECTION 02200

### EARTHWORK

#### PART 1 - GENERAL

##### 1.1 WORK INCLUDED

- A. This section includes earthwork and related operations, including but not limited to clearing and grubbing the construction site; dewatering; excavating all classes of material encountered; pumping, draining, and handling of water encountered in the excavations; handling, storage, transportation, and disposal of all excavated and unsuitable material; construction of fills and embankments; backfilling around structures and pipe; backfilling all trenches and pits; compacting; all sheeting, shoring, and bracing; preparation of subgrades; surfacing and grading; and any other similar, incidental, or appurtenant earthwork operation which may be necessary to properly complete the work.
- B. Provide all services, labor, materials, and equipment required for all earthwork and related operations necessary or convenient to the Contractor for furnishing a complete work as shown on the Drawings or specified in these Contract Documents.

##### 1.2 GENERAL

- A. The elevations shown on the Drawings as existing are taken from the best available data and are intended to give reasonable, accurate information about the existing elevations. They are not precise, and the Contractor should satisfy himself as to the exact quantities of excavation and fill required.
- B. Perform earthwork operations in a safe and proper manner taking appropriate precautions against all hazards.
- C. Maintain in good condition at all times all excavated and fill areas for structures, trenches, fills, topsoil areas, embankments, and channels until final acceptance by the Owner. Repair all damage caused by erosion or other construction operations using material of the same type as the damaged materials.
- D. If soil borings are available for the area of this work, they will be located in Appendix A at the end of the Bid documents where they have been made available for review. This information is made available for such use as Contractor may choose to make of it in the preparation of his bid, but the Owner gives no guarantee, either expressed or implied, that it represents a true or complete cross section of all of the material to be encountered in performing the excavation and earthwork on this project.

- E. Earthwork operations within the rights-of-way of the State Department of Transportation, the County Engineer's Department, and respective townships, villages, or cities shall be conducted in accordance with the requirements and provisions of the permits issued by those agencies for the construction within their respective rights-of-way. Such requirements and provisions, where applicable, shall take precedence over and supersede the provisions of these Specifications.
- F. Control grading to prevent water running into excavations. Obstruction of surface drainage shall be avoided and a means shall be provided whereby storm water can be uninterrupted in existing gutters, other surface drains, or temporary drains. Material for backfill or for protection of excavation in public roads from surface drainage shall be neatly placed and kept shaped so as to cause the least possible interference with public travel. Free access must be provided to all fire hydrants, watergates, meters, and private drives.
- G. No classification of excavated materials will be made. Excavation and trenching work shall include the removal and subsequent handling of all materials excavated or otherwise removed in performance of the contract work, regardless of the type, character, composition, or condition thereof.
- H. All earthwork operations shall comply with the requirements of OSHA Construction Standards, Part 1926, Subpart P, "Excavations, Trenching, and Shoring," and Subpart O, "Motor Vehicles, Mechanized Equipment, and Marine Operations," and shall be conducted in a manner acceptable to the Engineer.
- I. It is understood and agreed that a thorough investigation by the Contractor has been made of the surface and subsurface conditions of the site and any special construction problems which might arise as a result of nearby watercourses and floodplains, particularly in areas where construction activities may encounter water-bearing sands and gravels or limestone solution channels. Provide all services, labor, equipment, and materials necessary or convenient for completing the work within the time specified in these Contract Documents.

### 1.3 MEASUREMENT AND PAYMENT

- A. No separate measurement or payment will be allowed for this work. Payment for all work performed under this section shall be included in other items of work.

## PART 2 – PRODUCTS ( Not Applicable)

## PART 3 - EXECUTION

### 3.1 INITIAL SITE PREPARATION

- A. Preparatory to beginning construction operations, remove from the site all vegetative growth, trees, brush, stumps, roots, debris, and any other

objectionable matter, including fences, buildings, and other structures shown on the Drawings in the construction areas which are designated for removal or which, if left in place, would interfere with the proper performance or completion of the contemplated work, would impair its subsequent use, or would form obstructions therein.

- B. Grub and remove stumps and roots to a depth not less than 5 feet below grade. Fill all holes or cavities which extend below the subgrade elevation of the proposed work with compacted layers of crushed rock or earth backfill conforming to the requirements specified here for backfill. Do not incorporate organic material from clearing operations in excavation backfill or embankment material.
- C. Exercise special precautions for the protection and preservation of trees, cultivated shrubs, sod, fences, buildings, and other structures located in the construction area but not within designated clearing limits as shown on the Drawings or within the limits of embankments, excavations, or proposed structures. Repair or replace any of the aforementioned items damaged by Contractor's operation or construction activities.
- D. Remove and dispose of any excess material resulting from clearing or site preparation operations. Dispose of such materials in an acceptable manner.
- E. All disposal of excess soil, debris and materials must be done in an environmentally sound manner in accordance with local, state, and federal regulations. There shall be no disposal in or near any water body, floodplain, wetland, drainage course or environmentally sensitive area, even with permission of the property owner.

### 3.2 DEWATERING

- A. Provide and maintain at all times during construction ample means and devices with which to promptly remove and properly dispose of all water from any source entering the excavations or other parts of the work. Dewatering shall be accomplished by methods which will ensure a dry excavation and preservation of the final lines and grades of the bottoms of excavations. Methods of dewatering may include sump pumps, well points, deep wells, or other suitable methods which do not damage or weaken structures, foundations, or subgrades. Shallow excavations may be dewatered using open ditches, provided such ditches are kept open and free-draining at all times.
- B. If foundation soils are disturbed or loosened by the upward seepage of water or an uncontrolled flow of water, excavate and replace the affected areas with crushed rock.
- C. Dispose of the water from the work in a suitable manner without damage to adjacent property. Conveyance of the water shall not interfere with traffic flow.

Do not drain water into work built or under construction. The Contractor will be held responsible for the condition of any pipe or conduit which he may use for drainage purposes, and all such pipes or conduits shall be left clean and free of sediment.

### 2.3 SHEETING, SHORING, AND BRACING

- A. The sides of all excavations shall be sufficiently sheeted, shored, and braced as necessary to prevent slides, cave-ins, settlement, or movement of the banks; to maintain the excavation clear of all obstructions; and to provide safe working conditions. Wood or steel sheeting of approved design and type shall be used in wet, saturated, or flowing ground. All sheeting, shoring, and bracing shall have sufficient strength and rigidity to withstand the pressure exerted and to maintain shape and position under all circumstances. Used sheeting may be utilized for temporary use as long as it is safe, sound, and meets the requirements of this section.
- B. Correctly assessing the need for sheeting, analyzing the stresses induced, and maintaining regulatory compliances shall be totally the responsibility of the Contractor. Since the Owner's Representative does not dictate or determine the Contractor's sequence or limits of excavation, the Owner's Representative assumes no responsibility for sheeting and shoring. The Contractor must employ or otherwise provide for adequate professional structural and geotechnical engineering supervision to assess the need for sheeting and shoring and design same. Results of sheeting and shoring analysis and design shall be submitted to the Owner's Representative on request.
- C. Excavations adjacent to existing or proposed buildings and structures, or in paved streets or alleys, shall be sheeted, shored, and braced adequately to prevent undermining beneath or subsequent settlement of such structures or pavements. Underpinning of adjacent structures shall be done when necessary to maintain structures in safe condition. Any damage to structures or pavements occurring through settlements, water or earth pressures, slides, caves, or other causes due to failure or lack of sheeting or bracing, or improper bracing or occurring through negligence or fault of the Contractor in any other manner shall be repaired by the Contractor at his own expense.
- D. Sheeting, shoring, or bracing materials shall not be left in place unless otherwise specified or shown on the Drawings or ordered by the Owner's Representative in writing. Such materials shall be removed in such manner that no danger or damage will occur to new or existing structures or property, public or private, and so that cave-ins or slides will not take place. Trench sheeting shall be left in place until backfill has been brought to a level 12 inches above the top of the pipe. It shall then be cut off and the upper portion removed. Sheeting for structures shall be left in place until backfill has been brought to a level 12 inches above the top of the bottom footing. It shall then be cut off and the upper portion removed.

- E. All holes and voids left in the work by the removal of sheeting, shoring, or bracing shall be filled and thoroughly compacted.

### 3.3 EXCAVATION

#### A. GENERAL

1. Excavation shall include the removal of all material from an area necessary for the construction of a pipeline or structure. Excavations shall provide adequate working space and clearances for the work to be performed therein.
2. Where quicksand, soft clay, spongy or swampy earth, or other materials unsuitable for subgrade or foundation purposes are encountered below the excavation limits, they shall be removed and disposed of to the level of suitable material. Areas so excavated shall be backfilled in accordance with City of Canton Standard Drawing No. 19.
3. Place barriers at each end of all excavations and at such places as may be necessary along excavations to warn all pedestrian and vehicular traffic of such excavations. Place lights along excavations from sunset each day to sunrise of the next day until the excavations are backfilled. Barricade all excavations in such a manner as to prevent persons from falling or walking into any excavation.

#### B. ROCK EXCAVATION

1. Rock encountered in the process of excavation for structures shall be uncovered and stripped of all loose materials over the entire limits of excavation. Rock encountered for removal in a trench section shall be uncovered for a distance of not less than 50 feet.
2. Excavate rock and large boulders in trenches over the horizontal limits of excavation and to depths as shown on the Drawings.
3. Backfill the space below grade for pipelines to the proper grade with compacted layers of crushed rock or sand conforming to the requirements specified herein for backfill. Where pipe sewers are constructed on concrete cradles, excavate rock to the bottom of the cradle as shown on the Drawings.
4. Excavate rock under structures to lines and grades shown on the Drawings. Unless specified otherwise, where rock excavation has been carried below grade, the Contractor shall backfill to grade with Class B concrete at his own expense.

5. Where rock foundation is obtained at grade for over 50 percent of the area of any one structure, the portion of the foundation that is not rock shall be excavated below grade to reach a satisfactory foundation of rock. The portion below grade shall be backfilled with Class B concrete.
6. Where rock foundation is obtained at grade for less than 50 percent of any one structure and satisfactory rock cannot be found over the remaining area by reasonable additional excavation, the rock shall be removed for a depth of 12 inches below grade and the space below grade shall be backfilled to the proper grade with compacted layers of crushed rock conforming to the requirements specified herein for backfill.
7. Drilling and ripping operations shall be conducted with due regard for the safety of persons and property in the vicinity and in strict conformity with requirements of all ordinances, laws, and regulations. Conduct rock excavation near existing pipelines or other structures with the utmost care to avoid damage. Promptly repair injury or damage to other structures and properties to the satisfaction of the Owner by the Contractor at his own expense.
8. Complete rock excavation for all structures and adjacent trenches under this Contract and any other rock excavation directed by the Owner's Representative before construction of any structure is started in the vicinity.

#### C. TRENCH EXCAVATION

1. Trench excavation shall consist of the removal of materials necessary for the construction of pipelines and all appurtenant facilities.
2. Excavation for pipelines shall be made in open cut unless shown otherwise on the Drawings, or as specified elsewhere. Trenches shall be cut true to the lines and grades shown on the Drawings. The banks of trenches shall be cut in vertical, parallel planes equidistant from the pipe centerline. From an elevation 12 inches above the top of the pipe to the bottom of the trench, the horizontal distances between vertical planes for different sizes of pipe shall not exceed those shown on the Drawings. . The bottom of the trench shall be cut carefully to the required grade of the pipe except where bedding materials or cradles are shown, in which case the excavation shall extend to the bottom of the bedding or cradles as shown on the City of Canton Standard Drawings. Minimum pipe cover shall be as shown on the City of Canton Drawings.

3. Bell holes for bell and spigot pipe and/or mechanical joint pipe shall be excavated at proper intervals so the barrel of the pipe will rest for its entire length upon the minimum depth of bedding as shown on the City of Canton Standard Drawings. Bell holes shall be large enough to permit proper installation of all joints in the pipe. Bell holes shall not be excavated more than 10 joints ahead of pipe laying. No part of any bell or coupling shall be in contact with the trench bottom, trench walls, or granular embedment while the pipe is jointed.
5. Excavation for manholes, outlets, collars, saddles, piers, and other pipeline structures shall conform to the additional requirements specified herein for structural excavation.
6. Pipe trenches shall not be excavated more than 400 feet in advance of pipe laying and all work shall be performed to cause the least possible inconvenience to the public. Adequate temporary bridges or crossings shall be constructed and maintained where required to permit uninterrupted vehicular and pedestrian traffic.
7. Wherever pipe trenches are excavated below the elevation shown on the Drawings, the Contractor, at his own expense, shall fill the void thus made at the proper grade with material meeting the requirements of extra foundation material per City of Canton Standard Drawing No. 19.
8. In all cases where materials are deposited along open trenches, they shall be placed so that no damage will result to the work and/or adjacent property in case of rain or other surface wash.

D. Structural Excavation

1. Structural excavation shall consist of the removal of all materials necessary for the construction of structures, including tanks, foundations, footings, wetwells, dry wells, box culverts, flumes, channels, buildings, and other miscellaneous structures.
2. The bottoms of structural excavations shall be true to the lines and grades shown on the Drawings. Faces of excavations shall not be undercut for extended footings. Except as provided herein for excavation of unsuitable material or rock, where the excavation is carried below the grade elevation shown on the Drawings, the Contractor shall backfill the void thus made to the proper grade with Class B concrete at his own expense.

3.4 BACKFILLING

- A. Materials for backfilling shall conform to the City of Canton Standard Drawing No. 19.

## B. GENERAL

1. Earth backfill shall be compacted to not less than 90 percent of the maximum density as determined by ASTM D 698 at a moisture content within 3 percentage points, unless otherwise specified herein. Crushed stone and sand shall be compacted to not less than 83 percent of the solid volume density as determined from the bulk specific gravity by AASHTO T-84 and T-85 and the dry weight of the aggregate.
2. Material that is too dry for adequate compaction shall receive a prior admix of sufficient water to secure optimum moisture content. Material having excessive water content shall not be placed at any time.
3. Backfill material required to be compacted shall be placed in horizontal layers not to exceed 6 inches in thickness (before compaction) and compacted in place by ramming, tamping, or rolling, unless otherwise specified herein. Compaction shall be accomplished by power-driven tools and machinery wherever possible. Compaction and consolidation of sand and crushed stone backfill shall be accomplished using vibrating equipment in a manner acceptable to the Engineer.

## C. BACKFILLING TRENCHES

1. The backfilling of pipeline trenches shall be started immediately after the construction of same. Select backfill or crushed stone as shown on the Drawings shall be placed in the trench under and on each side of the pipe in 6-inch layers for the full width of the trench and thoroughly and uniformly compacted by ramming and/or tamping to a minimum of 90 percent of the maximum density determined as specified herein. Select earth backfilling or crushed stone as shown on the Drawings shall start above the pipe bedding. Sufficient select backfill or crushed stone shall be placed around the pipe and compacted to provide a cover of not less than 12 inches over the top of the pipe. Mechanical compactors or tampers shall not be used within 12 inches of pipe. Compaction in this area shall be accomplished by hand methods.. Backfilling shall proceed simultaneously on both sides of the pipe to prevent lateral displacement.
2. Caution shall be used during backfill operations for PVC or other flexible thermoplastic pipe to prevent pipe deformation. PVC or other flexible thermoplastic pipe shall not be subjected to roller or wheel loads until a minimum of 36 inches of backfill has been placed over the top of the pipe. A hydrohammer shall NOT be used until a minimum depth of 48 inches of backfill has been placed over the top of the pipe.
3. Backfilling of PVC pressure pipe or other flexible thermoplastic pipe (water pipe) shall be as described in Paragraph 1 above.



4. In streets and alleys, across sidewalks and driveways, and at any other places subject to vehicular traffic or other superimposed loads, crushed rock backfill shall be placed and compacted in 12-inch layers low strength mortar may be placed from the level of 12 inches above the top of the pipe upward for the full depth of the trench. Crushed rock backfill shall be compacted by use of a hydrohammer or approved vibratory compactor. The top 6 inches of the finished subgrade shall be equal to not less than 100 percent of the maximum density as determined by ASTM D 698 at a moisture content of within 3 percentage points of optimum. When field tests show failure to meet the density requirement, the subgrade shall be loosened by disking, harrowing, or other approved methods to a depth of not less than 6 inches, then reshaped and recompactd as indicated in this paragraph.
5. Trenches under concrete slabs and footings of structures shall be completely backfilled with compacted sand or crushed rock or filled with Class B concrete as shown on the Drawings.
6. All backfilling shall be done in such a manner that the pipe or structure over or against which it is being placed will not be disturbed or injured. Any pipe or structure injured, damaged, or moved from its proper line or grade during backfilling operations shall be removed and repaired to the satisfaction of the Engineer and then rebackfilled.

#### D. Backfilling Around Structures

1. Backfilling around structures shall consist of common earth backfill placed in 6-inch layers and compacted by tamping to a minimum of 90 percent of the maximum density determined as specified herein for the full depth of the excavation from the bottom to the finished grade. No backfill shall be placed against concrete structures until the concrete has reached its specified 28-day compressive strength. Where practical, compaction of structural backfill shall be accomplished by power-driven tamping equipment.
2. Where crushed rock mats under slabs and foundations are called for on the Drawings, excavate below grade to the depth of the crushed rock mat as shown on the Drawings and install a compacted crushed rock bed. This shall be finished to a true line or plane and even with the subgrade of the concrete foundations, piers, footings, or slabs. Before placing any crushed stone, remove all loose earth or debris. This crushed rock mat shall extend 12 inches beyond all slabs and foundations or to edges of sheet piling.

3. Crushed rock mats 12 inches or less in thickness shall be constructed of compacted layers of crushed rock conforming to Section 903.23, Size 7 (1/2-inch to No. 4), of the SSRBC.
4. Crushed rock mats of thickness greater than 12 inches shall have the top 12 inches constructed of compacted layers of crushed rock as specified above. That portion below the top 12 inches shall be constructed of compacted layers of crushed rock conforming to section 903.05, Class A, with a modified gradation of 6 inches to dust as received from the crusher.
5. The use of earth backfill to support footings, foundations, and structures shall not be permitted, unless otherwise shown on the Drawings.

### 3.5 FILLS AND EMBANKMENTS

- A. Fills and embankments shall consist of all earth fills except backfills in trenches or around structures. Unless special material is specified or shown on the Drawings, material for fills and embankments shall consist of excavated material from structures or of a mixture of such excavated materials and materials borrowed from other sources by the Contractor.

### 3.6 DISPOSAL OF WASTE AND UNSUITABLE MATERIALS

- A. All excavated materials not used for such purposes shall be considered as waste materials and the disposal thereof shall be made in an acceptable manner.
- B. Unsuitable materials, consisting of wood, vegetable matter, debris, soft or spongy clay, peat, and other objectionable material shall be removed from the work site.
- C. The Contractor is responsible for any and all permits and other requirements, such as sediment runoff control necessitated by the disposal of waste material.

### 3.7 FINAL GRADING

- A. After other earthwork operations have been completed, the sites of all structures, roads, and embankments shall be graded within the limits and to the elevations shown on the Drawings. Grading operations shall be so conducted that materials shall not be removed or loosened beyond the required limits. The finished surfaces shall be left in smooth and uniform planes such as are normally obtainable from the use of hand tools. If Contractor is able to obtain the required degree of evenness by means of mechanical equipment, the use of hand labor methods will not be required. Neatly trim and finish slopes and ditches to slopes shown on the Drawings unless otherwise approved by the Engineer.
- B. Grade and dress all finished ground surfaces to present a surface varying not more than plus or minus 0.10 foot as regards local humps or depressions, unless

otherwise specified or shown on the Drawings, and shall be acceptable to the Engineer.

END OF SECTION

## SECTION 02200

### EARTHWORK

#### PART 1 - GENERAL

##### 1.1 WORK INCLUDED

- A. This section includes earthwork and related operations, including but not limited to clearing and grubbing the construction site; dewatering; excavating all classes of material encountered; pumping, draining, and handling of water encountered in the excavations; handling, storage, transportation, and disposal of all excavated and unsuitable material; construction of fills and embankments; backfilling around structures and pipe; backfilling all trenches and pits; compacting; all sheeting, shoring, and bracing; preparation of subgrades; surfacing and grading; and any other similar, incidental, or appurtenant earthwork operation which may be necessary to properly complete the work.
- B. Provide all services, labor, materials, and equipment required for all earthwork and related operations necessary or convenient to the Contractor for furnishing a complete work as shown on the Drawings or specified in these Contract Documents.

##### 1.2 GENERAL

- A. The elevations shown on the Drawings as existing are taken from the best available data and are intended to give reasonable, accurate information about the existing elevations. They are not precise, and the Contractor should satisfy himself as to the exact quantities of excavation and fill required.
- B. Perform earthwork operations in a safe and proper manner taking appropriate precautions against all hazards.
- C. Maintain in good condition at all times all excavated and fill areas for structures, trenches, fills, topsoil areas, embankments, and channels until final acceptance by the Owner. Repair all damage caused by erosion or other construction operations using material of the same type as the damaged materials.
- D. If soil borings are available for the area of this work, they will be located in Appendix A at the end of the Bid documents where they have been made available for review. This information is made available for such use as Contractor may choose to make of it in the preparation of his bid, but the Owner gives no guarantee, either expressed or implied, that it represents a true or complete cross section of all of the material to be encountered in performing the excavation and earthwork on this project.

- E. Earthwork operations within the rights-of-way of the State Department of Transportation, the County Engineer's Department, and respective townships, villages, or cities shall be conducted in accordance with the requirements and provisions of the permits issued by those agencies for the construction within their respective rights-of-way. Such requirements and provisions, where applicable, shall take precedence over and supersede the provisions of these Specifications.
- F. Control grading to prevent water running into excavations. Obstruction of surface drainage shall be avoided and a means shall be provided whereby storm water can be uninterrupted in existing gutters, other surface drains, or temporary drains. Material for backfill or for protection of excavation in public roads from surface drainage shall be neatly placed and kept shaped so as to cause the least possible interference with public travel. Free access must be provided to all fire hydrants, watergates, meters, and private drives.
- G. No classification of excavated materials will be made. Excavation and trenching work shall include the removal and subsequent handling of all materials excavated or otherwise removed in performance of the contract work, regardless of the type, character, composition, or condition thereof.
- H. All earthwork operations shall comply with the requirements of OSHA Construction Standards, Part 1926, Subpart P, "Excavations, Trenching, and Shoring," and Subpart O, "Motor Vehicles, Mechanized Equipment, and Marine Operations," and shall be conducted in a manner acceptable to the Engineer.
- I. It is understood and agreed that a thorough investigation by the Contractor has been made of the surface and subsurface conditions of the site and any special construction problems which might arise as a result of nearby watercourses and floodplains, particularly in areas where construction activities may encounter water-bearing sands and gravels or limestone solution channels. Provide all services, labor, equipment, and materials necessary or convenient for completing the work within the time specified in these Contract Documents.

### 1.3 MEASUREMENT AND PAYMENT

- A. No separate measurement or payment will be allowed for this work. Payment for all work performed under this section shall be included in other items of work.

## PART 2 – PRODUCTS ( Not Applicable)

## PART 3 - EXECUTION

### 3.1 INITIAL SITE PREPARATION

- A. Preparatory to beginning construction operations, remove from the site all vegetative growth, trees, brush, stumps, roots, debris, and any other

objectionable matter, including fences, buildings, and other structures shown on the Drawings in the construction areas which are designated for removal or which, if left in place, would interfere with the proper performance or completion of the contemplated work, would impair its subsequent use, or would form obstructions therein.

- B. Grub and remove stumps and roots to a depth not less than 5 feet below grade. Fill all holes or cavities which extend below the subgrade elevation of the proposed work with compacted layers of crushed rock or earth backfill conforming to the requirements specified here for backfill. Do not incorporate organic material from clearing operations in excavation backfill or embankment material.
- C. Exercise special precautions for the protection and preservation of trees, cultivated shrubs, sod, fences, buildings, and other structures located in the construction area but not within designated clearing limits as shown on the Drawings or within the limits of embankments, excavations, or proposed structures. Repair or replace any of the aforementioned items damaged by Contractor's operation or construction activities.
- D. Remove and dispose of any excess material resulting from clearing or site preparation operations. Dispose of such materials in an acceptable manner.
- E. All disposal of excess soil, debris and materials must be done in an environmentally sound manner in accordance with local, state, and federal regulations. There shall be no disposal in or near any water body, floodplain, wetland, drainage course or environmentally sensitive area, even with permission of the property owner.

### 3.2 DEWATERING

- A. Provide and maintain at all times during construction ample means and devices with which to promptly remove and properly dispose of all water from any source entering the excavations or other parts of the work. Dewatering shall be accomplished by methods which will ensure a dry excavation and preservation of the final lines and grades of the bottoms of excavations. Methods of dewatering may include sump pumps, well points, deep wells, or other suitable methods which do not damage or weaken structures, foundations, or subgrades. Shallow excavations may be dewatered using open ditches, provided such ditches are kept open and free-draining at all times.
- B. If foundation soils are disturbed or loosened by the upward seepage of water or an uncontrolled flow of water, excavate and replace the affected areas with crushed rock.
- C. Dispose of the water from the work in a suitable manner without damage to adjacent property. Conveyance of the water shall not interfere with traffic flow.

Do not drain water into work built or under construction. The Contractor will be held responsible for the condition of any pipe or conduit which he may use for drainage purposes, and all such pipes or conduits shall be left clean and free of sediment.

### 2.3 SHEETING, SHORING, AND BRACING

- A. The sides of all excavations shall be sufficiently sheeted, shored, and braced as necessary to prevent slides, cave-ins, settlement, or movement of the banks; to maintain the excavation clear of all obstructions; and to provide safe working conditions. Wood or steel sheeting of approved design and type shall be used in wet, saturated, or flowing ground. All sheeting, shoring, and bracing shall have sufficient strength and rigidity to withstand the pressure exerted and to maintain shape and position under all circumstances. Used sheeting may be utilized for temporary use as long as it is safe, sound, and meets the requirements of this section.
- B. Correctly assessing the need for sheeting, analyzing the stresses induced, and maintaining regulatory compliances shall be totally the responsibility of the Contractor. Since the Owner's Representative does not dictate or determine the Contractor's sequence or limits of excavation, the Owner's Representative assumes no responsibility for sheeting and shoring. The Contractor must employ or otherwise provide for adequate professional structural and geotechnical engineering supervision to assess the need for sheeting and shoring and design same. Results of sheeting and shoring analysis and design shall be submitted to the Owner's Representative on request.
- C. Excavations adjacent to existing or proposed buildings and structures, or in paved streets or alleys, shall be sheeted, shored, and braced adequately to prevent undermining beneath or subsequent settlement of such structures or pavements. Underpinning of adjacent structures shall be done when necessary to maintain structures in safe condition. Any damage to structures or pavements occurring through settlements, water or earth pressures, slides, caves, or other causes due to failure or lack of sheeting or bracing, or improper bracing or occurring through negligence or fault of the Contractor in any other manner shall be repaired by the Contractor at his own expense.
- D. Sheeting, shoring, or bracing materials shall not be left in place unless otherwise specified or shown on the Drawings or ordered by the Owner's Representative in writing. Such materials shall be removed in such manner that no danger or damage will occur to new or existing structures or property, public or private, and so that cave-ins or slides will not take place. Trench sheeting shall be left in place until backfill has been brought to a level 12 inches above the top of the pipe. It shall then be cut off and the upper portion removed. Sheeting for structures shall be left in place until backfill has been brought to a level 12 inches above the top of the bottom footing. It shall then be cut off and the upper portion removed.

- E. All holes and voids left in the work by the removal of sheeting, shoring, or bracing shall be filled and thoroughly compacted.

### 3.3 EXCAVATION

#### A. GENERAL

1. Excavation shall include the removal of all material from an area necessary for the construction of a pipeline or structure. Excavations shall provide adequate working space and clearances for the work to be performed therein.
2. Where quicksand, soft clay, spongy or swampy earth, or other materials unsuitable for subgrade or foundation purposes are encountered below the excavation limits, they shall be removed and disposed of to the level of suitable material. Areas so excavated shall be backfilled in accordance with City of Canton Standard Drawing No. 19.
3. Place barriers at each end of all excavations and at such places as may be necessary along excavations to warn all pedestrian and vehicular traffic of such excavations. Place lights along excavations from sunset each day to sunrise of the next day until the excavations are backfilled. Barricade all excavations in such a manner as to prevent persons from falling or walking into any excavation.

#### B. ROCK EXCAVATION

1. Rock encountered in the process of excavation for structures shall be uncovered and stripped of all loose materials over the entire limits of excavation. Rock encountered for removal in a trench section shall be uncovered for a distance of not less than 50 feet.
2. Excavate rock and large boulders in trenches over the horizontal limits of excavation and to depths as shown on the Drawings.
3. Backfill the space below grade for pipelines to the proper grade with compacted layers of crushed rock or sand conforming to the requirements specified herein for backfill. Where pipe sewers are constructed on concrete cradles, excavate rock to the bottom of the cradle as shown on the Drawings.
4. Excavate rock under structures to lines and grades shown on the Drawings. Unless specified otherwise, where rock excavation has been carried below grade, the Contractor shall backfill to grade with Class B concrete at his own expense.



5. Where rock foundation is obtained at grade for over 50 percent of the area of any one structure, the portion of the foundation that is not rock shall be excavated below grade to reach a satisfactory foundation of rock. The portion below grade shall be backfilled with Class B concrete.
6. Where rock foundation is obtained at grade for less than 50 percent of any one structure and satisfactory rock cannot be found over the remaining area by reasonable additional excavation, the rock shall be removed for a depth of 12 inches below grade and the space below grade shall be backfilled to the proper grade with compacted layers of crushed rock conforming to the requirements specified herein for backfill.
7. Drilling and ripping operations shall be conducted with due regard for the safety of persons and property in the vicinity and in strict conformity with requirements of all ordinances, laws, and regulations. Conduct rock excavation near existing pipelines or other structures with the utmost care to avoid damage. Promptly repair injury or damage to other structures and properties to the satisfaction of the Owner by the Contractor at his own expense.
8. Complete rock excavation for all structures and adjacent trenches under this Contract and any other rock excavation directed by the Owner's Representative before construction of any structure is started in the vicinity.

#### C. TRENCH EXCAVATION

1. Trench excavation shall consist of the removal of materials necessary for the construction of pipelines and all appurtenant facilities.
2. Excavation for pipelines shall be made in open cut unless shown otherwise on the Drawings, or as specified elsewhere. Trenches shall be cut true to the lines and grades shown on the Drawings. The banks of trenches shall be cut in vertical, parallel planes equidistant from the pipe centerline. From an elevation 12 inches above the top of the pipe to the bottom of the trench, the horizontal distances between vertical planes for different sizes of pipe shall not exceed those shown on the Drawings. . The bottom of the trench shall be cut carefully to the required grade of the pipe except where bedding materials or cradles are shown, in which case the excavation shall extend to the bottom of the bedding or cradles as shown on the City of Canton Standard Drawings. Minimum pipe cover shall be as shown on the City of Canton Drawings.

3. Bell holes for bell and spigot pipe and/or mechanical joint pipe shall be excavated at proper intervals so the barrel of the pipe will rest for its entire length upon the minimum depth of bedding as shown on the City of Canton Standard Drawings. Bell holes shall be large enough to permit proper installation of all joints in the pipe. Bell holes shall not be excavated more than 10 joints ahead of pipe laying. No part of any bell or coupling shall be in contact with the trench bottom, trench walls, or granular embedment while the pipe is jointed.
5. Excavation for manholes, outlets, collars, saddles, piers, and other pipeline structures shall conform to the additional requirements specified herein for structural excavation.
6. Pipe trenches shall not be excavated more than 400 feet in advance of pipe laying and all work shall be performed to cause the least possible inconvenience to the public. Adequate temporary bridges or crossings shall be constructed and maintained where required to permit uninterrupted vehicular and pedestrian traffic.
7. Wherever pipe trenches are excavated below the elevation shown on the Drawings, the Contractor, at his own expense, shall fill the void thus made at the proper grade with material meeting the requirements of extra foundation material per City of Canton Standard Drawing No. 19.
8. In all cases where materials are deposited along open trenches, they shall be placed so that no damage will result to the work and/or adjacent property in case of rain or other surface wash.

#### D. Structural Excavation

1. Structural excavation shall consist of the removal of all materials necessary for the construction of structures, including tanks, foundations, footings, wetwells, dry wells, box culverts, flumes, channels, buildings, and other miscellaneous structures.
2. The bottoms of structural excavations shall be true to the lines and grades shown on the Drawings. Faces of excavations shall not be undercut for extended footings. Except as provided herein for excavation of unsuitable material or rock, where the excavation is carried below the grade elevation shown on the Drawings, the Contractor shall backfill the void thus made to the proper grade with Class B concrete at his own expense.

### 3.4 BACKFILLING

- A. Materials for backfilling shall conform to the City of Canton Standard Drawing No. 19.

## B. GENERAL

1. Earth backfill shall be compacted to not less than 90 percent of the maximum density as determined by ASTM D 698 at a moisture content within 3 percentage points, unless otherwise specified herein. Crushed stone and sand shall be compacted to not less than 83 percent of the solid volume density as determined from the bulk specific gravity by AASHTO T-84 and T-85 and the dry weight of the aggregate.
2. Material that is too dry for adequate compaction shall receive a prior admix of sufficient water to secure optimum moisture content. Material having excessive water content shall not be placed at any time.
3. Backfill material required to be compacted shall be placed in horizontal layers not to exceed 6 inches in thickness (before compaction) and compacted in place by ramming, tamping, or rolling, unless otherwise specified herein. Compaction shall be accomplished by power-driven tools and machinery wherever possible. Compaction and consolidation of sand and crushed stone backfill shall be accomplished using vibrating equipment in a manner acceptable to the Engineer.

## C. BACKFILLING TRENCHES

1. The backfilling of pipeline trenches shall be started immediately after the construction of same. Select backfill or crushed stone as shown on the Drawings shall be placed in the trench under and on each side of the pipe in 6-inch layers for the full width of the trench and thoroughly and uniformly compacted by ramming and/or tamping to a minimum of 90 percent of the maximum density determined as specified herein. Select earth backfilling or crushed stone as shown on the Drawings shall start above the pipe bedding. Sufficient select backfill or crushed stone shall be placed around the pipe and compacted to provide a cover of not less than 12 inches over the top of the pipe. Mechanical compactors or tampers shall not be used within 12 inches of pipe. Compaction in this area shall be accomplished by hand methods.. Backfilling shall proceed simultaneously on both sides of the pipe to prevent lateral displacement.
2. Caution shall be used during backfill operations for PVC or other flexible thermoplastic pipe to prevent pipe deformation. PVC or other flexible thermoplastic pipe shall not be subjected to roller or wheel loads until a minimum of 36 inches of backfill has been placed over the top of the pipe. A hydrohammer shall NOT be used until a minimum depth of 48 inches of backfill has been placed over the top of the pipe.
3. Backfilling of PVC pressure pipe or other flexible thermoplastic pipe (water pipe) shall be as described in Paragraph 1 above.

4. In streets and alleys, across sidewalks and driveways, and at any other places subject to vehicular traffic or other superimposed loads, crushed rock backfill shall be placed and compacted in 12-inch layers low strength mortar may be placed from the level of 12 inches above the top of the pipe upward for the full depth of the trench. Crushed rock backfill shall be compacted by use of a hydrohammer or approved vibratory compactor. The top 6 inches of the finished subgrade shall be equal to not less than 100 percent of the maximum density as determined by ASTM D 698 at a moisture content of within 3 percentage points of optimum. When field tests show failure to meet the density requirement, the subgrade shall be loosened by disking, harrowing, or other approved methods to a depth of not less than 6 inches, then reshaped and recompactd as indicated in this paragraph.
5. Trenches under concrete slabs and footings of structures shall be completely backfilled with compacted sand or crushed rock or filled with Class B concrete as shown on the Drawings.
6. All backfilling shall be done in such a manner that the pipe or structure over or against which it is being placed will not be disturbed or injured. Any pipe or structure injured, damaged, or moved from its proper line or grade during backfilling operations shall be removed and repaired to the satisfaction of the Engineer and then rebackfilled.

#### D. Backfilling Around Structures

1. Backfilling around structures shall consist of common earth backfill placed in 6-inch layers and compacted by tamping to a minimum of 90 percent of the maximum density determined as specified herein for the full depth of the excavation from the bottom to the finished grade. No backfill shall be placed against concrete structures until the concrete has reached its specified 28-day compressive strength. Where practical, compaction of structural backfill shall be accomplished by power-driven tamping equipment.
2. Where crushed rock mats under slabs and foundations are called for on the Drawings, excavate below grade to the depth of the crushed rock mat as shown on the Drawings and install a compacted crushed rock bed. This shall be finished to a true line or plane and even with the subgrade of the concrete foundations, piers, footings, or slabs. Before placing any crushed stone, remove all loose earth or debris. This crushed rock mat shall extend 12 inches beyond all slabs and foundations or to edges of sheet piling.

3. Crushed rock mats 12 inches or less in thickness shall be constructed of compacted layers of crushed rock conforming to Section 903.23, Size 7 (1/2-inch to No. 4), of the SSRBC.
4. Crushed rock mats of thickness greater than 12 inches shall have the top 12 inches constructed of compacted layers of crushed rock as specified above. That portion below the top 12 inches shall be constructed of compacted layers of crushed rock conforming to section 903.05, Class A, with a modified gradation of 6 inches to dust as received from the crusher.
5. The use of earth backfill to support footings, foundations, and structures shall not be permitted, unless otherwise shown on the Drawings.

### 3.5 FILLS AND EMBANKMENTS

- A. Fills and embankments shall consist of all earth fills except backfills in trenches or around structures. Unless special material is specified or shown on the Drawings, material for fills and embankments shall consist of excavated material from structures or of a mixture of such excavated materials and materials borrowed from other sources by the Contractor.

### 3.6 DISPOSAL OF WASTE AND UNSUITABLE MATERIALS

- A. All excavated materials not used for such purposes shall be considered as waste materials and the disposal thereof shall be made in an acceptable manner.
- B. Unsuitable materials, consisting of wood, vegetable matter, debris, soft or spongy clay, peat, and other objectionable material shall be removed from the work site.
- C. The Contractor is responsible for any and all permits and other requirements, such as sediment runoff control necessitated by the disposal of waste material.

### 3.7 FINAL GRADING

- A. After other earthwork operations have been completed, the sites of all structures, roads, and embankments shall be graded within the limits and to the elevations shown on the Drawings. Grading operations shall be so conducted that materials shall not be removed or loosened beyond the required limits. The finished surfaces shall be left in smooth and uniform planes such as are normally obtainable from the use of hand tools. If Contractor is able to obtain the required degree of evenness by means of mechanical equipment, the use of hand labor methods will not be required. Neatly trim and finish slopes and ditches to slopes shown on the Drawings unless otherwise approved by the Engineer.
- B. Grade and dress all finished ground surfaces to present a surface varying not more than plus or minus 0.10 foot as regards local humps or depressions, unless

otherwise specified or shown on the Drawings, and shall be acceptable to the Engineer.

END OF SECTION

## SECTION 02234

### COMPACTED BACKFILL

#### PART 1 – GENERAL

##### 1.1 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.

##### 1.2 DESCRIPTION OF WORK

- A. The Contractor shall furnish all the materials from the top of pipe bedding to the pavement subgrade and shall properly place and compact with approved mechanical compaction equipment in layers sufficient to meet the compaction requirement of 100% of maximum laboratory dry density per ASTM D 698, material as specified in Part 2.01 of this Section under pavement, drives and elsewhere when compacted backfill is required.

##### 1.3 MEASUREMENT AND PAYMENT

- A. No separate measurement or payment will be allowed for this work. Payment for all work performed under this section shall be included in other items of work.

#### PART 2 – PRODUCTS

##### 2.1 MATERIALS

- A. Suitable excavated material as specified in ODOT Item 203.

#### PART 3 – EXECUTION

##### 3.1 PLACING

- A. Compacted backfill shall be properly graded and placed in layers sufficient to meet the compaction requirement of 100% of maximum laboratory dry density per ASTM D 698 and thoroughly compacted with mechanical compaction equipment, so as to prevent after-settlement. The placing of this material shall be continued until the entire depth is compacted, and the top of backfill is finished to the lines and grades called for by the contract drawings, or as ordered by the Engineer. Should after-settlement occur, the Contractor must add and compact additional material, and he must maintain the backfill at the required sub-grade until the project is satisfactorily completed.

- B. Approved mechanical compaction equipment shall be used for tamping backfill. Flooding, jetting or puddling of backfill will not be permitted.

END OF SECTION



## SECTION 02270

### SLOPE PROTECTION AND EROSION CONTROL

#### PART 1 - GENERAL

##### 1.1 SCOPE

- A. This section shall consist of temporary control measures as shown in the plans or directed by the Engineer during the life of the Contract to control erosion and water pollution through the use of berms, dikes, dams, sediment basins, fiber mats, netting, mulches, grasses, slope drains, temporary silt fences, and other control devices.
- B. The temporary pollution control provisions contained herein shall be coordinated with the permanent erosion control features to assure economical, effective, and continuous erosion control throughout the construction and post-construction periods.
- C. Develop a site-specific sediment and erosion control or storm water management plan for all construction activities that disturb 1 acre or more. The Storm Water Pollution Plan (SWP3) shall incorporate the sediment and erosion control measures shown on the Drawings as well as written procedures and methods that the Contractor shall utilize during the performance of the work to mitigate stream pollution due to storm water runoff.
- D. The SWP3 shall be in conformance with Section 319 of the Federal Clean Water Act and the Ohio EPA, Division of Surface Water requirements as listed in their "Checklist for Construction Sites". The SWP3 shall be submitted by the Owner and the Contractor shall comply with the approved SWP3 plan.
- E. While performing work, utilize Best Management Practices (BMP) similar to those listed in the publication titled "Rainwater and Land Development, Ohio's Standards for Stormwater Management Land Development and Urban Stream Protection" as prepared by the Ohio Department of Natural Resources Division of Soil and Water Conservation, Fountain Square Court, Columbus, Ohio, 43224, (614) 265-6610.

##### 1.2 MEASUREMENT AND PAYMENT

- A. Payment for this work will include all equipment, materials and labor necessary to perform the work under this specification as shown on the Drawings and specified herein and included in the Contract. The payment for this work shall be included in the lump sum price for Erosion Control.

## PART 2 - PRODUCTS

### 2.1 TEMPORARY BERMS

- A. A temporary berm is constructed of compacted soil, with or without a shallow ditch, at the top of fill slopes or transverse to centerline on fills.
- B. These berms are used temporarily at the top of newly constructed slopes to prevent excessive erosion until permanent controls are installed or slopes stabilized.

### 2.2 TEMPORARY SLOPE DRAINS

- A. A temporary slope drain is a facility consisting of stone gutters, fiber mats, plastic sheets, concrete or asphalt gutters, half-round pipe, metal pipe, plastic pipe, sod, or other material acceptable to the Engineer that may be used to carry water down slopes to reduce erosion.

### 2.3 SEDIMENT STRUCTURES

- A. Sediment basins, ponds, and traps are prepared storage areas constructed to trap and store sediment from erodible areas in order to protect properties and stream channels below the construction areas from excessive siltation.

### 2.4 CHECK DAMS

- A. Check dams are barriers composed of logs and poles, large stones, sand bags, or other materials placed across a natural or constructed drainway.
- B. Stone check dams shall not be utilized where the drainage area exceeds 50 acres. Log and pole structures shall not be used where the drainage area exceeds five acres.

### 2.5 TEMPORARY SEEDING AND MULCHING

- A. Temporary seeding and mulching are measures consisting of seeding, mulching, fertilizing, and matting utilized to reduce erosion. All cut and fill slopes, including waste sites and borrow pits, shall be seeded when and where necessary to eliminate erosion.

### 2.6 BRUSH BARRIERS

- A. Brush barriers shall consist of brush, tree trimmings, shrubs, plants, and other approved refuse from the clearing and grubbing operation.
- B. Brush barriers are placed on natural ground at the bottom of fill slopes, where the most likely erodible areas are located, to restrain sedimentation particles.

## 2.7 BALED HAY OR STRAW CHECKS

- A. Baled hay or straw erosion checks are temporary measures to control erosion and prevent siltation. Bales shall be either hay or straw containing 5 cubic feet or more of material.
- B. Baled hay or straw checks shall be used where the existing ground slopes toward or away from the embankment along the toe of slopes, in ditches, or other areas where siltation, erosion, or water run-off is a problem.

## 2.8 TEMPORARY SILT FENCES

- A. Silt fences are temporary measures utilizing woven wire or other approved material attached to posts with filter cloth composed of burlap, plastic filter fabric, etc., attached to the upstream side of the fence to retain the suspended silt particles in the run-off water.

## PART 3 - EXECUTION

### 3.1 PROJECT REVIEW

- A. Prior to the Preconstruction Conference, meet with the Engineer and go over in detail the proposed SWP3 and the expected problem areas in regard to the erosion control work. Different solutions should be discussed so that the best method might be determined. It is the responsibility of the Owner to submit the SWP3 to the Stark County Soil and Water Conservation District for review and approval. The Contractor shall comply with the SWP3.

### 3.2 PRECONSTRUCTION CONFERENCE

- A. At the Preconstruction Conference, submit for acceptance the schedule for accomplishment of temporary and permanent erosion control work as applicable for clearing and grubbing, grading, bridges and other structures at watercourses, construction, and paving. Also submit for acceptance the proposed method of erosion control on haul roads and borrow pits and the plan for disposal of waste materials. No work shall be started until the erosion control schedules and methods of operation have been accepted by the Owner.

### 3.3 CONSTRUCTION REQUIREMENTS

- A. The Owner has the authority to limit the surface area of erodible earth material exposed by clearing and grubbing, and the surface of erodible earth material exposed by excavation, borrow, and fill operations and to direct the Contractor to provide immediate permanent or temporary pollution control measures to prevent contamination of adjacent streams or other watercourses, lakes, ponds, or other

water impoundment. Such work may involve the construction of temporary berms, dikes, dams, sediment basins, or slope drains, and the use of temporary mulches, mats, seeding, or other control devices or methods as necessary to control erosion. Cut and fill slopes shall be seeded and mulched as the excavation proceeds to the extent directed by the Owner.

- B. Incorporate all permanent erosion control features into the project at the earliest practicable time as outlined in the accepted schedule. Temporary pollution control measures shall be used to correct conditions that develop during construction that were not foreseen during the design stage; that are needed prior to installation of permanent pollution control features; or that are needed temporarily to control erosion that develops during normal construction practices, but are not associated with permanent control features on the project.
- C. Where erosion is likely to be a problem, clearing and grubbing operations should be so scheduled and performed that grading operations and permanent erosion control features can follow immediately thereafter if the project conditions permit; otherwise, erosion control measures may be required between successive construction stages. Preconstruction vegetation ground cover shall not be destroyed, removed, or disturbed more than 20 calendar days prior to grading or earth moving unless approval is granted otherwise.
- D. The Engineer will limit the area of excavation, borrow, and embankment operations in progress commensurate with the Contractor's capability and progress to keep the finish grading, mulching, seeding, and other such permanent pollution control measures current in accordance with the accepted schedule. Should seasonal limitations make such coordination unrealistic, temporary erosion control measures shall be taken immediately to the extent feasible and justified.
- E. Under no conditions shall the amount of surface area or erodible earth material exposed at one time by excavation or fill within the project area exceed 750,000 square feet without prior approval by the Owner.
- F. The Owner may increase or decrease the amount of surface area of erodible earth material to be exposed at one time by clearing and grubbing, excavation, and borrow and fill operations as determined by his analysis of project conditions.
- G. In the event of conflict between these requirements and pollution control laws, rules, or regulations of other federal, state, or local agencies, the more restrictive laws, rules, or regulations shall apply.

### 3.4 CONSTRUCTION MANAGEMENT TECHNIQUES

- A. Clearing and grubbing must be held to the minimum necessary for grading and equipment operation.

- B. Construction must be sequenced to minimize the exposure time of cleared surface area.
- C. Construction must be staged or phased for large projects. Areas of one phase must be stabilized before another phase can be initiated. Stabilization shall be accomplished by temporarily or permanently protecting the disturbed soil surface from rainfall impacts and runoff.
- D. Erosion and sediment control measures must be in place and functional before earth moving operations begin, and must be constructed and maintained throughout the construction period. Temporary measures may be removed at the beginning of the work day, but must be replaced at the end of the work day.
- E. All control measures shall be checked, and repaired as necessary, weekly in dry periods and within 24 hours after any rainfall of 0.5 inch within a 24-hour period. During prolonged rainfall, daily checking and repairing is necessary. The permittee shall maintain records of checks and repairs.
- F. A specific individual shall be designated to be responsible for erosion and sediment controls on each project site.

### 3.5 CONSTRUCTION OF STRUCTURES

- A. Temporary Berms. A temporary berm shall be constructed of compacted soil, with a minimum width of 24 inches at the top and a minimum height of 12 inches with or without a shallow ditch, constructed at the top of fill slopes or transverse to centerline on fills. Temporary berms shall be graded so as to drain to a compacted outlet at a slope drain. The area adjacent to the temporary berm in the vicinity of the slope drain must be properly graded to enable this inlet to function efficiently and with minimum ponding in this area. All transverse berms required on the downstream side of a slope drain shall extend across the grade to the highest point at approximately a 10 degree angle with a perpendicular to centerline. The top width of these berms may be wider and the side slope flatter on transverse berms to allow equipment to pass over these berms with minimum disruptions. When practical and until final roadway elevations are approached, embankments should be constructed with a gradual slope to one side of the embankment to permit the placement of temporary berms and slope drains on only one side of the embankment.
- B. Temporary Slope Drains
  - 1. Temporary slope drains shall consist of stone gutters, fiber mats, plastic sheets, concrete or asphalt gutters, half-round pipe, metal pipe, plastic pipe, flexible rubber, or other materials which can be used as temporary measures to carry water accumulating in the cuts and on the fills down the slopes prior to installation of permanent facilities or growth of adequate ground cover on the slopes.

2. Fiber matting and plastic sheeting shall not be used on slopes steeper than 4:1 except for short distances of 20 feet or less.
3. All temporary slope drains shall be adequately anchored to the slope to prevent disruption by the force of the water flowing in the drains. The base for temporary slope drains shall be compacted and concavely formed to channel the water or hold the slope drain in place. The inlet end shall be properly constructed to channel water into the temporary slope drain. Energy dissipaters, sediment basins, or other approved devices shall be constructed at the outlet end of the slope drains to reduce erosion downstream. An ideal dissipater would be dumped rock or a small sediment basin which would slow the water as well as pick up some sediment. All temporary slope drains shall be removed when no longer necessary and the site restored to match the surroundings.

#### C. Sediment Structures

1. Sediment structures shall be utilized to control sediment at the foot of embankments where slope drains outlet, at the bottom as well as in the ditchlines atop waste sites, and in the ditchlines or borrow pits. Sediment structures may be used in most drainage situations to prevent excessive siltation of pipe structures. All sediment structures shall be at least twice as long as they are wide.
2. When use of temporary sediment structures is to be discontinued, all sediment accumulation shall be removed, and all excavation backfilled and properly compacted. The existing ground shall be restored to its natural or intended condition.

#### D. Check Dam

1. Utilize check dams to retard stream flow and catch small sediment loads. Materials utilized to construct check dams are varied and should be clearly illustrated or explained in the Contractor's erosion control plan.
2. Key all check dams into the sides and bottom of the channel a minimum depth of 2 feet. A design is not needed for check dams but some typical designs are shown in the standard plans.
3. Do not use stone check dams where the drainage area exceeds 50 acres. Log and pole structures should generally not be used where the drainage area exceeds five acres.

#### E. Temporary Seeding and Mulching. Perform seeding and mulching in accordance with Section 02485, Seeding.

- F. Brush Barriers. Brush barriers shall consist of brush, tree trimmings, shrubs, plants, and other approved refuse from the clearing and grubbing operation. The brush barriers shall be constructed approximately parallel to original ground contour. Each brush barrier shall be compressed to an approximate height of 3 to 5 feet and approximate width of 5 to 10 feet. The embankment shall not be supported by the construction of brush barriers.
- G. Baled Hay or Straw Erosion Checks. Hay or straw shall be embedded in the ground 4 to 6 inches to prevent water flowing underneath. The bales shall also be anchored securely to the ground by wooden stakes driven through the bales into the ground. Bales can remain in place until they rot, or be removed after they have served their purpose, as determined by the Engineer. Keep the checks in good condition by replacing broken or damaged bales immediately after damage occurs. Normal debris clean-out will be considered routine maintenance.
- H. Temporary Silt Fences
  - 1. Temporary silt fences shall be placed on the natural ground, at the bottom of fill slopes, in ditches, or other areas where siltation is a problem. Silt fences are constructed of wire mesh fence with a covering of burlap or some other suitable material on the upper grade side of the fence and anchored into the soil.
  - 2. Maintain the silt fence in a satisfactory condition for the duration of the project or until its removal is requested by the Engineer. The silt accumulation at the fence may be left in place and seeded, removed, etc., as directed by the Engineer. The silt fence becomes the property of the Contractor whenever the fence is removed.

### 3.6 MAINTENANCE

- A. The temporary erosion control features installed by the Contractor shall be acceptably maintained by the Contractor until no longer needed or permanent erosion control methods are installed. Any materials removed shall become the property of the Contractor.
- B. In the event that temporary erosion and pollution control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of work as scheduled, and are ordered by the Engineer, such work shall be performed by the Contractor at his own expense.
- C. Where the work to be performed is not attributed to the Contractor's negligence, carelessness, or failure to install permanent controls and falls within the specifications for a work item that has a contract price, the units of work shall be paid for at the proper contract prices.

### 3.7 EROSION CONTROL OUTSIDE PROJECT AREA

- A. Temporary erosion control shall include construction work outside the project area where such work is necessary as a result of construction such as borrow pit operations, haul roads, and equipment storage sites. Bid price in such cases shall include all necessary clearing and grubbing, construction incidentals, maintenance, and site restoration when no longer needed.

END OF SECTION



## SECTION 02485

### SEEDING

#### PART 1 – GENERAL

##### 1.1 SCOPE

- A. The work covered by this section consists of furnishing all labor, equipment, and material required to place topsoil, seed, commercial fertilizer, agricultural limestone, and mulch material, including seedbed preparation, harrowing, compacting, and other placement operations on graded earthen areas as described herein and/or shown on the Drawings. In general, seeding operations shall be conducted on all newly graded earthen areas not covered by structures, pavement, or sidewalks; all cleared or grubbed areas which are to remain as finish grade surfaces; and on all existing turf areas which are disturbed by construction operations and which are to remain as finish grade surfaces. Areas disturbed by borrow activities shall also be seeded according to these Specifications.
- B. The work shall include temporary seeding operations to stabilize earthen surfaces during construction or inclement weather and to minimize stream siltation and erosion. Temporary seeding shall be performed at the times and locations directed by the Engineer.

##### 1.2 QUALITY ASSURANCE

- A. Prior to seeding operations, furnish to the Engineer labels or certified laboratory reports from an accredited commercial seed laboratory or a state seed laboratory showing the analysis and germination of the seed to be furnished. Acceptance of the seed test reports shall not relieve the Contractor of any responsibility or liability for furnishing seed meeting the requirements of this section.
- B. Prior to topsoil operations, obtain representative samples and furnish soil test certificates including textural, pH, and organic ignition analysis from the State University Agricultural Extension Services or other certified testing laboratory.

##### 1.3 MEASUREMENT AND PAYMENT

- A. Payment for this work will include all equipment, materials and labor necessary to perform the work under this specification as shown on the Drawings and specified herein and included in the Contract. The payment for this work shall be included in the lump sum price for Seeding and Mulching.

## PART 2 – PRODUCTS

### 2.1 TOPSOIL

- A. Place a minimum of 4 inches of topsoil over all graded earthen areas and over any other areas to be seeded. Sources of topsoil shall be approved by the Engineer prior to disturbance.
- B. Topsoil shall be a friable loam containing a large amount of humus and shall be original surface soil of good, rich, uniform quality, free from any material such as hard clods, stiff clay, hardpan, partially disintegrated stone, pebbles larger than 1/2 inch in diameter, lime, cement, bricks, ashes, cinders, slag, concrete, bitumen or its residue, boards, sticks, chips, or other undesirable material harmful or unnecessary to plant growth. Topsoil shall be reasonably free from perennial weeds and perennial weed seeds, and shall not contain objectionable plant material, toxic amounts of either acid or alkaline elements, or vegetable debris undesirable or harmful to plant life.
- C. Topsoil shall be natural topsoil without admixture of subsoil material, and shall be classifiable as loam, silt loam, clay loam, sandy loam, or a combination thereof. The pH shall range from 5.5 to 7.0. Topsoil shall contain not less than 5 percent nor more than 20 percent, by weight, of organic matter as determined by loss on ignition of samples oven-dried to 65 C.

### 2.2 SEED

- A. Deliver seed in new bag or bags that are sound and labeled in accordance with the U.S. Department of Agriculture Federal Seed Act.
- B. All seed shall be from the last crop available at time of purchase and shall not be moldy, wet, or otherwise damaged in transit or storage.
- C. Seed shall bear the grower's analysis testing to 98 percent for purity and 90 percent for germination. At the discretion of the Engineer, samples of seed may be taken for check against the grower's analysis.
- D. Species, rate of seeding, fertilization, and other requirements are shown in the Seeding Requirements Table.

### 2.3 FERTILIZER AND LIMING MATERIALS

- A. Fertilizer and liming materials shall comply with applicable state, local, and federal laws concerned with their production and use.

SEEDING REQUIREMENTS TABLE						
Area	Sowing Season	Species	Rates per 1,000 Square Feet			
			Seed	Fertilizer	Limestone	Maintenance <sup>2</sup>
Flat to rolling terrain with slopes less than 3:1	3/1 to 6/1	Kentucky 31 Fescue Ladino White Clover <sup>1</sup>	4 lbs. 1/4 lb.	30 lbs. 6-12-12	100 lbs.	15 lbs. 10-10-10
	8/1 to 11/1	Kentucky 31 Fescue Ladino White Clover <sup>1</sup> Annual Ryegrass	4 lbs. 1/4 lb. 2 lbs.	30 lbs. 6-12-12	100 lbs.	15 lbs. 10-10-10
Embankments with slopes greater than 3:1	3/1 to 6/1	Crownvetch <sup>1</sup> Kentucky 31 Fescue Weeping Lovegrass	1 lb. 2 lbs. 1/4 lb.	30 lbs. 6-12-12	100 lbs.	10 lbs. 0-20-20
	8/1 to 11/1	Crownvetch <sup>1</sup> Kentucky 31 Fescue Annual Ryegrass	1 lb. 2 lbs. 2 lbs.	30 lbs. 6-12-12	100 lbs.	10 lbs. 0-20-20

<sup>1</sup>Requires inoculation.  
<sup>2</sup>Maintenance fertilizer shall be applied in early spring following initial establishment of cover.

- B. Commercial fertilizer shall be a ready-mixed material and shall be equivalent to the grade or grades specified in the Seeding Requirements Table. Container bags shall be labeled with the name and address of the manufacturer, brand name, net weight, and chemical composition.
- C. Agricultural limestone shall be a pulverized limestone with a calcium carbonate content not less than 85 percent by weight. Agricultural limestone shall be crushed so that at least 85 percent of the material will pass a No. 10 mesh screen and 50 percent will pass a No. 40 mesh screen.

2.4 MULCH MATERIAL

- A. All mulch materials shall be air-dried and reasonably free of noxious weeds and weed seeds or other materials detrimental to plant growth.
- B. Mulch shall be composed of wood cellulose fiber, straw, or stalks, as specified herein. Mulch shall be suitable for spreading with standard mulch-blowing equipment.
- C. Wood cellulose fiber mulch shall be as manufactured by Weyerhaeuser Company, Conway Corporation, or equal.
- D. Straw mulch shall be partially decomposed stalks of wheat, rye, oats, or other approved grain crops.
- E. Stalks shall be the partially decomposed, shredded residue of corn, cane, sorghum, or other approved standing field crops.

2.5 MULCH BINDER

- A. Mulch on slopes exceeding a 3 to 1 ratio shall be held in place by the use of an approved erosion control fabric, such as Hold/Gro Erosion Control Fabric as manufactured by Gulf States Paper Corporation, or approved equal. Fabric

shall consist of strips of biodegradable paper interwoven with yarn that is subject to degradation by ultraviolet light.

## 2.6 INOCULANTS FOR LEGUMES

- A. All leguminous seed shall be inoculated prior to seeding with a standard culture of nitrogen-fixing bacteria that is adapted to the particular seed involved.

## 2.7 WATER

- A. Water shall be clean, clear, and free from any objectionable or harmful chemical qualities or organisms and shall be furnished by the Contractor.

## PART 3 - EXECUTION

### 3.1 SECURING AND PLACING TOPSOIL

- A. Topsoil shall be secured from areas where topsoil has not been previously removed, either by erosion or mechanical methods. Topsoil shall not be removed to a depth in excess of the depth approved by the Engineer.
- B. The area or areas from which topsoil is secured shall possess such uniformity of soil depth, color, texture, drainage, and other characteristics as to offer assurance that when removed the product will be homogeneous in nature and will conform to the requirements of these Specifications.
- C. All areas from which topsoil is to be secured shall be cleaned of all sticks, boards, stones, lime, cement, ashes, cinders, slag, concrete, bitumen or its residue, and any other refuse which will hinder or prevent growth.
- D. When securing topsoil from a designated pit or elsewhere, should strata or seams of material occur which do not come under the requirements for topsoil, such material shall be removed from the topsoil or if required by the Engineer, the pit shall be abandoned.
- E. Before placing or depositing topsoil upon any area, all improvements within the area shall be completed, unless otherwise approved by the Engineer.
- F. The areas in which topsoil is to be placed or incorporated shall be prepared before securing topsoil for use.

### 3.2 SEEDBED PREPARATION

- A. Before fertilizing and seeding, the topsoil surfaces shall be trimmed and worked to true line free from unsightly variations, bumps, ridges, and depressions, and all detrimental material, roots, and stones larger than 3 inches in any dimension shall be removed from the soil.

- B. Not earlier than 24 hours before the seed is to be sown, the soil surface to be seeded shall be thoroughly cultivated to a depth of not less than 2 inches with a weighted disc, tiller, pulvimixer, or other equipment, until the surface is smooth and in a condition acceptable to the Engineer.
- C. If the prepared surface becomes eroded as a result of rain or for any other reason, or becomes crusted before the seed is sown, the surface shall again be placed in a condition suitable for seeding.
- D. Ground preparation operations shall be performed only when the ground is in a tillable and workable condition, as determined by the Engineer.

### 3.3 FERTILIZATION AND LIMING

- A. Following seedbed preparation, fertilizer shall be applied to all areas to be seeded so as to achieve the application rates shown in the Seeding Requirements Table.
- B. Fertilizer shall be spread evenly over the seedbed and shall be lightly harrowed, raked, or otherwise incorporated into the soil for a depth of 1/2 inch.
- C. Fertilizer need not be incorporated in the soil as specified above when mixed with seed in water and applied with power sprayer equipment. The seed shall not remain in water containing fertilizer for more than 30 minutes when a hydraulic seeder is used.
- D. Agricultural limestone shall be thoroughly mixed into the soil according to the rates in the Seeding Requirements Table. The specified rate of application of limestone may be reduced by the Engineer if pH tests indicate this to be desirable. It is the responsibility of the Contractor to obtain such tests and submit the results to the Engineer for adjustment in rates.
- E. It is the responsibility of the Contractor to make one application of maintenance fertilizer according to the recommendations listed in the Seeding Requirements Table.

### 3.4 SEEDING

- A. Seed of the specified group shall be sown as soon as preparation of the seedbed has been completed. No seed shall be sown during high winds, nor until the surface is suitable for working and is in a proper condition. Seeding shall be performed during the dates shown in the Seeding Requirements Table unless otherwise approved by the Engineer. Seed mixtures may be sown together, provided they are kept in a thoroughly mixed condition during the seeding operation.
- B. Seeds shall be uniformly sown by any approved mechanical method to suit the slope and size of the areas to be seeded, preferably with a broadcast type

seeder, windmill hand seeder, or approved mechanical power-drawn seed drills. Hydroseeding and hydromulching may be used on steep embankments, provided full coverage is obtained. Care shall be taken to adjust the seeder to the proper rate before seeding operations are started and to maintain the adjustment during seeding. Seed in hoppers shall be agitated to prevent segregation of the various seeds in a seeding mixture.

- C. Immediately after sowing, the seeds shall be covered and compacted to a depth of 1/8 to 3/8 inch by a cultipacker or suitable roller.
- D. Leguminous seeds shall be inoculated prior to seeding with an approved and compatible nitrogen-fixing inoculant in accordance with the manufacturer's mixing instructions.

### 3.5 MULCHING

- A. All seeded areas shall be uniformly mulched in a continuous blanket immediately after seeding. The mulch shall be applied so as to permit some sunlight to penetrate and air to circulate, and at the same time shade the ground, reduce erosion, and conserve soil moisture. Approximately 25 percent of the ground shall be visible through the mulch blanket.
- B. One of the following mulches shall be spread evenly over the seeded areas at the following application rates:
  - 1. Wood Cellulose Fiber 1,400 lbs/acre
  - 2. Straw 4,000 lbs/acre
  - 3. Stalks 4,000 lbs/acre

These rates may be adjusted at the discretion of the Engineer at no additional cost to the Owner, depending on the texture and condition of the mulch material and the characteristics of the seeded area.

- C. Mulch on slopes greater than a 3 to 1 ratio shall be held in place by the use of an approved erosion control fabric. Fabric shall be installed immediately after seeding and fertilizing area (mulch shall not be used under fabric).
- D. Erosion control fabric shall be installed and applied in accordance with the manufacturer's recommendations. Any fabric which becomes torn, broken loose from securing staples, or undermined shall be immediately and satisfactorily repaired. Areas where seed is washed out before germination shall be fertilized, reseeded, and restored. Any required restoration work shall be performed without additional compensation.

### 3.6 WATERING

- A. Maintain the proper moisture content of the soil to ensure adequate plant growth until a satisfactory stand is obtained. If necessary, watering shall be performed to maintain an adequate water content in the soil.
- B. Watering shall be accomplished by hoses, tank truck, or sprinklers in such a way to prevent erosion, excessive runoff, and overwatered spots.

### 3.7 MAINTENANCE

- A. Upon completion of seeding operations, the Contractor shall clear the area of all equipment, debris, and excess material, and the premises shall be left in a neat and orderly condition.
- B. Maintain all seeded areas without additional payment until final acceptance of the work by the Owner, and any regrading, refertilizing, reliming, reseeding, or remulching shall be done at his own expense. Seeding work shall be repeated on defective areas until a satisfactory uniform stand is achieved. Damage resulting from erosion, gulleys, washouts, or other causes shall be repaired by filling with topsoil, compacting, and repeating the seeding work at his expense.

END OF SECTION

## SECTION 02500

### NEW AND REPLACEMENT PAVING

#### PART 1 – GENERAL

##### 1.1 SUMMARY

- A. The Contractor shall provide the labor, tools, equipment, and materials necessary to construct the driveways, parking areas, and pavement in accordance with the plans and as specified herein.

##### 1.2 RELATED DOCUMENTS

- A. Drawings.
- B. Section 02200 – Earthwork
- C. ODOT Construction and Materials Specifications
- D. City of Canton Standard Drawings

##### 1.3 QUALITY ASSURANCE

###### A. CODES AND REGULATORY AGENCIES

- 1. Perform all work in compliance with all applicable federal, state, and local codes and regulatory agencies.

###### B. STANDARDS

- 1. Material and work shall be in conformance with:
  - a. ODOT – Ohio Department of Transportation.
  - b. City of Canton Standard Drawings.

###### C. TESTING LABORATORY

- 1. Engage a testing laboratory acceptable to the Engineer to perform subgrade inspection and compaction tests.

##### 1.4 SUBMITTALS

###### A. PRODUCT DATA

- 1. Submit Manufacturer's data on all material.



B. CERTIFICATION

1. Submit in writing certifying that all materials and mixes are in conformance with ODOT specifications.

C. TEST DATA

1. Submit test data as required under paragraph 3.1.B.1.

1.5 SITE CONDITIONS

A. COORDINATION

1. Coordinate all pavement installation with proper authorities.
2. Coordinate pavement installation with other work of Contract such that there is minimum disruption of the completed pavement and/or delays of other work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. DELIVERY

1. Comply with ODOT Item 401.09.

B. STORAGE

1. Comply with ODOT Item 106.06.

C. HANDLING

1. Comply with ODOT Item 106.07.

1.7 MEASUREMENT AND PAYMENT

- A. Payment for this work will include all equipment, materials and labor necessary to perform the work under this specification as shown on the Drawings and specified herein and included in the Contract. The payment for this work shall be included in the unit price for Pavement Removal and Saw cutting and the respective New Asphalt Pavement items.

PART 2 – PRODUCTS

2.1 MATERIALS

A. GENERAL

1. All material shall be in accordance with ODOT "Construction and Material Specifications" except for method of payment.

#### B. BASES

1. Aggregate base shall meet the specifications of ODOT Item 304. The use of slag is not permitted
2. Bituminous aggregate base shall meet the specifications of ODOT Item 301.

#### C. PRIME COAT

1. Prime coat shall be RT-2, RT-3, MC70, or MC250 in accordance with ODOT Item 702.

#### D. TACK COAT

1. Tack coat shall be RC-250, RS-1, SS-1, or SS-1h in accordance with ODOT Item 702.

#### E. ASPHALT CONCRETE

1. Asphalt concrete surface course shall be in accordance with ODOT Item 448 Type 1.
2. Asphalt concrete intermediate course shall be in accordance with ODOT Item 448 Type 2.

#### F. CONCRETE WITH PORTLAND CEMENT

1. Concrete shall be in accordance with Section 03300 "Cast-in-Place Concrete" Class A or ODOT Item 452.

#### G. EXPANSION JOINT

1. Expansion joints shall be ½-inch thick premolded, nonextruding type.

#### H. PARKING BLOCKS

1. Parking blocks shall be precast concrete, standard curb type, 6" x 8" x 8' with tapered edges and predrilled for anchoring. Provide three (3) ¾" x 16" hot dip galvanized steel anchor pins per unit.

## PART 3 – EXECUTION

### 3.1 GENERAL

#### A. TOPSOIL

1. Topsoil shall be removed. See Section 02485 – Seeding.

#### B. SUBGRADE

1. Compaction. See Section 02200 – Earthwork.
2. All loose and foreign materials shall be removed and the subgrade shall be free of ruts and standing water when the base material is placed.

#### C. SLOPE

1. Driveways, parking areas, and walks shall be sloped to drain away from buildings and structures. Driveways in open areas shall have a center crown. Cross slope for driveways and walks shall be ¼-inch per foot unless otherwise shown.

#### D. EXISTING PAVEMENT

1. Driveways, parking areas, and walks shall conform to the grade of existing driveways, parking areas, curbs and walks unless modifications are shown on the plans or required by the specification. Where it is necessary to disturb existing Portland cement concrete pavements, curbs or walks, the concrete shall be saw cut in neat, straight lines. The depth of saw cut shall be at least 2 inches. Where it is necessary to disturb existing asphalt concrete pavements, curbs or walks, the asphalt concrete shall be line cut with straight vertical edges by saw cutting. All cut bituminous surfaces shall be sealed with a bituminous material.

### 3.2 PAVEMENT

#### A. GENERAL

1. All construction shall be in accordance with ODOT “Construction and Material Specifications” latest edition, except for method of payment.

## B. ASPHALT CONCRETE DRIVEWAYS AND PARKING AREAS

1. Aggregate base shall consist of compacted aggregate applied in layers of equal thickness to a depth shown on the City of Canton Standard Drawings in accordance with Item 304.03. No layer shall exceed 6 inches in thickness after compaction. Compaction shall be in accordance with ODOT Item 304.04.
2. Prime coat shall be applied according to ODOT Item 408 at the rate of 0.40 gallon per square yard.
3. Bituminous aggregate base shall be installed in two (2) layers each as shown on the Drawings after compaction.
4. Unless otherwise shown, wearing surface shall consist of asphalt concrete applied in two (2) layers. The surface course shall be as shown on the City of Canton Standard Drawings after compaction. The intermediate course shall be as shown on the Drawings after compaction.
5. Bituminous aggregate base and asphalt pavement shall be installed in accordance with ODOT Items 301, 401, and 448 Types 1 & 2.

### 3.3 CONCRETE WALKS

#### A. CONCRETE WALKS

1. Concrete walks shall be per City of Canton Standard Drawings. B.  
FINISH
1. At a minimum, Concrete shall be float finished with a tooled joint every 4 feet and an expansion joint every 20 feet.

END OF SECTION

## SECTION 02567

### MANHOLE SEALING WITH A PROTECTIVE POLYMER LINING

#### PART 1 – GENERAL

##### 1.1 WORK INCLUDED

- A. The work under this section includes furnishing all equipment, materials, and labor required to complete manhole and lift station wet well rehabilitation repair type as specified herein and shown on the Drawings. All manhole rehabilitation items shall be determined in the field by the Engineer. Items may be modified at the discretion of the Engineer.
- B. All manholes specified to receive manhole sealing shall be examined by the Contractor. Notify the Engineer in writing if surfaces are not acceptable. Contractor shall not begin liner application until unacceptable conditions have been corrected.
- C. The Contractor shall provide necessary sewer flow control for all manhole rehabilitation. Flow through type plugs installed in the manhole inlets and plumbed into the outlet allowing flow to pass through the structure without interference of bench and invert replacements are may be used by the Contractor. Flow through type plugs shall be removed by the Contractor at the end of each work day.
- D. Manhole rehabilitation shall consist of cleaning and preparing the surface for crack, void and leak repair, bench replacement, channel replacement, and manhole sealing with a polymer based liner material on the bench surfaces and on the walls from the bench to bottom of frame as specified herein.
- E. All work shall be in strict accordance with the Engineers specifications and recommendations including application of all products as required and in accordance with Manufacturer's directions.

##### 1.2 QUALITY ASSURANCE

- A. The Contractor shall have suitable equipment for performing the manhole rehabilitation work and shall have demonstrated satisfactory performance in completing previous comparable work.
- B. The Contractor shall have a minimum of five (5) years experience applying and installing the products specified herein.

- C. The Contractor must certify in writing from the Manufacturer that he is approved to install the Manufacturer's products specified herein.
- D. Manufacturer Qualifications: The Manufacturer of work of this section shall have five (5) years minimum proven experience in such work and shall have satisfactorily completed three (3) jobs of similar size and type within the last five (5) years.

### 1.3 RELATED WORK

### 1.4 REFERENCES

- A. ASTM D638 - Tensile Properties of Plastics.
- B. ASTM D790 - Flexural Properties of Unreinforced and Reinforced Plastics.
- C. ASTM D695 - Compressive Properties of Rigid Plastics.
- D. ASTM D4541 - Pull-off Strength of Coatings Using a Portable
- E. ASTM D7234 - Pull-off Adhesion Strength of Coatings on Concrete Using Portable Adhesion Testers.
- F. ASTM D2584 - Volatile Matter Content.
- G. ASTM D2240 - Durometer Hardness, Type D.
- H. ASTM D543 - Resistance of Plastics to Chemical Reagents.
- I. ASTM C109 - Compressive Strength Hydraulic Cement Mortars.
- J. ACI 506.2-77 - Specifications for Materials, Proportioning, and Application of Shotcrete.
- K. ASTM C579 - Compressive Strength of Chemically Setting Silicate and Silica Chemical Resistant Mortars.
- L. ASTM - The published standards of the American Society for Testing and Materials, West Conshohocken, PA.
- M. NACE - The published standards of National Association of Corrosion Engineers (NACE International), Houston, TX.
- N. SSPC - The published standards of the Society of Protective Coatings, Pittsburgh, PA.

- O. Los Angeles County Sanitation District – Evaluation of Protective Coatings for Concrete.
- P. ASTM F1216 (Including Appendix XI): Design Parameters for Buried Structures (structural rehabilitation) utilizing the External Buckling Equation for thickness determination.
- Q. ASTM D2990: Test Methods for Tensile, Compressive and Flexural Creep and Creep Rupture in Plastics
- R. SSPWC 210-2.3.3 - Chemical resistance testing published in the Standard Specifications for Public Works Construction, 1997 edition (otherwise known as “The Greenbook”).

## 1.5 SUBMITTALS

### A. SHOP DRAWINGS AND ENGINEERING DATA

1. Submit complete shop drawings and Engineering data to the Engineer in accordance with the requirements of Supplemental Specifications. Submit Manufacturer’s literature, design data, samples, and warranty with the submittal. Manufacturer’s literature shall include material specifications, product safety sheets (MSDS sheets) and application instructions for the material to be used for the manhole lining work.
2. Wall thickness design calculations for each manhole to be rehabilitated utilizing the specified resin technology systems must be submitted, along with supporting formulas that document that version of formula used. Additionally, product specific strength values, including the short term flexural modulus and the long term flexural modulus strength, must be substantiated by third party testing which will be submitted. The materials utilized for the contracted project shall be of a quality equal to or better than the materials used in the long term test with respect to the initial flexural modulus and the long term reduction factor used in design.
3. Submit certification that the equipment to be used for applying the products has been manufactured or approved by the protective coating manufacturer and applicator personnel have been trained and certified for proper use of the equipment.

## 1.6 STORAGE AND PROTECTION

- A. Deliver materials in original sealed containers with seals unbroken and labels legible and intact, as applicable. Materials shall be delivered in sufficient

quantities so as not to cause delay in the work. Materials shall be stored in accordance with the Manufacturer's instruction.

#### 1.7 GUARANTEE

- A. Provide a guarantee against defects and workmanship in accordance with the requirements of the General Specifications.

#### 1.8 DESIGN CONDITIONS

- A. The following design conditions shall be assumed for all structures being rehabilitated with the approved resin system:

<b>Parameter</b>	<b>Design Requirement</b>
1. Structure Condition	Partially Deteriorated, based on condition of the existing structure.
2. Soil Type	Saturated
3. Design Thickness	ASTM 1216-Appendix. XI
4. Ovality	Not greater than 5%
5. Soil Load	120 lbs/cu. ft.
6. Traffic Load	AASHTO-HS-20-44 Highway
7. Soil Modulus	>500 psi.<1000 psi.
8. Safety Factor	2.0
9. Soil Cover	Distance from grade to invert of pipe.
10. Water Table	Same as Soil Cover unless changed by Owner or Engineer.

#### 1.9 MEASUREMENT AND PAYMENT

- A. Payment for this work will include all equipment, materials and labor necessary to perform the work under this specification as shown on the Drawings and specified herein and included in the Contract. The payment for this work shall be included in the unit price for Manhole and Lift Station Wet Well Sealing With Protective Polymer Lining.

### PART 2 – PRODUCTS

#### 2.1 MANHOLE SEALING PRODUCTS

- A. REPAIR MATERIAL



1. Standard Portland cement or new concrete (not quick setting high strength cement) must be well cured prior to application of the protective coating. Generally, 28 days is adequate cure time for standard Portland cement. If earlier application is desired, compressive or tensile strength of the concrete can be tested to determine if acceptable cure has occurred. (Note: Bond strength of the coating to the concrete surface is generally limited to the tensile strength of the concrete itself. Engineer may require Elcometer pull tests to determine suitability of concrete for coating.
2. Cementitious patching and repair materials should not be used unless their manufacturer provides information as to its suitability and procedures for topcoating with the approved coating. Project specific submittals should be provided including application, cure time and surface preparation procedures which permit optimum bond strength with the approved coating.
3. Repair materials shall be used to fill voids, structurally reinforce and/or rebuild surfaces, etc. as determined necessary by the protective coating applicator. Repair materials must be compatible with the specified coating and shall be applied in accordance with the manufacturer's recommendations.
4. The following products may be accepted and approved as compatible repair basecoat materials for approved topcoating for use within the specifications:
  - a. 100% solids, solvent-free grout specifically formulated for approved topcoating compatibility. The grout manufacturer shall provide instructions for trowel or spray application and for approved topcoating procedures.
  - b. Factory blended, rapid setting, high early strength, non-shrink repair mortar that can be troweled or pneumatically spray applied may be approved if specifically formulated to be suitable for approved topcoating. Such repair mortars should not be used unless their manufacturer provides information as to its suitability for topcoating with the approved topcoating. Project specific submittals should be provided including application, cure time and surface preparation procedures which permit optimum bond strength with the approved coating.
  - c. In the case of excessive infiltration, a hydraulic cement or plug may be used to stop the flow of the infiltration. Manufacturer's include Strong, Sika, Preco or approved equal. The hydraulic cement shall be compatible with the spray applied resin coating.

**B. PROTECTIVE LINING MATERIAL**

1. Manufacturer: The protective lining material shall be SprayWall® as manufactured by Sprayroq, Inc., SpectraShield as manufactured by CCI Spectrum, Inc or approved equal.
2. The resin based material shall be used to form the sprayed structurally enhanced monolithic liner covering all interior surfaces of the structure, including benches and inverts of manholes. The physical requirements must be verified by an independent, certified, third party testing laboratory within the last five years and must be submitted with the shop drawings.

**SprayWall lining shall conform to the following minimum properties:**

Compressive strength	ASTM D 695	> 18,000 psi
Tensile strength	ASTM D 638	> 7,450 psi
Bond	Substrate Failure	
Flexural Modulus (initial)	ASTM D 790	> 735,000 psi
Flexural Modulus (long term)	ASTM D2990-01	> 520,000 psi
Density		87 ± pcf
Chemical Resistance:	Severe Municipal Sewer: All types of service	

**SpectraShield lining shall conform to the following minimum properties:**

Compressive strength	ASTM D 1621	90-150 psi
Tensile strength	ASTM D 638	> 3,600 psi
Tear strength	ASTM D 624	550 pli
Bond	Substrate Failure	
Flexural Modulus (100%)		> 2,400 psi
Hardness (Shore D)	ASTM D2240	45
Density		4-10 pcf

Chemical Resistance: Severe Municipal Sewer: All types of service

3. When the wall of the resin based liner is to be structurally designed to withstand the hydraulic load generated by the groundwater table the long term (50yr) value of the flexural modulus of elasticity will be utilized to calculate the thickness of the structural liner. The initial flexural modulus of elasticity (short term) of the submitted resin material will be utilized with the long term deformation percentage as determined by ASTM D2990 (see below) in the design equation outlined in ASTM 1216-07b, Appendix X1. The value of the long term flexural modulus of the proposed product will be certified by an independent, certified, third party testing lab, independent of the Manufacturer and submitted with the bid package. The definition of long term value will be identified as initial flexural modulus of elasticity less the reduction in value caused by Creep over a fifty (50) year minimum period and verified by third party DMA testing(ASTM D2990). All design submittals will include this certified third party DMA testing (ASTM D2990) value in their respective design calculations for each structure being rehabilitated.
4. Unless dictated by the Owner or the Engineer, the finished corrosion repair will include the entire structure, including the bottom and any invert areas of the structure. The entire repaired structure will be repaired with the same material over the entire area of the structure.

#### C. PROTECTIVE LINING APPLICATION REQUIREMENTS

1. SprayWall® liner as manufactured by Sprayroq, Inc., shall have a minimum thickness of 125 mils.
2. SpectraShield liner as manufactured by CCI Spectrum, Inc shall have a minimum thickness of 500 mils.

#### D. PROTECTIVE LINING APPLICATION EQUIPMENT

1. Manufacturer approved heated plural component spray equipment shall be used in the application of the specified protective lining.

#### 2.2 BENCH AND CHANNEL REPLACEMENT

- A. Concrete shall conform to the following ASTM standards: C-33; C-94; C-150; and C-494. Concrete shall have a 28 day cure strength of 4,500 psi and be resistant to weathering and abrasion.

#### 2.3 WATER

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- A. Water used to mix product shall be clean and potable and provided by the Contractor. Questionable water shall be tested by a laboratory per ASTM C-94 procedure.

## PART 3 – EXECUTION

### 3.1 SEWER MANHOLE CLEANING

- A. Sewer manhole cleaning shall be performed as necessary to perform rehabilitation items as specified. It is recognized that there are some conditions such as deteriorated walls and major blockages that prevent cleaning from being accomplished or where additional damage would result if cleaning were attempted or continued. Should such conditions be encountered, the Contractor shall immediately notify the Engineer, who will decide whether to proceed with cleaning.
- B. Cleaning Precautions
  - 1. During manhole cleaning operations, satisfactory precaution shall be taken in the use of cleaning equipment. When hydraulic cleaning tools (which depend upon water pressure to provide their cleaning force) are used, precautions shall be taken to ensure that the water pressure created does not damage the manhole or cause flooding of public or private property being served by the sewer.
  - 2. Any foreign material, including sludge, mud, sand, gravel, rocks, bricks, grease, and other debris shall be removed from the manhole. The removal of debris shall be completed before any flushing of the manhole occurs. All debris shall be completely removed and not allowed to enter the sewer pipe. After the debris is completely removed, the manhole walls, invert and bench surfaces shall be flushed using a high velocity water gun (minimum 5,000 psi water spray), to complete the cleaning. Verification of the cleaning work will be by visual inspection by the Engineer.
  - 3. If all deposits have not been removed from the manhole, a 10% solution of muriatic acid will be applied by spraying from above the manhole. Manholes treated with acid solution shall be thoroughly flushed and the manhole allowed to dry. The mixing, application, and removal of the acid solution shall be in strict accordance with the Manufacturers' specifications and recommendations. All safety procedures and protective devices applicable to the handling of the acid will be strictly adhered to.

4. Remove existing coatings prior to application of the new protective coating. Applicator is to maintain strict adherence to applicable NACE and SSPC recommendations with regard to proper surface preparation and compatibility with existing coatings.
5. All existing manhole steps within the manholes shall be removed or cut off flush with the wall surface.

### 3.2 MATERIAL REMOVAL

- A. Debris such as sludge, rocks, grease, and other solid or semisolid material resulting from the cleaning operation shall be removed at the manhole being cleaned by the use of vacuum or other suitable equipment. Passing material from sewer section to sewer section shall not be permitted. Placement of a temporary dam in the downstream manhole exit may be necessary to prevent debris from washing downstream.

### 3.3 DISPOSAL OF MATERIALS

- A. All solids or semisolids resulting from the cleaning operations shall be removed from the site and disposed of offsite. No additional payment shall be made for the removal and offsite disposal of materials resulting from cleaning operations

### 3.4 ENVIRONMENTAL CONDITIONS

- A. When freezing temperatures are expected, the Contractor shall take measures to keep applied materials warm and provide the required heat in the manhole before repair work is started and the 24 hour period following application. No application shall be made if ambient temperature is below 40 degrees Fahrenheit. No application shall be made to frozen surfaces or if freezing is expected to occur within the substrate within 24 hours after application. Precautions shall be taken to keep the temperatures at time of application below 90 degrees Fahrenheit. Water temperature shall not exceed 80 degrees Fahrenheit. Chill with ice if necessary.

### 3.5 SURFACE PREPARATION

- A. Each manhole shall be cleaned prior to the start of sealing operation, as described in Section 3.1 of this specification. The invert shall be covered during construction operations to prevent loose, extraneous materials from collecting in the invert and entering sewer lines. All loose, unsound, and protruding brick, mortar and concrete shall be removed. Before application of each material, surfaces to be sprayed or coated will be inspected by the Owner or Engineer.
- B. Applicator shall inspect all surfaces specified to receive a protective coating prior to surface preparation. Applicator shall notify Owner of any noticeable disparity

in the surfaces which may interfere with the proper preparation or application of the repair mortar and protective coating.

- C. All contaminants including: oils, grease, incompatible existing coatings, waxes, form release, curing compounds, efflorescence, sealers, salts, or other contaminants shall be removed.
- D. All concrete or mortar that is not sound or has been damaged by chemical exposure shall be removed to a sound concrete surface or replaced.
- E. Surface preparation method(s) should be based upon the conditions of the substrate, service environment and the requirements of the resin protective coating to be applied.
- F. Surfaces to receive protective coating shall be cleaned and abraded to produce a sound surface with adequate profile and porosity to provide a strong bond between the protective coating and the substrate. Generally, this can be achieved with a high pressure water cleaning using equipment capable of 5,000 psi at 4 gpm. Other methods such as high pressure water jetting (refer to NACE Standard No. 5/SSPC-SP12), abrasive blasting, shotblasting, grinding, scarifying or acid etching may also be used. Detergent water cleaning and hot water blasting may be necessary to remove oils, grease or other hydrocarbon residues from the concrete. Whichever method(s) are used, they shall be performed in a manner that provides a uniform, sound clean neutralized surface that is not excessively damaged.
- G. Infiltration shall be stopped by using a material which is compatible with the specified repair mortar and is suitable for topcoating with the specified protective coating. Flows should be totally plugged and/or diverted when coating the invert. All extraneous flows into the manhole at or above the area coated shall be plugged and/or diverted until the coating has set hard to the touch. As an option, hot air may be added to the manhole to accelerate set time of the coating.
- H. The area between the manhole and the manhole ring and any other area that might exhibit movement or cracking due to expansion and contraction, shall be grouted with a flexible grout or gel.
- I. Installation of the protective coating shall not commence until the concrete substrate has properly cured in accordance with these specifications.
- J. Temperature of the surface to be coated should be maintained between 50 degrees F and 120 degrees F during application. Prior to and during application, care should be taken to avoid exposure of direct sunlight or other intense heat source to the structure being coated. Where varying surface temperatures do exist, care should be taken to apply the coating when the temperature is falling versus rising (ie. late afternoon into evening vs. morning into afternoon).

### 3.6 APPLICATION OF REPAIR MATERIALS

- A. If using approved cementitious repair materials, such shall be troweled to provide a smooth surface with an average profile equivalent to coarse sandpaper to optimally receive the protective coating. No bugholes or honeycomb surfaces should remain after the final trowel procedure of the repair mortar.
- B. The repair materials shall be permitted to cure according to manufacturer recommendations. Curing compounds should not be used unless approved for compatibility with the specified protective coating.
- C. Application of the repair materials, if not performed by the coating certified applicator, should be inspected by the protective coating certified applicator to ensure proper finishing for suitability to receive the specified coating.
- D. After abrasive blast and leak repair is performed, all surfaces shall be inspected for remaining laitance prior to protective coating application. Any evidence of remaining contamination or laitance shall be removed by additional abrasive blast, shotblast or other approved method. If repair materials are used, refer to these specifications for surface preparation. Areas to be coated must also be prepared in accordance with these specifications after receiving a cementitious repair mortar and prior to application of the approved coating.
- E. All surfaces should be inspected during and after preparation and before the protective coating is applied.

### 3.7 VOID REPAIR

- A. Patching of manhole walls shall be required in areas where large voids exist (greater than 2 inches in depth) including missing bricks, cracks, spalls in manhole walls, around steps, frames, pipes and mortar joints. All cracked or disintegrated material shall be removed from the area to be patched exposing a clean, sound substrate. Patching material shall be used as specified and water plug type materials shall not be used for general patching. Missing bricks shall be replaced by a qualified mason.

### 3.8 ACTIVE LEAK REPAIR

- A. Wall repair shall include the sealing of all visible leaks in the manhole with infiltration control material as specified. Weep holes shall be installed as required to localize infiltration during application of patching material or infiltration control material. Weep holes shall be plugged after material application with infiltration control material prior to application of protective coating material. Wherever heavy infiltration is present due to high ground water and cannot be

reasonably stopped, 5/8" diameter holes will be drilled at intervals around the base of the manhole wall to relieve outside pressure. All pressure leaks shall be sealed with a rapid setting pressure grout that bonds both mechanically and chemically to saturated surfaces. Once the walls have been rehabilitated, the drilled holes shall be plugged as specified in Section 2.1 A of this specification.

### 3.9 BENCH AND CHANNEL REPLACEMENT

- A. Manholes will require bench and/or channel removal and replacement as indicated on the Drawings.
- B. Forming new manhole inverts shall provide a smooth, straight, and uniform flow line from the invert of the inlet pipe(s) to the invert of the outlet pipe. Where laterals are present, the system shall provide for a sanitary sweep into the main flow line.
- C. New concrete shall be placed to a minimum 2 inch thickness, over solid existing concrete base properly prepared as specified for manhole walls. Where solid concrete does not remain after preparation, new concrete shall be poured to a minimum 4 inch thickness. The new bench shall be tapered up to the manhole wall at a minimum slope of 4:1.
- D. Channel repair shall include patching of the invert, bench areas and sewer lines in the manholes using patching material in accordance with the Manufacturer's recommendations. The flow channel shall be checked for leaks, cracks, spalls or other discrepancies by plugging the upstream side and visually inspecting the channel. Repairs to the channel shall be made after the flow has been blocked and the invert cleaned. The patching material shall be uniformly troweled onto the damaged channel at a minimum thickness of ½ inch at the invert. Material shall be extended out onto bench of manhole to sufficiently tie into liner material. Repairs made to the channel shall create a smooth surface and provide for smooth flow through the manhole. Flow shall be established after a minimum of 30 minutes after application of patching material. All loose and deteriorated material shall be removed from the work site and properly disposed of by the Contractor.

### 3.10 APPLICATION OF PROTECTIVE LINING MATERIAL

- A. Application procedures shall conform to the recommendations of the protective coating manufacturer, including material handling, mixing, environmental controls during application, safety, and spray equipment.
- B. The spray equipment shall be specifically designed to accurately ratio and apply the specified protective coating materials and shall be regularly maintained and in proper working order.



- C. The protective coating material must be spray applied by a Certified Applicator of the protective coating manufacturer.
- D. Specified surfaces shall be coated by spray application of a solvent-free, 100% solids, polyurethane structural lining or 100% solids, silicone modified polyurea as further described herein.
- E. Airless spray application equipment approved by the coating manufacturer shall be used to apply each coat of the protective coating.
- F. If necessary, subsequent topcoating or additional coats of the protective coating should occur as soon as the basecoat becomes tack free, no later than the recoat window for the specified products. Additional surface preparation procedures will be required if this recoat window is exceeded.

### 3.11 CURING

- A. Liner product shall be cured for a minimum of 1 hour before releasing sanitary sewer flows.
- B. After final application of the liner product, traffic shall be withheld 4 to 6 hours.

### 3.12 PRODUCT TESTING

- A. High Voltage Spark Test. After the protective coating has set hard to the touch it shall be inspected by the Contractor and witnessed by the Owner with high-voltage holiday detection equipment. This test is critical when applied to corrosion protection applications (i.e. mil coatings less than 250 mils). Surface shall first be dried, an induced holiday shall then be made on to the coated concrete or metal surface and shall serve to determine the minimum/maximum voltage to be used to test the coating for holidays at that particular area. The spark tester shall be initially set at 100 volts per 1 mil (25 microns) of film thickness applied but may be adjusted as necessary to detect the induced holiday (refer to NACE RPO188-99). All detected holidays shall be marked and repaired by abrading the coating surface with grit disk paper or other hand tooling method. After abrading and cleaning, additional protective coating material can be hand applied to the repair area. All touch-up/repair procedures shall follow the protective coating manufacturer's recommendations.
- B. Adhesion Testing. The adhesion tests shall be performed by the Contractor on a minimum of one or 10% of all rehabilitated structures, which ever is greater, or as shown on the Plan and/or specified in the Special Provisions. Adhesion testing shall be conducted after the lining or coating system has cured per manufacturer instruction and in accordance with ASTM D4541 or ASTM 7234 as modified herein. Adhesion is critical for proper performance of a corrosion barrier (i.e. < 250 mils). A minimum of one 20 mm dolly shall be affixed to the lined surface of

the structure at the upper section or cone area, mid section and at the bottom, unless otherwise specified in the Special Provisions. Each testing location shall be identified by the Owner. The adhesive used to attach the dollies to the liner shall be rapid setting with tensile strength in excess of the liner material and permitted to cure in accordance with manufacturer recommendations. The lining material and dollies shall be adequately prepared to receive the adhesive. Prior to pull test, the Contractor shall utilize a scoring device to cut through the coating until the substrate is reached. Extreme care shall be required while scoring to prevent micro cracking in the coating, since cracks may cause failures at diminished strengths. Failure due to improper dolly adhesive or scoring shall require retesting. The pull tests in each area shall meet or exceed 200 psi. and shall include subbase adhered to the back of the dolly or no visual signs of coating material in the test hole. Pull tests with results between a minimum 150 psi and 200 psi shall be acceptable if more than 50% of the subsurface is adhered to the back of the dolly. A test result can be discarded, as determined by the Owner, if there is a valid nonstatistical reason for discarding the test results as directed by Sections 8.4 and 8.5 of ASTM D4541 and ASTM 7234. If any test fails, a minimum of three additional locations in the section of the failure shall be tested, as directed by the Owner. If any of the retests fail, all loosely adhered or unadhered liner in the failed area, as determined by the Owner shall be removed and replaced at the Contractor's expense.

NOTE: The mil thickness will be measured and confirmed with the scored and pulled test samples. In structural repairs (partially or fully deteriorated design assumptions), it is critical to confirm the design thickness with the pulled sample as adhesion is not assumed in the ASTM 1216 design. The primary purpose of the pull test in structural rehabilitation is to confirm applied thickness, not adhesion. Any derived adhesion is further enhancement to the final installation strength of the rehabilitated structure.

### 3.12 QUALITY CONTROL TESTING

- A. Once all manholes have been sealed and the proper curing time for the waterproofing materials has elapsed, the manholes shall be visually inspected by viewing from street level for the elimination of infiltration by the Contractor in the presence of the Owner. The inspection shall be performed at the discretion of the Owner during the warranty period following rainfall sufficient to raise the ground water table above the problem areas. All leakage problems determined by this inspection shall be corrected by the Contractor within an agreed upon time, to the satisfaction of the Owner, at no additional cost.

END OF SECTION

## SECTION 02570

### MONOLITHIC OR SECTIONAL PRECAST CONCRETE VAULT STRUCTURES

#### PART 1 - GENERAL

##### 1.1 SCOPE

- A. As an option to cast-in-place construction, the Contractor may furnish all labor, materials, equipment, and incidentals required to install rectangular, monolithic, or sectional precast vault structures as specified herein.

##### 1.2 RELATED SECTIONS

- A. Section 02200 – Earthwork

##### 1.3 REFERENCES

- A. Prestressed Concrete Institute. Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products.
- B. National Precast Concrete Association. Quality Control Manual for Precast Concrete Plants.
- C. American Society for Testing and Materials (ASTM)
  - 1. ASTM C478 - Standard Specification for Precast Reinforced Concrete Manhole Sections.
  - 2. ASTM C890 - Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures.
  - 3. ASTM C891 - Standard Practice for Installation of Underground Precast Concrete Utility Structures.
  - 4. ASTM C923 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipe and Laterals.
  - 5. ASTM C913 - Standard Specifications for Precast Concrete Water and Wastewater Structures.
- D. American Concrete Institute Building Code Requirements for Reinforced Concrete (ACI 318).

- E. Occupational Safety and Health Administration Standard 1926.704 - Requirements for Precast Concrete.

#### 1.4 SUBMITTALS SHALL BE AS FOLLOWS

- A. Copy of certificate or report showing that the precast concrete manufacturer conforms to Article 1.5 - Qualifications.

- B. Schedule of precast concrete structure sections to be provided on the project, charting the following items, when applicable:

1. Sheet number where the precast structure plan and profile is shown on the plans.
2. Line number (when there is more than one line on the project).
3. Precast structure station number.
4. Top elevation of the precast structure frame as indicated on the plans.
5. Top elevation of precast structure base slab as calculated.
6. Total height of precast structure required from top of base slab to top of frame.
7. Total height of assembled base, risers, and cone or top provided from top of base to top of top.
8. Manufacturer's part number or catalog number and number required of each base, riser, and top provided for the precast structure.
9. Each pipe size and type and its connector's part number, distance from top of base slab, and horizontal distances from inner wall corners of precast structure.

- C. Detail of each precast concrete structure section to be provided showing or charting the following:

1. Manufacturer's part number or catalog number.
2. Inside dimensions.
3. Lay length excluding base slab.
4. Wall thickness and base or top thickness where applicable.

5. Handling weight.
  6. Wire size, spacing, and area provided per vertical foot.
  7. Reinforcing bar size and spacing.
  8. Design loads.
  9. Concrete mix number and design strength.
  10. Height, width, slope, and annular space of the tongue and groove.
- D. Pipe connector details and material specifications.
- E. Joint material detail, material specifications and calculations showing that the joint material cross section is greater than the joint's annular space times its height.
- F. Lifting device and hole detail.
- G. Submit the following at the request of the Engineer or Owner:
1. Structural analysis and design calculations for precast components, performed in accordance with applicable codes and standards, showing that allowable stresses will not be exceeded. All calculations must be sealed by a registered professional engineer.
  2. Calculations or test results verifying that the lifting device components and holes are designed in accordance with OSHA Standard 1926.704.
  3. Concrete 28-day compression strength results for every day production of precast components for the project was performed showing the required strength according to the guidelines established in ACI 318.
  4. Reinforcing and cement mill reports for materials used in the manufacture of precast components for this project.
  5. The above test reports for similar precast components recently produced, submitted prior to production of precast components for this project.

## 1.5 QUALIFICATIONS

- A. The precast Manufacturer shall comply with one of the following requirements:
1. Manufacture precast components for the project in a plant certified in the Prestressed Concrete Institute's (PCI) Plant Certification Program.

2. Manufacture precast components for the project in a plant certified in the National Precast Concrete Association's (NPCA) Plant Certification Program.
  3. Retain an independent testing or consulting engineering firm approved by the Engineer for precast plant inspection. The basis for plant inspection shall be the National Precast Concrete Association Quality Control Manual or the Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products. The above firm shall inspect the precast plant 2 weeks prior to and at 1 week intervals during production of materials for this project and issue a report, certified by a registered engineer that materials, methods, products, and quality control meet the requirements of the above quality control manuals.
- B. The precast Manufacturer shall have a recognized quality improvement process installed at the manufacturing facility.
  - C. The precast Manufacturer shall provide engineering certification as to the structural adequacy of any precast component, if requested.
  - D. All concrete compressive strength testing shall be performed in a laboratory inspected by the CCRL of the National Bureau of Standards.

## 1.6 ENVIRONMENTAL REQUIREMENTS

- A. Maintain materials and surrounding air temperature to minimum 50 F prior to, during, and 48 hours after completion of masonry, grouting or concreting work.

## 1.7 MEASUREMENT AND PAYMENT

- A. Payment for this work will include all equipment, materials and labor necessary to perform the work under this specification as shown on the Drawings and specified herein and included in the Contract. The payment for this work shall be included in the lump sum price for the Faircrest Lift Station, Complete.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Concrete shall conform to ASTM C478 and as follows:
  1. Compressive Strength: 5,000 psi minimum at 28 days.
  2. Air Content: 4 percent minimum.
  3. Alkalinity: Adequate to provide a life factor,  $A_z = \text{Calcium carbonate equivalent times cover over reinforcement, no less than 0.35 for bases, risers and tops.}$

4. Cementitious Materials: Minimum of 564 pounds per cubic yard.
  5. Coarse Aggregates: ASTM C33. Sound, crushed, angular stone only. Smooth or rounded stone shall not be used.
  6. Fine Aggregates: ASTM C33. Free from organic impurities.
  7. Chemical Admixtures: ASTM C494. Calcium chloride or admixtures containing calcium chloride shall not be used.
  8. Air Entraining Admixtures: ASTM C260.
  9. Waterproofing Admixture for Concrete
    - a. Admixture – cementitious, capillary waterproofing admixture which, when added at the approximate dosage rate of 1% by weight of cement (0.8% minimum), will create a crystalline growth in the pores, capillary tracts, and bleed water tracks of the concrete.
    - b. Manufacturer – Penetron Admix (ICS Penetron International – 631-941-9700), or ODNR approved equal.
- B. Reinforcing steel shall be ASTM A615 Grade 60 deformed bar, ASTM A82 wire or ASTM A185 welded wire fabric.
  - C. Lifting loops shall be ASTM A416 steel strand. Lifting loops made from deformed bars shall not be allowed.
  - D. Butyl rubber sealant shall conform to Federal Specification SS-S-210A, AASHTO M-198, Type B - Butyl Rubber and as follows: maximum of 1% volatile matter and suitable for application temperatures between 10 and 100 F.
  - E. Butyl rubber with bentonite sealant shall conform to Federal Specification SS-S-210A, ASTM D-297, and containing no asphaltics as follows: maintaining 99% solids with a maximum of 1% volatile matter and suitable for application temperatures between 5 and 125 F.
  - F. Epoxy gels used for interior patching of wall penetrations shall be a 2-component, solvent-free, moisture-insensitive, high modulus, high-strength, structural epoxy paste adhesive meeting ASTM C881, Type I and II, Grade 3, Class B and C, Epoxy Resin Adhesive.

## 2.2 COMPONENTS

- A. Precast component fabrication and manufacture shall be as described in this paragraph and as described in the paragraphs for the specific components.
1. Precast structures shall be manufactured in conformance with ASTM C913. Wall and inside slab finishes resulting from casting against forms standard for the industry shall be acceptable, except form ties through the wall of the product are not allowed. Exterior slab surfaces shall have a float finish. Small surface holes, normal color variations, normal form joint marks, minor depressions, chips and spalls will be tolerated. Dimensional tolerances shall be those set forth in the appropriate references and specified below.
  2. Joint surfaces for joints between precast structure components shall be keyways or tongue and grooves manufactured to the joint surface design and tolerance requirements of ASTM C913.
  3. Lift holes and inserts used for handling precast structures shall be sized for a precision fit with the lift devices, shall not penetrate through the precast structure wall, and shall comply with OSHA Standard 1926.704.
  4. The Contractor shall coordinate with the manufacturer for the installation of wall pipe, door frames, and any other embedded items, prior to casting base, walls, and top slabs.
- B. Precast base sections shall have the base slab cast monolithically with the walls, or have an approved galvanized or PVC waterstop cast in the cold joint between the base slab and the walls.
- C. Precast riser sections. The minimum lay length of precast riser sections shall be 36 inches.
- D. Precast top sections. Flat slab top sections shall be designed for a minimum superimposed live load of 300 psf in accordance with ACI 318 and ASTM C890.
- E. Joints shall be sealed internally between the tongue and the groove and additionally around the external perimeter of the joint as follows:
1. External seals shall consist of a polyethylene backed flat butyl rubber sheet no less than 1/16-inch thick and 6 inches wide applied to the outside perimeter of the joint.
  2. Joints with a perimeter greater than or equal to 18 feet shall be internally sealed with butyl rubber/bentonite sealant.
  3. Joints with a perimeter less than 18 feet shall be internally sealed with butyl rubber sealant.



- F. Manhole rings, covers, hatches and doors, frames and grate to be provided as equal to those shown on the precast structure details. Materials shall be cast iron, steel, or aluminum as conforming to details per application. For dimensions of castings see precast top details.
- G. Lifting devices complying with OSHA Standard 1926.704 for handling the precast components shall be provided by the precast manufacturer. The design of lifting devices shall comply with ASTM C913, Paragraph 5.8 standards.
- H. The exterior of the precast structure wall shall be coated with 21 mils of coal tar epoxy, Koppers 300M or equal, where shown on the plans. The coating shall be spray applied according to the manufacturer's recommendations by an applicator with a minimum of 5 years experience. The joints between precast sections shall not be coated. Use joint sealant as specified above to seal the interior horizontal joint surface.

## 2.3 CONFIGURATION

- A. Precast concrete structures are to be constructed as specified and as shown on the detail drawings.
- B. The number of joints shall be minimized. Use no more than two (2) sections up to 8 feet of depth and no more than one additional section for each 4 feet of depth.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Inspect precast components prior to unloading from the delivery truck.

### 3.2 DELIVERY, STORAGE, AND HANDLING

- A. Coordinate delivery with the Manufacturer. Handle and store the precast components in accordance with ASTM C891 and the Manufacturer's recommendations using methods that will prevent damage to the components and their joint surfaces.

### 3.3 PLACING PRECAST CONCRETE SECTIONS

- A. Excavate the required depth and remove materials that are unstable or unsuitable for a good foundation. Prepare a level, compacted foundation extending 6 inches beyond the precast base and follow ASTM C891 excavation standards.
- B. Set base plumb and level, aligning pipe opening with pipe invert.

- C. Set risers and tops, aligning internal wall surfaces, so that proper alignment is achieved taking particular care to clean, prepare, and seal joints.
- D. Connect piping as indicated on Drawings.
- E. Fill the void between horizontal joint surfaces with a sand cement grout around the outside perimeter, when recommended by the Manufacturer.
- F. After joining sections, apply the butyl sealant sheet around the outside perimeter of the joint.
- G. Lift holes leaving less than 2 inches of wall thickness shall be plugged from the outside using a sand cement mortar. Lift holes penetrating the wall shall be additionally sealed with an interior application of an epoxy gel 1/8 inch thick extending 2 inches beyond the penetration.
- H. Perform the final finishing to the manhole interior by filling all chips or fractures greater than ½ inch in length, width or depth and depressions more than ½ inch deep in inverts with a sand cement mortar. Grout joints according to manufacturer's specifications. Clean the interior of the precast structure, removing all dirt, spills, or other foreign matter.

END OF SECTION

## SECTION 02620

### HIGH DENSITY POLYETHYLENE PIPING

#### PART 1 - GENERAL

##### 1.1 WORK INCLUDED

- A. Furnish all labor, materials, equipment and incidentals required and install in the locations as shown on the Drawings the high density polyethylene (HDPE) piping as specified herein.

##### 1.2 QUALITY ASSURANCE

- A. All HDPE pipe and fittings shall be furnished by a single manufacturer who is fully experienced, reputable, and qualified in the manufacture of the items to be furnished. The equipment shall be designed, constructed, and installed in accordance with ASTM methods and shall comply with these Specifications.

##### 1.3 SUBMITTALS

###### A. SHOP DRAWINGS AND ENGINEERING DATA

1. Submit complete shop drawings and engineering data to the Engineer in accordance with the requirements of the Supplemental Specifications.
2. Shop drawings shall be submitted to the Engineer for approval and shall include dimensioning, product data, and technical specification for all piping to be furnished.
3. Submit samples of all materials specified herein to the Engineer for approval when requested.

##### 1.4 PIPE MARKING

###### A. All HDPE pipe shall be marked with the following information:

1. Manufacturer's name or trademark.
2. Nominal pipe size and OD base.
3. ASTM material code designation.
4. Dimension ratio.
5. Type, class, and grade.
6. ASTM specification designation (D 3350).

## 1.5 STORAGE AND PROTECTION

- A. Store and protect the high density polyethylene pipe in accordance with the Manufacturer's recommendations.
- B. Care shall be taken during transportation of the pipe that it is not cut, kinked or otherwise damaged.
- C. Ropes, fabric, or rubber protected slings and straps shall be used when handling pipes.
- D. Chains, cables, or hooks inserted into the pipe ends shall not be used.
- E. Two slings spread apart shall be used for lifting each length of pipe. Pipe or fittings shall not be dropped onto rocky or unprepared ground.
- F. The handling of the joined pipe line shall be in such a manner that the pipe is not damaged by dragging it over sharp and cutting objects.
- G. Slings for handling the pipeline shall not be positioned at butt fused joints.
- H. Sections of the pipes with deep cuts and gouges shall be removed and the ends of the pipeline rejoined.
- I. Pipes shall be stored on wooden sleepers, spaced suitably and of such width as not to allow deformation of the pipe at the point of contact with the sleeper or between the supports.
- J. Stacking of the polyethylene pipes shall be limited to a height that will not cause excessive deformation of the bottom layers of pipes under anticipated temperatures conditions.

## 1.6 GUARANTEE

- A. Provide a guarantee against defective products and workmanship.

## 1.7 MEASUREMENT AND PAYMENT

- A. Measurement and Payment for this work shall be by unit price and will include all equipment, materials and labor necessary to perform the work under this specification as shown on the Drawings and specified herein and included in the Contract. The payment for this work shall be included in the unit price for Force Main, 6 inch HDPE and Sanitary Sewer, 8 inch HDPE, Directionally Drilled.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. The pipe and fittings supplied under this Specification shall be high performance, high molecular weight, high density polyethylene pipe as manufactured in accordance with ASTM D 1248.
- B. The pipe material shall be a Type III, Class C, Category 5, P34 material as described in ASTM D 1248, PE3408. Minimum cell classification values of the pipe material shall be in conformance with ASTM D 3350.
- C. The fittings supplied under this Specification shall be molded from a polyethylene compound having a cell classification equal to or exceeding the compound used in the pipe or shall be manufactured using a poly-ethylene compound having a cell classification equal to or exceeding the cell classification of the pipe supplied under this Specification. To ensure compatibility of polyethylene materials, all fittings supplied under this Specification shall be of the same manufacture as the pipe being supplied.
- D. All sanitary gravity sewer shall be grey in color.

## 2.2 PHYSICAL PROPERTIES OF PIPE COMPOUND

- A. Density. The density shall be 0.941 - 0.957 gms/cm<sup>3</sup> when tested in accordance with ASTM D 1505.
- B. Melt Flow. Melt flow shall be not greater than 0.15 gms/10 min. when tested in accordance with ASTM D 1238 - Condition E. (Melt Flow shall be no greater than 4.0 gms/10 min. when tested in accordance with ASTM D 1238 - Condition F.)
- C. Flex Modulus. Flexural Modulus shall be 110,000 psi to less than 160,000 psi when tested in accordance with ASTM D 790.
- D. Tensile Strength at Yield. Tensile strength at yield shall be 3,200 psi to less than 3,500 psi when tested in accordance with ASTM D 638.
- E. ESCR. Environmental Stress Crack Resistance shall be in excess of 5,000 hours with zero failures when tested in accordance with ASTM D 1693 - Condition C.
- F. Hydrostatic Design Basis shall be 1,600 psi at 23°C when tested in accordance with ASTM D 2837.

## 2.3 PIPE DIMENSIONS

- A. General. Pipe supplied under this specification shall have a nominal iron pipe size (IPS) OD unless otherwise specified. The standard dimension ratio (SDR) of the pipe supplied shall be as specified on the Drawings.
- B. Sewer Force Main. ASTM D 3350 (6-inch diameter), SDR 11.

## 2.4 CERTIFICATION

- A. The Owner or the Engineer may request certified lab data to verify the physical properties of the materials supplied under this Specification or may take random samples and have them tested by an independent laboratory.

## 2.5 REJECTION

- A. Polyethylene pipe and fittings may be rejected for failure to meet any of the requirements of this Specification. The decision to accept material deviating from this specification shall be the responsibility of the specifying Engineer.

## PART 3 – EXECUTION

### 3.1 INSTALLATION

- A. Alignment and Grade. All pipe shall be laid to, and maintained at, the established lines and grades. The Contractor may set line and grade for the sewer by using a laser beam coaxially through the sewer being laid.
- B. Trench Construction
  - 1. Stockpiling Excavated Material: All excavated material shall be stockpiled in a manner that will not endanger the work or obstruct sidewalks and driveways. Hydrants under pressure, valve-pit covers, valve boxes, curb-stop boxes, fire and police call boxes, and other utility controls shall be kept accessible.
  - 2. Dewatering: Where conditions are such that running or standing water occurs in the trench bottom or the soil in the trench bottom displays a "quick" tendency, the water shall be removed by pumps and other suitable means (such as well points or pervious underdrain bedding) until the pipe has been installed and the backfill has been placed to a sufficient height to prevent flotation of pipe. Generally, a depth of backfill over the top of the pipe equal to 1-1/2 pipe diameters is sufficient to prevent flotation.
  - 3. Preparation of Trench Bottom: The trench bottom shall be constructed to provide a firm, stable, and uniform "V" shape (3" deep) support for the full length of the pipe. Any part of the trench bottom excavated below grade shall be backfilled to grade and shall be compacted as required to provide firm pipe support. When an unstable subgrade condition is encountered that could provide inadequate pipe support, additional trench depth shall be excavated and refilled with suitable foundation material. Ledge rock, boulders, and large stones shall be removed to provide 6 inches of cushion on all sides of the pipe and accessories.
  - 4. Laying of Pipe: To prevent damage, use proper implements, tools, and equipment for placement of pipe in trench. Under no circumstances shall pipe or accessories be dropped into the trench. All foreign matter or dirt shall be removed from the pipe interior. Pipe joints shall be assembled with care. When pipe laying is not in progress, open ends of installed

pipe shall be closed to prevent entrance of trench water, dirt, foreign matter, or small animals into the pipeline.

5. Pipe Embedment

a. Native Earth Embedment: HDPE pipe shall be installed with native earth embedment and backfill in areas where the native earth materials are suitable for pipe embedment. Suitable material shall be ASTM D 2487, Class I (with graded or angular stone less than 3/4-inch in size), Class II, Class III, or Class IV.

b. Rock Trench Embedment: In areas having rock trenches, HDPE pipe shall be installed with crushed stone (less than 3/4-inch diameter) or sand bedding providing uniform longitudinal support under the pipe. Backfill material shall be worked under the sides of the pipe to provide satisfactory haunching. Initial backfill material shall be crushed limestone and shall be placed to a minimum depth of 12 inches over the top of the pipe as shown on the Drawings. All pipe embedment material shall be selected and placed carefully. Sharp stones and crushed rock (larger than 3/4 inch) which could cause significant scratching or abrasion of the pipe, shall be excluded from the embedment material. Bedding and initial backfill shall be compacted to a minimum of 90 percent standard proctor.

6. Final Backfill: After placement and compaction of pipe embedment materials and initial backfill, the balance of backfill materials may be machine placed. The material shall contain no large stones or rocks, frozen material or debris. Proper compaction procedures shall be exercised to provide required 90 percent density, standard Proctor.

7. Magnetic Locator Wire 10 AWG shall be installed on the top of the HDPE pipe as shown on the Drawings. Locator/Tracer wire access boxes shall be provided and installed at the locations indicated on the Drawings.

8. The force main may be installed using the horizontal directional drilling method conforming to ASTM specification F1962-99. The force main shall be installed at the location as shown on the detailed drawings. The price bid per L.F. of force main shall include the following:

- a. Furnishing and installing the necessary fittings and adapter at the pump station.
- b. Furnishing and installing all necessary fittings, all excavation and backfill, all sheeting and all compacted premium backfill.
- c. The core boring and seal at the receiving manhole.
- d. All restoration work.
- e. Magnetic Locator Wire 10 AWG on the Top of the Force Main.

9. Force mains shall be installed at the location as shown on the detailed drawings. Force mains shall include the following:

- a. Furnishing and installing the necessary fittings and adapter at the pump stations.
- b. Furnishing and installing all necessary fittings, all excavation and backfill, all sheeting and all compacted premium backfill.
- c. The core boring and seal at the receiving pump station wetwells.
- d. All restoration work.

## B. JOINING

1. Thermal Butt-Fusion Joints. Pipes shall be joined to one another, to the polyethylene fitting, and to the flange connections by means of thermal butt-fusion. Thermal butt-fusion is a process whereby the two pipes or fittings to be joined are held aligned in a fixture; their ends are softened by means of heat and then pressed together under controlled pressure.
2. Polyethylene pipe lengths, fittings and flanged connections to be joined by thermal-butt fusion shall be of the same type, grade, and class of polyethylene compound and supplied from and the same raw material supplier.
3. Thermal Butt-Fusion joint beads on the HDPE pipe interior and exterior shall be removed after butt-fusion is completed for each joint for all gravity sanitary sewer mainline and laterals.
4. Connection to dissimilar pipes shall be made using Fernco Donut gaskets or another approved equal.
5. Connections for HDPE pressure applications to PVC or DIP shall be made using fusion PE mechanical joint adaptors with stainless steel stiffeners. Adaptors shall conform to ASTM D3261 and be compatible for heat fusion
6. All HDPE piping shall be adequately supported, anchored, and restrained.

## 3.2 TESTING

### A. AIR PRESSURE TESTING PROCEDURE

The force main shall be air tested to a pressure of 60 pounds per square inch (PSI). A tee shall be installed on top of the force main at the highest air and vacuum release valve chamber. Both ends of the force main shall be adequately plugged and air shall be discharged into the force main until the pressure reaches 60 PSI. This pressure shall be held for a minimum period of time of two (2) hours. If the pressure can not be held for two (2) hours, the force main shall be hydrostatically tested as follows:

### B. HYDROSTATIC TESTING PROCEDURE



1. Filling, Drainage, and Air Relief of Mains: Permanent air vents shall be installed at all high points. Lines shall be filled slowly with maximum velocity of 2 fps, preferably 1 fps, while venting all air. Valves shall be closed very slowly to prevent surges.
2. Procedure: The following procedure is based on the assumption that the pressure and leakage tests will be performed at the same time. Separate tests may be made if desired, in which case the pressure test shall be performed first. The specified test pressure shall be applied by means of a pump connected to the pipe. The test pressure shall be maintained (by additional pumping if necessary) for the specified time. While the line is under pressure, the system and all exposed pipe, fittings, valves, and hydrants shall be carefully examined for leakage. All defective elements shall be repaired or replaced and the test repeated until all visible leakage has been stopped and the allowable leakage requirements have been met.
3. Test Method: The installer may perform simultaneous pressure and leakage tests, or he may perform separate pressure and leakage tests on the installed system at test durations and pressures specified below.

**SYSTEM TEST METHODS**

Procedure	Pressure	Test Duration (hours)
Simultaneous pressure and leaking tests	150% of working pressure at point of test, but not less than 125% of normal working pressure at highest elevation	2
Separate pressure test	150% of working pressure at point of test, but not less than 125% of normal working pressure at highest elevation	1
Separate leakage test	150% of normal average working pressure of segment tested	2

Allowable Leakage. The duration of each leakage test shall be 2 hours, unless otherwise specified, and during the test the main shall be subjected to the pressure required in the following table.

**ALLOWABLE LEAKAGE  
FOR HDPE PRESSURE PIPE**

Nominal Pipe Size (inches)	Average Test Pressure in Line (psi)				
	50 psi	100 psi	150 psi	200 psi	250 psi
	Allowable Leakage Per 1,000 Feet (gal/hr/1,000 ft)				
1	0.05	0.07	0.08	0.10	0.11
1 ¼	0.06	0.08	0.10	0.12	0.13
3	0.14	0.20	0.25	0.29	0.32
4	0.19	0.27	0.33	0.38	0.43
6	0.29	0.41	0.50	0.57	0.64
8	0.38	0.54	0.66	0.76	0.85
10	0.48	0.68	0.83	0.96	1.07
12	0.57	0.81	0.99	1.15	1.28

Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof, to maintain pressure within 5 psi of the specified leakage test pressure after the pipe has been filled with water and the air in the pipeline has been expelled. No installation shall be accepted if the leakage is greater than that determined by the following formula:

$$L = \frac{ND\sqrt{P}}{7400}$$

Where: L = allowable leakage, gph  
N = number of joints in the length of pipeline tested  
D = nominal diameter of the pipe, inch  
P = average test pressure during the leakage test, psig

Leakage values determined by the above formula are to be found in the preceding table.

#### B. AIR PRESSURE TESTING PROCEDURE FOR GRAVITY PIPE

1. All gravity pipe shall be tested in accordance with the testing procedures outlined in Specification Section 02630 – Polyvinyl Chloride Pipe for Gravity Sewer.

### 3.3 PIPE SCHEDULE

- A. High density polyethylene pipe shall be used for the following unless noted otherwise on the Drawings:

<b>SERVICE AND LOCATION</b>	<b>PIPE DIMENSIONS</b>
Sewer Force Main. (6-inch diameter),	SDR 11 ASTM D 3350
Gravity sanitary sewer between MH 8 & MH 9	SDR 11 w/ DIPS O.D. GREY

END OF SECTION

## SECTION 02630

### POLYVINYL CHLORIDE PIPE FOR GRAVITY SEWERS

#### PART 1 - GENERAL

##### 1.1 WORK INCLUDED

- A. The Contractor shall furnish all labor, materials, equipment and accessories required to assemble, install, test, and place into satisfactory service, the PVC piping as specified herein and shown on the Drawings.

##### 1.2 RELATED WORK

- A. Section 02200 - Earthwork.

##### 1.3 SYSTEM DESCRIPTION

- A. PVC piping shall be installed for gravity sewer mains including wyes, bends, laterals, and caps in the locations as shown on the Drawings.

##### 1.4 QUALITY ASSURANCE

- A. The Contractor shall be responsible for ensuring that all equipment installed is properly connected to other related equipment for proper functioning of the system.

##### 1.5 SUBMITTALS

###### A. SHOP DRAWINGS AND ENGINEERING DATA

- 1. Submit complete shop drawings and engineering data to the Engineer in accordance with the requirements of Supplemental Specifications.

##### 1.6 STORAGE AND PROTECTION

- A. Store and protect the PVC pipe in accordance with the Manufacturer's recommendations

##### 1.7 GUARANTEE

- A. Provide a guarantee against defective products and workmanship

##### 1.8 MEASUREMENT AND PAYMENT

- A. Payment for this work will include all equipment, materials and labor necessary to perform the work under this specification as shown on the Drawings and specified herein and included in the Contract. The payment for this work shall be included in the unit price Sanitary Sewer 8 inch PVC, Sanitary Lateral 6 inch PVC, and Sanitary Lateral Cap 6 inch PVC.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Pipe shall meet the requirements of ASTM D 2241 "Standard Specification for Polyvinyl Chloride (PVC) Plastic Pipe (SDR-PR)", class as shown on the Drawings; or AWWA C900, class as shown on the Drawings.
- B. Gasket shall be ASTM F 477, "Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe." Gaskets for pipe 6 inch and larger shall be supplied with retainer rings.
- C. Push-on joint shall meet ASTM D 3212, "Standard Specification for Joints for Drain and Sewer Pipes Using Flexible Elastomeric Seals."
- D. PVC material shall be 12454-B, as defined in ASTM D 1784, "Standard Specification for Rigid Polyvinyl Chloride (PVC) Compounds and Chlorinated Polyvinyl Chloride (CPC) Compounds."

## PART 3 - EXECUTION

### 3.1 EXISTING UTILITIES

- A. Carefully protect from damage at all times all existing sewers, water lines, gas lines, underground conduits, telephone lines, sidewalks, curbs, gutters, pavements, electric lines, or other utilities or structures in the vicinity of the work. Where it is necessary for the proper accomplishment of the work to repair, remove and/or replace any such utility, the work shall be done under the provisions set forth by the affected utility owner.
- B. Sewers to be installed parallel to any existing or proposed water main shall be laid at least 10 feet, horizontally, from the water main. If conditions prevent the 10-foot separation, the sewer may be constructed closer to a water main if it is laid in a separate trench and if the bottom of the water main is at least 18 inches above the top of the sewer.
- C. When sewers cross under water mains, the top of the sewer shall be at least 18 inches below the bottom of the water main. If necessary, the water main shall be relocated to provide this separation or reconstructed with mechanical-joint ductile iron pipe for a distance of 10 feet on each side of the sewer. One full length of water main shall be centered over the sewer so that both joints will be as far from the sewer as possible.
- D. When it is impossible to obtain proper horizontal and vertical separation as stipulated above, both water main and sewer shall be constructed of mechanical-joint ductile iron pipe and shall be pressure tested to assure water tightness.

### 3.2 INSTALLATION

- A. Alignment and Grade. All pipe shall be laid to, and maintained at, the established lines and grades. The Contractor may set line and grade for the sewer by using a laser beam coaxially through the sewer being laid.
- B. Trench Construction
1. Stockpiling Excavated Material: All excavated material shall be stockpiled in a manner that will not endanger the work or obstruct sidewalks and driveways. Hydrants under pressure, valve-pit covers, valve boxes, curb-stop boxes, fire and police call boxes, and other utility controls shall be kept accessible.
  2. Dewatering: Where conditions are such that running or standing water occurs in the trench bottom or the soil in the trench bottom displays a "quick" tendency, the water shall be removed by pumps and other suitable means (such as well points or pervious underdrain bedding) until the pipe has been installed and the backfill has been placed to a sufficient height to prevent flotation of pipe. Generally, a depth of backfill over the top of the pipe equal to 1-1/2 pipe diameters is sufficient to prevent flotation.
  3. Preparation of Trench Bottom: The trench bottom shall be constructed to provide a firm, stable, and uniform support for the full length of the pipe. Bell holes shall be provided at each joint to permit proper assembly and pipe support. Any part of the trench bottom excavated below grade shall be backfilled to grade and shall be compacted as required to provide firm pipe support. When an unstable subgrade condition is encountered that could provide inadequate pipe support, additional trench depth shall be excavated and refilled with suitable foundation material. Ledge rock, boulders, and large stones shall be removed to provide 6 inches of cushion on all sides of the pipe and accessories.
  4. Laying of Pipe: To prevent damage, proper implements, tools, and equipment shall be used for placement of the pipe in the trench. Under no circumstances shall pipe or accessories be dropped into the trench. All foreign matter or dirt shall be removed from the pipe interior. Pipe joints shall be assembled with care. When pipe laying is not in progress, open ends of installed pipe shall be closed to prevent entrance of trench water, dirt, foreign matter, or small animals into the pipeline.
  5. Pipe Embedment: PVC pipe shall be installed with crushed stone (less than 3/4-inch diameter or washed No. 67 stone) or sand bedding providing uniform longitudinal support under the pipe. Backfill material shall be worked under the sides of the pipe to provide satisfactory haunching. Initial backfill material shall be crushed stone and shall be placed to a minimum depth of 12 inches over the top of the pipe as shown on the Drawings. All pipe embedment material shall be selected and placed carefully. Sharp stones and crushed rock (larger than 3/4-inch) which could cause significant scratching or abrasion of the pipe, shall be excluded from the embedment material. Bedding and initial backfill shall be compacted to a minimum of 90 percent standard Proctor.

6. Final Backfill: After placement and compaction of pipe embedment materials and initial backfill, the balance of backfill materials may be machined placed. The material shall contain no large stones or rocks, frozen material or debris. Proper compaction procedures shall be exercised to provide required 90 percent density, standard Proctor. See Section 02200, Earthwork, for backfill requirements in streets, roads, drives, and alleys.

### 3.1 TESTING

- A. All gravity sanitary sewers shall pass the deflection test in accordance with Ohio EPA requirements and ASTM specifications. Deflection testing shall be conducted 30 days after installation and backfilling of the pipe or otherwise directed by the engineer.
  1. The contractor shall furnish all necessary equipment including an approvable mandrel or other approved device and conduct the deflection tests at the direction of the engineer.
  2. The allowable deflection rate shall not exceed 5%. The engineer has the option to require a second test anytime between initial testing and release of the contract bond. Any sections found to have a deflection in excess of the specified rate shall be excavated and corrected either by re-bedding, pipe replacement, or both as directed by the engineer. These corrections shall be required if warranted by either initial or secondary testing.
- B. Internal inspection and video recordings are required on all new sanitary sewers. Inspection and video recording shall be in accordance with ODOT Specification 611.12. The video media must be submitted to the city engineer prior to final acceptance.
- C. All plastic sanitary sewer pipes shall be air tested in accordance with ASTM F-1417.

END OF SECTION

**SECTION 02830**  
**CHAIN LINK FENCING**

**PART 1 - GENERAL**

**1.1 SCOPE**

- A. The work covered by this section includes furnishing all labor, materials, and equipment required to install chain link fence, including all excavation, concrete, and accessories for enclosure of the wastewater treatment plant, as shown on the Drawings or specified herein.
- B. Excavation, backfilling, and concrete shall conform with the requirements of Section 02200, Earthwork, and Section 03300, Cast- in-Place Concrete.

**1.2 SHOP DRAWINGS AND ENGINEERING DATA**

- A. Submit complete shop drawings and engineering data in accordance with the requirements of the Supplemental Specifications.

**1.3 GUARANTEE**

- A. Provide a guarantee against defective products and workmanship.

**1.4 INSTALLER QUALIFICATIONS**

- A. Installer must be experienced in installations of this type. Installer must submit list showing last three installations of this type, project name, and project reference.

**1.5 SAMPLES**

- A. Submit one 6-inch-long sample of each type and size of pipe to be used along with a 1-foot-square section of chain link fabric which will be used on this project. Material mill certifications shall be submitted with shop drawings.

**1.6 MEASUREMENT AND PAYMENT**

- A. Measurement and Payment for this work shall be by unit price and will include all equipment, materials and labor necessary to perform the work under this specification as shown on the Drawings and specified herein and included in the Contract. The payment for this work shall be included in the unit price for Chain Link Fence and Gates, Complete.



## PART 2 - PRODUCTS

### 2.1 CHAIN LINK FENCE

- A. Chain link fence shall be standard 2" mesh opening using No. 9 Gauge hot dipped galvanized wire and shall be constructed of chain link fabric 72 inches high. Chain link fencing shall be coated with not less than 7 mils of green polyvinyl chloride (PVC) plastic resin finish, thermally fused to galvanized steel wire over a thermoset bonding agent. Bond shall be greater than cohesive strength of vinyl. Cut ends shall be coated with PVC. Comply with ASTM F668, Class 2B.
- B. Fabric in fence and gates shall be filled with green privacy slats. Each Slat shall measure 1-11/16-inch X 5-feet 8-1/2-inches and be of a flat tubular design with a wall thickness of 0.030". Bottom and top retaining channels shall be used. Slats and retaining channels shall be high density virgin polyethylene with ultra-violet inhibitors.
- C. Material for pipe sections shall conform to ASTM F 1083. Roll formed sections shall conform to ASTM A 875. Fittings and accessories shall conform to ASTM A 153.
- D. Fence Posts, rails, and caps shall be 10 to 14 mils of green polyvinyl chloride (PVC) plastic resin finish thermally fused to galvanized steel.
- E. End, corner, angle, gate, and pull posts shall be 3-inch outside diameter schedule 40 pipe, fitted with weathertight closure caps with loop to receive top rail or tension wire. Supply one cap per post.
- F. Line posts shall be 2-1/2-inch schedule 40 pipe
- G. Full Weight Concrete with a minimum of strength of 2500 psi shall be used around all posts
- H. Top rail and corner intermediate rail shall be 1-5/8-inch outside diameter steel pipe weighing 2.27 pounds per linear foot or 1.625-inch by 1.25-inch roll-formed section weighing 1.35 pounds per linear foot. Top rails shall be provided with expansion rail couplings spaced at not less than 20-foot intervals.
- I. Braces shall be provided at all corners and wherever fabric is not continuous, such as at gates or at other openings. Braces shall be of the same material as top rail.
- J. A bottom tension wire of galvanized wire rope shall be used.

- K. Fittings used in connection with the fence and gates shall be heavy malleable iron or pressed steel.
- L. A 2-inch padlock and chain conforming to the latest Federal Specifications FF-P-101a, Type Id, shall be furnished with each gate. Three keys shall be furnished with each padlock. Chain shall be welded to the gate and shall lock both gates in the closed position.
- M. Gate frames shall be of 2-inch outside diameter schedule 40 pipe. Corner fittings shall be welded. Fabric shall be same as in fence. Each gate frame shall be equipped with 3/8-inch diameter adjustable truss rod. Gates shall be complete with ball-and-socket hinges, catch and stops. Double gates shall have center rests. Hinges shall provide for swinging the gate open through an arc of not less than 180 degrees. Gates shall be suitably braced and reinforced to prevent sagging. Double gates shall be provided with center plunger rod, catch and semi-automatic outer catches to secure gate in opened position. Pedestrian gates shall have 4-foot openings. Vehicular gates shall be of double swing type with 20-foot opening, unless shown otherwise on the Drawings. Gate openings shall remain unobstructed.
- N. All tension bars shall be 1/4-inch by 3/4-inch ASTM A 36 mild carbon steel, and hot dipped galvanized. Tension bars shall extend the full height of the chain link fabric with no splices. Tension bars shall be held in place by 7/8-inch galvanized tension bands at a maximum spacing of 24 inches.
- O. All ferrous materials entering into the construction of required fencing shall be heavily galvanized by the hot dip process.
- P. Barbed wire shall be installed around the perimeter of the fence. Barbed wire shall be galvanized and use 4 point barbs on 5-inch centers.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. End, corner, and gate posts shall be set in a concrete base not less than 12 inches in diameter which shall extend at least 3 inches below the bottom of the post. The post shall extend to a depth of at least 3 feet below the surface of the ground. A brace shall be spaced midway in height of each end, corner, and gate post and shall extend to the first line post. Braces shall be securely fastened to posts by means of malleable iron connections and trussed from line post back to end, corner, or gate post with a 3/8-inch diameter rod.
- B. Line posts shall be set in a concrete base not less than 10 inches in diameter which shall extend at least 3 inches below the bottom of the post.

The post shall extend to a depth of at least 36 inches below the surface of the ground. Line posts shall be equally spaced along the line of fence at not to exceed 10-foot intervals.

- C. Galvanized steel pipe sleeves, 3-inch O.D. for corner, pull, and gate posts and 2-1/2-inch O.D. for line posts shall be embedded in concrete as shown on the Drawings for all fence posts to be installed on concrete structures.
- D. Top rail shall be installed between line posts. Fabric shall not be erected until concrete has had sufficient time to cure. Chain-link fabric shall be stretched to uniform tightness on the outside of the posts with suitable tools and shall be attached with No. 6 gauge galvanized wire clips. Fabric shall be fastened to line posts at 14-inch intervals with 9 gauge ties. Fabric shall be attached to top rail at 24-inch intervals by 9 gauge tie wires.
- E. A No. 7 gauge galvanized wire shall be stretched along the bottom of the fence and securely fastened to the posts. The chain-link fabric shall be attached to the tension wire at intervals not to exceed 2 feet with No. 9 gauge aluminum coated tie wires.

END OF SECTION

## SECTION 03300

### CAST-IN-PLACE CONCRETE

#### PART 1 - GENERAL

##### 1.1 WORK INCLUDED

- A. This section specifies cast-in-place concrete, including formwork, reinforcing, mix design, placement procedures, and finishes.

##### 1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplemental Conditions or General Provisions and Division 1 specification sections, apply to this section.

##### 1.3 QUALITY ASSURANCE

- A. Codes and Standards. Comply with provisions of following codes, specifications, and standards, except where more stringent requirements are shown or specified:
  - 1. ACI 318, "Building Code Requirements for Reinforced Concrete."
  - 2. Concrete Reinforcing Steel Institute (CRSI), "Manual of Standard Practice."
- B. Concrete Testing. The Owner will engage an independent testing laboratory to conduct testing of materials and concrete to ensure compliance with this Specification.
- C. Materials and installed work may require testing and retesting at any time during progress of work. Tests, including retesting, of rejected materials or installed work which fails its initial testing, shall be done at Contractor's expense.

##### 1.4 SUBMITTALS

###### A. SHOP DRAWINGS AND ENGINEERING DATA

- 1. Submit complete shop drawings and engineering data to the Engineer in accordance with the requirements of the Supplemental Specifications.
- 2. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching

compounds, waterstops, joint systems, curing compounds, and others as requested by Engineer.

3. Shop drawings for reinforcement, describing the fabrication, bending, and placement of concrete reinforcement. Comply with ACI SP-66 (88), "ACI Detailing Manual," showing bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of concrete reinforcement. Include special reinforcement required for openings through concrete structures. Splices, clearances, and tolerances shall comply with ACI 318 requirements.
4. Shop drawings for formwork, prepared by a registered professional engineer, for fabrication and erection of forms for suspended slabs, beams, and other elevated concrete elements.
  - a. Engineer's review is for general design compliance only. Design of formwork for structural stability and efficiency is Contractor's responsibility.
5. Laboratory test reports for concrete materials and mix design test.
6. Materials certificates for the items listed below. Materials certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with or exceeds specified requirements. Provide certification for admixture manufacturers that chloride content complies with specification requirements.
  - a. Aggregates.
  - b. Cement.
  - c. Admixtures.
  - d. Reinforcement (including welds).
  - e. Curing compounds.
  - f. Waterstops.
  - g. Bonding compounds.

#### 1.5 GUARANTEE

- A. Provide a guarantee against defective products and workmanship.

#### 1.6 MEASUREMENT AND PAYMENT

- A. No separate measurement or payment will be allowed for this work. Payment for all work performed under this section shall be included in other items of work.

## PART 2 - PRODUCTS

### 2.1 FORM MATERIALS

- A. Forms for Exposed Finish Concrete. Plywood, metal, metal-framed plywood-faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on Drawings.
  - 1. Use overlaid plywood complying with U.S. Product Standard PS-1 "A- C or B-B High Density Overlaid Concrete Form," Class 1.
  - 2. Plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood," Class 1, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection trademark.
- B. Forms for Unexposed Finish Concrete. Plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Forms for Cylindrical Columns and Supports. Metal, fiberglass-reinforced plastic, or paper or fiber tubes. Provide paper or fiber tubes of laminated plies with water-resistant adhesive and wax-impregnated exterior for weather and moisture protection. Provide units with sufficient wall thickness to resist wet concrete loads without deformation.
- D. Form Coatings. Provide commercial formulation form-coating compounds with a maximum VOC of 350 mg/l that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
- E. Form Ties. Factory-fabricated, adjustable-length, removable or snap-off metal form ties, designed to prevent form deflection and to prevent spalling concrete upon removal. Provide units that will leave no metal closer than 1-1/2 inches to exposed surface. Provide ties that, when removed, will leave holes not larger than 1 inch diameter in concrete surface.

### 2.2 REINFORCING MATERIALS

- A. Reinforcing Bars. ASTM A 615, Grade 60, deformed unless noted otherwise.
- B. Steel Wire. ASTM A 82, plain, cold-drawn steel.
- C. Welded Wire Fabric. ASTM A 185, welded steel wire fabric.

- D. Supports for Reinforcement. Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire-bar-type or plastic supports complying with CRSI specifications.
  - 1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.
  - 2. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs that are plastic protected (CRSI, Class 1) or stainless steel protected (CRSI, Class 2).
  - 3. Bricks or similar objects will not be allowed for use as reinforcement supports.

## 2.3 CONCRETE MATERIALS

- A. Portland Cement. ASTM C 150, Type I.
  - 1. Use one brand of cement throughout project unless otherwise acceptable to the Engineer.
- B. Fly Ash. ASTM C 618, Type C or Type F.
- C. Normal Weight Coarse Aggregate. ASTM C 33, Class Designation 3S, Grading Size No. 57, and as herein specified. Provide coarse aggregate from a single source for all exposed concrete.
- D. Normal Weight Fine Aggregate. Natural siliceous river sand, consisting of hard, clean, sharp, strong, durable, and uncoated particles, conforming to the requirements of ASTM C 33.

Fine aggregate shall have a fineness modulus of 2.40 minimum and 3.00 maximum and the material passing the No. 200 sieve shall not exceed 3.0 percent by weight of the total sample. Coal and lignite shall not exceed 0.5 percent by weight of the total sample for all concrete. The fineness modulus of fine aggregate incorporated in the work shall not vary more than 0.10 plus or minus from the fineness modulus of the fine aggregate in the appropriate preliminary mix design approved by the Engineer.

- E. Water: Drinkable.
- F. Admixtures, General. Provide admixtures for concrete that contain not more than 0.1 percent chloride ions.
  - 1. Available Manufacturers: Provide admixtures from single source manufacturer for air entrainment and water reducing admixtures.

Manufacturers of admixtures shall include but not be limited to the following, provided single source availability requirements are met:

- a. Master Builders, Inc.
  - b. W. R. Grace and Company.
  - c. Euclid Chemical Company.
2. Air-Entraining Admixture. ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
  3. Water-Reducing Admixture: ASTM C 494, Type A.
  4. High-Range Water-Reducing Admixture (Super Plasticizer). ASTM C 494, Type F or Type G.
  5. Water-Reducing, Accelerating Admixture. ASTM C 494, Type E. Accelerating admixtures must be nonchloride type and are for use only when specifically authorized by the Engineer. Submittal of separate mix design using accelerating admixture will be required.
  6. Water-Reducing, Retarding Admixture. ASTM C 494, Type D. Retarding admixtures must be nonchloride type and are for use only when specifically authorized by the Engineer. Submittal of separate mix design using retarding admixture will be required.

## 2.4 RELATED MATERIALS

- A. Waterstops. Provide waterstops at construction joints and other joints as indicated on the Drawings.
  1. Polyvinyl Chloride Waterstops. Corps of Engineers CRD-C 572.
    - a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the work include, but are not limited to, the following:
      - 1) The Burke Company.
      - 2) Greenstreak Plastic Products Company.
      - 3) W. R. Meadows, Inc.
      - 4) Vinylex Corp.
    - b. PVC water stops shall be ribbed with a minimum nominal width of 6 inches and a minimum nominal thickness of 3/16 inches. Control joints shall utilize dumbbell type water stop.
  2. Bentonite Clay Waterstops. Specially formulated joint sealant, manufactured in coils with a rectangular cross section, which swells upon



contact with water. Adhesive supplied by the water stop manufacturer shall be used to secure the waterstop to existing concrete prior to placing adjoining concrete.

- a. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, "Waterstop-RX," American Colloid Company.
- B. Granular Base. Evenly graded mixture of fine and coarse aggregates to provide, when compacted, a smooth and even surface below slabs on grade.
- C. Sand Cushion. Clean, manufactured or natural sand.
- D. Vapor Barrier. Multi-ply lamination of polyethylene film and glass scrim reinforced paper to form a moisture, scuff, and puncture-resistant membrane. Moisture permeance shall not exceed 0.10 perms in accordance with ASTM E 96, Procedure A.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:
    - a. "Moistop," St. Regis Paper Company.
    - b. "Plybar," Glas-Kraft.
- E. Liquid Membrane-Forming Curing Compound. Liquid-type membrane-forming curing compound with fugitive dye complying with ASTM C 309, Type I-D, Class A. Moisture loss not more than 0.055 gr./sq. cm. when applied at 200 sq. ft./gal.
1. Available Products: Subject to compliance with requirements, manufacturers whose products may be incorporated in the work include, but are not limited to, the following:
    - a. Dayton Superior Corp.
    - b. Euclid Chemical Co.
    - c. Sonneborn-Rexnord.
- F. Epoxy Bonding Agent. ASTM C 881, two-component material suitable for use on dry or damp surfaces. Provide material "Type," "Grade," and "Class" to suit project requirements.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:
    - a. "Burke Epoxy M.V.," The Burke Company.
    - b. "Euco Epoxy System #452 or #620," Euclid Chemical Co.

- c. "Sikadur 32 Hi-Mod," Sika Corporation.
- G. Chemical Hardener. U.S. Army Corps of Engineers Specification 204, liquid hardener composed of magnesium and zinc fluorosilicates combined with an anionic surfactant to improve wetting penetration. Hardener to be colorless, nontoxic, nonflammable, and compatible with and providing good adhesion for subsequent topping and/or coatings. Install hardener in accordance with manufacturer's recommendations on interior concrete floors of shops, garages, vehicle service areas, and elsewhere as indicated on the Drawings.
  - 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:
    - a. "Lapidolith," Sonneborn.
- H. Joint Filler. At joints in slabs and elsewhere as indicated on the Drawings, use preformed strips of asphalt saturated fiberboard (½-inch nominal thickness) complying with ASTM D 1751.
- I. Epoxy Grout. Epoxy grout for installing rubber form tie plugs shall be as follows:
  - 1. Sikadur 32 Hi-Mod, Sika Corporation.

## 2.5 PROPORTIONING AND DESIGN OF MIXES

- A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If trial batch method used, use an independent testing facility acceptable to the Engineer for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing.
  - 1. Fly ash may be substituted for cement in amounts not to exceed 20 percent of the specified cement content by weight providing that the mix conforms with all other requirements.
- B. Submit written reports to the Engineer of each proposed mix for each class of concrete at least 15 days prior to start of concrete placement. Do not begin concrete production until proposed mix designs have been reviewed by the Engineer.
- C. Design mixes to provide normal weight concrete with the following properties:

Property	Concrete Class	
	A	B
28-day Compressive Strength:		
Average of Three Consecutive Specimens	4,000 psi	2,500 psi
Minimum Any One Specimen	3,200 psi	2,000 psi
Minimum Cement Content (sacks/cubic yard)	6.5	5.0
Maximum Water-to-Cement Ratio:		
By Weight (pound/pound)	0.49	0.54
By Sack (gallon/sack)	5.5	6.0
Air Content (percent by volume):		
Minimum	4.5	4.5
Maximum	5.5	5.5
Ratio of Coarse to Fine Aggregate (by weight):		
Minimum	1.0	1.0
Maximum	2.0	2.5

Class "A" concrete shall be used for all concrete work unless Class "B" is specifically called for on the Drawings.

- D. Adjustment to Concrete Mixes. Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by the Engineer. Laboratory test data for revised mix design and strength results must be submitted to and accepted by The Engineer before using in work.

## 2.6 ADMIXTURES

- A. Use water-reducing admixture or high-range water-reducing admixture (Superplasticizer) in all concrete.
- B. Use nonchloride accelerating admixture in concrete placed at ambient temperatures below 50°F (10°C) when authorized by the Engineer.
- C. Use high-range water reducing admixture (HRWR) in pumped concrete.
- D. Admixtures. Use admixtures for water reduction and set control in strict compliance with manufacturer's directions.

## 2.7 SLUMP LIMITS

- A. Proportion and design mixes to result in concrete slump at point of placement as follows:
1. Ramps, slabs, and sloping surfaces: Not more than 3 inches.
  2. Walls and Columns: 3 to 4 inches.

3. Floors and slabs: 3 to 4 inches.
4. Beams: 3 to 4 inches.
5. Blocks and Footings: 2 to 4 inches.

Concrete having a slump greater than 1 inch over the specified maximum shall be rejected.

- B. Pumped Concrete. The maximum slump of the concrete at the suction of the pump may be increased above the maximum slumps specified in 2.7 A. by the addition of high range water reducing agent at the jobsite in accordance with the manufacturer's recommendations. The adjustment to the slump shall be only that required to overcome the slump loss in the pumping equipment. In no circumstance shall the slump exceed 6 inches at the suction or discharge of the pump.
- C. Congested Placement. When specifically requested in writing by the Contractor and approved by the Engineer, increases in discharge slumps may be considered in placements that include congested areas of reinforcement or areas otherwise deemed to be difficult to place concrete and achieve necessary consolidation. The increases in slump, if approved, shall be achieved by the addition of high range water reducing agent at the site in accordance with the manufacturer's instructions. The request shall include the proposed amount of slump increase and the amount of high range water reducer to be added. The Engineer will evaluate each request independently.

## 2.8 CONCRETE MIXING

- A. Job-Site Mixing. Only allowed when specifically authorized by the Engineer.
- B. Ready-Mix Concrete. Comply with requirements of ASTM C 94, and as specified.
  1. When air temperature is between 85°F (30°C) and 90°F (32°C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90°F (32°C), reduce mixing and delivery time to 60 minutes.

## 2.9 EPOXY ANCHORS AND DOWELS

- A. Anchors. Unless shown otherwise, dowels or anchors placed in existing or hardened concrete shall be stainless steel Type 316 ASTM F 593 and ASTM F 594, threaded rod with hex nuts.
- B. Epoxy adhesive shall be as follows:
  1. Two component, 100% solid (containing no solvents), non-sag paste, insensitive to moisture, gray in color.

2. Conform to NSF Standard 61 for use in conjunction with drinking water systems.
3. Conform to ASTM C 881-90; Type IV; Grade 3; Class A, B, and C with the exception of gel time.
4. Maximum shrinkage during cure per ASTM D 2566 of 0.00051 in./in.
5. Compressive strength, ASTM D 695: 10,300 psi minimum.
6. Shelf life: 3 years minimum.
7. Water solubility: None.
8. Heat deflection temperature, ASTM D648: 140°F minimum.
9. Epoxy adhesive shall be Epcon C-6, manufactured by ITW Ramset.

## PART 3 - EXECUTION

### 3.1 GENERAL

- A. Coordinate the installation of joint materials and vapor barriers with placement of forms and reinforcing steel.

### 3.2 FORMS

- A. General. Design, erect, support, brace, and maintain formwork to support vertical and lateral, static and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances complying with ACI 347.
- B. Construct forms to sizes, shapes, lines, and dimensions shown and to obtain accurate alignment, location, grades, level, and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent leakage of cement paste.
- C. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is

too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.

- D. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- E. Chamfer exposed corners and edges at 3/4 inch unless indicated otherwise on the Drawings, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- F. Provisions for Other Trades. Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.
- G. Cleaning and Tightening. Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before concrete is placed. Retighten forms and bracing before concrete placement as required to prevent mortar leaks and maintain proper alignment.

### 3.3 VAPOR BARRIER INSTALLATION

- A. General. Following leveling and tamping of granular base for slabs on grade, place vapor barrier sheeting with longest dimension parallel with direction of pour.
- B. Lap joints 6 inches and seal vapor barrier joints with manufacturers' recommended mastic and pressure-sensitive tape.

### 3.4 PLACING REINFORCEMENT

- A. General. Comply with ACI 318 and the CRSI's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports and as herein specified.
  - 1. Avoiding cutting or puncturing vapor retarder during reinforcement placement and concreting operations.
  - 2. Field bending of reinforcement using heat and/or welding of reinforcement is NOT permitted.

- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as approved by The Engineer.
- D. Place reinforcement to obtain at least minimum coverage for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
  - 1. All bars on face of concrete cast against earth shall have 3 inches clear cover.
  - 2. All bars on face of concrete exposed or otherwise not cast against earth shall have clear cover as follows:
    - a. Bars No. 5 and smaller shall have 1.5 inches clear cover.
    - b. Bars No. 6 and larger shall have 2 inches clear cover.
- E. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.
- F. Install dowels into existing concrete using EPCON C-6 ceramic epoxy as indicated on the Drawings and conforming to the provisions of this section.

### 3.5 JOINTS

- A. Construction and Control Joints. Locate and install construction and control joints as indicated or, if not indicated, locate so as not to impair strength and appearance of the structure, as acceptable to The Engineer.
  - 1. Provide keyways at least 1-1/2 inches deep with a width of approximately one-half the thickness of the thinnest section being joined at construction and control joints in walls, slabs, between walls and slabs, and between walls and footings unless otherwise indicated. Acceptable bulkheads designed for this purpose may be used for slabs.
  - 2. Place construction and control joints perpendicular to main reinforcement. Continue reinforcement across construction joints except as otherwise indicated. Do not continue reinforcement through sides of strip placements or at control joints.
  - 3. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete at construction joints.

4. Wall and Structural Slab Construction Joints. Provide construction joints in walls and structural slabs as indicated or as specified herein if not indicated. Construction joints shall be placed in walls and structural slabs at intervals indicated on the Drawings or at intervals not exceeding 48 feet in any direction if not indicated on the Drawing unless authorized by the Engineer.
- B. Waterstops. Provide waterstops in construction and control joints as indicated. Install waterstops to form continuous diaphragm in each joint in strict accordance with manufacturer's instructions. Make provisions to support and protect exposed waterstops during progress of work. Field-fabricate joints in waterstops in accordance with manufacturer's printed instructions.
  - C. Isolation Joints in Slabs-on-Ground for Floors of Buildings, Sidewalks, and Driveways. Construct isolation joints in slabs-on-ground at points of contact between slabs-on-ground and vertical surfaces, such as column pedestals, foundation walls, grade beams, and elsewhere as indicated. Construct isolation joints using preformed joint filler board.
  - D. Contraction Joints in Slabs-on-Ground for Floors of Buildings, Sidewalks, and Driveways. Construct contraction joints in slabs-on-ground to form panels of patterns as shown. Use saw cuts 1/8 inch wide by 1/4 of slab depth or inserts 1/4 inch wide by 1/4 of slab depth, unless otherwise indicated.
    1. Form contraction joints by inserting premolded plastic, hardboard, or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris.
    2. Begin saw cutting of contraction joints in floor slabs as soon as possible after slab finishing as may be safely done without dislodging aggregate. Saw cutting must be completed within 8 hours following slab placement.
    3. If joint pattern is not shown, provide joints not exceeding 15 feet in either direction and locate to conform to bay spacing wherever possible (at column centerlines, half bays, third bays).

### 3.6 INSTALLATION OF EMBEDDED ITEMS

- A. General. Set and build into work anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached thereto.
- B. Forms for Slabs. Set edge forms, bulkheads, and intermediate screed strips for slabs to obtain required elevations and contours in finished surfaces. Provide



and secure units to support screed strips using strike-off templates or compacting-type screeds.

### 3.7 PREPARATION OF FORM SURFACES

- A. General. Coat contact surfaces of forms with an approved, nonresidual, low-VOC, form-coating compound before reinforcement is placed.
- B. Do not allow excess form-coating material to accumulate in forms or to come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.
- C. Coat steel forms with a nonstaining, rust-preventative material. Rust-stained steel formwork is not acceptable.

### 3.8 CONCRETE PLACEMENT

- A. Inspection. Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work.
- B. General. Comply with ACI 304, "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete," and as herein specified.
- C. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete that has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete to avoid segregation at its final location.
- D. Placing Concrete in Forms. Deposit concrete in forms in horizontal layers not deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
  - 1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI 309.
  - 2. One operable, back-up, mechanical vibrator shall be on site prior to beginning concrete placement.
  - 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each

insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.

- E. Placing Concrete Slabs. Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.
1. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
  2. Bring slab surfaces to correct level with straightedge and strike off. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
  3. Maintain reinforcing in proper position during concrete placement.
- F. Cold-Weather Placing. If permitted by the Engineer, comply with provisions of ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
1. When air temperature has fallen or is expected to fall below 40°F (4 C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50°F (10°C) and not more than 80°F (27°C) at point of placement.
  3. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
  4. Do not place concrete on or against any formwork that has an accumulation of ice or snow. Remove ice or snow by manual means and by melting with heat. Do not melt snow or ice by the application of melting agents or chemicals.
  5. Do not use calcium chloride, salt, and other materials containing antifreeze agents or chemical accelerators unless authorized by the Engineer.
  6. Provide adequate means for maintaining the temperature of the air surrounding the concrete at 70°F for three days, or 50°F for five days, or for as long as is necessary to ensure proper curing of the concrete. Rapid cooling of the concrete shall be prevented. Housing, covering, or other protection used in connection with heating shall remain in place and intact at least 24 hours after the artificial heat is discontinued.

- G. Hot-Weather Placing. When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.
1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 85°F. Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing water. Use of liquid nitrogen to cool concrete is Contractor's option.
  2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
  3. Fog spray forms, reinforcing steel, and subgrade just before concrete is placed.
  4. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, when acceptable to The Engineer.

### 3.9 FINISH OF FORMED SURFACES

- A. Coordinate finish requirements with surface preparation requirements for concrete to be coated in accordance with Section 09900, Painting.
- B. Provide rough form finish for formed concrete surfaces not exposed to view in the finish work or concealed by other construction. This is the concrete surface having texture imparted by form-facing material, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4-inch in height rubbed down or chipped off.
- C. Provide smooth form finish for formed concrete surfaces exposed to view or to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or other similar system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.
- D. Grout-Cleaned Finish. Provide grout-cleaned finish as follows to concrete surfaces that have received smooth form finish treatment not to be coated with paint, waterproofing, dampproofing, or other similar system.
1. Combine one part portland cement to 1-1/2 parts fine sand by volume, and a 50:50 mixture of acrylic-based bonding admixture and water to consistency of thick paint. Blend standard portland cement and white

portland cement, amounts determined by trial patches, so that final color of dry grout will match adjacent surfaces.

2. Thoroughly wet concrete surfaces, apply grout to coat surfaces, and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least 36 hours after rubbing.
- E. Related Unformed Surfaces. At tops of walls, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

### 3.10 MONOLITHIC SLAB FINISHES

- A. Coordinate finish requirements with surface preparation requirements for concrete to be coated in accordance with Section 09900, Painting.
- B. Float Finish. Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified; slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo; and as otherwise indicated.
  1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared, when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats or by hand-floating if area is small or inaccessible to power units. Check and level surface plane to a tolerance of plus or minus 1/4-inch as measured from a 10-foot straight edge. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.
- C. Trowel Finish. Apply trowel finish to monolithic slab surfaces to be exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or other thin film finish coating system.
- D. Trowel and Fine Broom Finish. Where ceramic or quarry tile is to be installed with thin-set mortar, apply trowel finish as specified, then immediately follow with slightly scarifying surface by fine brooming.
- E. Nonslip Broom Finish. Apply nonslip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with The Engineer before application.

### 3.11 CONCRETE CURING AND PROTECTION

- A. General. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather, protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply in accordance with manufacturer's instructions after screeding and bull floating, but before power floating and troweling.
- B. Initial Curing. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing.
- C. Curing Methods. Perform curing of concrete by curing and sealing compound, by moist curing, by moisture-retaining cover curing, and by combinations thereof, as herein specified. Select curing method appropriate for subsequent coating and finishing requirements. Coordinate curing methods with Section 09900, Painting, for concrete to be painted.
  1. Provide moisture curing by either of the following methods or combination thereof, maintaining concrete surface moisture for seven days:
    - a. Keep concrete surface continuously wet by covering with water.
    - b. Use continuous water-fog spray.
    - c. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water, and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4-inch lap over adjacent absorptive covers.
  2. Moisture-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape. Maintain concrete surface moisture for seven days.
  2. Curing and sealing compound, when utilized, shall be applied as follows:
    - a. Flatwork: Apply curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall

within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.

- b. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.
  - c. Formed Surfaces: Apply curing and sealing compound upon removal of form work.
4. Curing Formed Surfaces. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.
5. Curing Unformed Surfaces. Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces, by application of appropriate curing method.
- a. Cure concrete surfaces to receive liquid floor hardener or other finish by use of moisture-retaining cover, unless otherwise directed.

### 3.12 REMOVAL OF FORMS

- A. General. Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50°F (10°C) for 72 hours after placing concrete, provided curing and protection operations are maintained.
- B. Formwork supporting weight of concrete, such as beams, soffits, joists, slabs, and other structural elements, may not be removed in less than 14 days and until concrete has attained at least 75 percent of design minimum compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.
- C. Form-facing material may be removed 4 days after placement only if shores and other vertical supports have been arranged to permit removal of form-facing material without loosening or disturbing shores and supports.

### 3.13 REUSE OF FORMS

- A. Clean and repair surfaces of forms to be reused in work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-coating compound as specified for new formwork.

- B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces except as acceptable to The Engineer.

### 3.14 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In. Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.
- B. Curbs. Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations. Provide machine and equipment bases and foundations, as shown on Drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment. Anchor bolts set into existing concrete shall utilize EPCON C-6 ceramic epoxy.
- D. Reinforced Masonry. Provide concrete grout for reinforced masonry lintels and bond beams where indicated on Drawings and as scheduled. Maintain accurate location of reinforcing steel during concrete placement.
- E. Concrete Embedment and Encasement of Pipe. Install concrete for embedment and encasement where indicated on the Drawings and at such locations where installation conditions require such pipe support as determined by the Engineer. Embedment and encasement of pipe shall be preceded by the following preliminary steps:
  - 1. Remove all loose material from the trench prior to placing concrete. All concrete shall have a continuous contact with undisturbed soil on sides and bottom of trench.
  - 2. Accurately place a base course of concrete to such grade and elevation that the pipe will be at specified grade when pipe bells are supported on, and in contact with, the top surface of the base course.
  - 3. Restrain each length of pipe to maintain alignment and prevent floatation in a manner acceptable to the Engineer.

### 3.15 CONCRETE SURFACE REPAIRS

- A. Patching Defective Areas. Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to The Engineer.
1. Cut out honeycomb, rock pockets, voids over 1/4-inch in any dimension, and holes left by tie rods and bolts, down to solid concrete but in no case to a depth of less than 1-inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with specified bonding agent. Place patching mortar before bonding compound has dried.
  2. For exposed-to-view surfaces, blend white portland cement and standard portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- B. Repair of Formed Surfaces. Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of The Engineer. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes, fill with dry-pack mortar, or precast cement cone plugs secured in place with bonding agent.
1. All tie holes shall be filled with non-shrink grout a minimum of 1.5 inches in depth from each surface.
  2. Tie holes from tie systems using through-the-wall bolts shall be plugged using rubber plugs manufactured for use with form tie systems. Plugs shall be set in place as instructed by the manufacturer. After setting plugs, fill hole with epoxy grout to within 1.5 inches of the formed surface on each side of the plug.
  3. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.
- C. Repair of Unformed Surfaces. Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having required slope.



1. Repair finished unformed surfaces that contain defects that affect durability of concrete. Surface defects, as such, include crazing and cracks in excess of 0.01-inch wide or that penetrate to reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycomb, rock pockets, and other objectionable conditions.
  2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.
  3. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with patching compound. Finish repaired areas to blend into adjacent concrete.
  4. Repair defective areas, except random cracks and single holes not exceeding 1-inch-diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
- D. Repair isolated random cracks and single holes not over 1-inch-diameter by dry-pack method. Groove top of cracks and cut out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry-pack, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry-pack before bonding compound has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.
- E. Perform structural repairs with prior approval of The Engineer for method and procedure, using specified epoxy adhesive and mortar.
- F. Repair methods not specified above may be used, subject to acceptance of The Engineer.

### 3.16 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. General. The Owner will employ a testing laboratory to perform tests and to submit test reports.
- B. Field Sampling and Testing. During concreting operations, the Engineer will periodically require additional field inspection, sampling, and testing of cement,

aggregate, and/or concrete by an independent testing laboratory in order to determine if the requirements of this specification section are being satisfied.

1. Field sampling and testing of cement, aggregate, and concrete will be performed according to the following ASTM standards at a frequency determined by the Engineer:

- a. Aggregate
  - 1) Sampling                   ASTM D 75
  - 2) Testing                    Any test specified in ASTM C 33
  
- b. Cement
  - 1) Sampling                   ASTM C 183
  - 2) Testing                    Any test specified in ASTM C 150
  
- c. Concrete
  - 1) Sampling                    ASTM C 172
  - 2) Slump Test                 ASTM C 143
  - 3) Air Content Test           ASTM C 231
  - 4) Making and Curing Test Cylinders   ASTM C 31
  - 5) Compression Strength Tests         ASTM C 39

2. Compressive strength testing will consist of making, curing, and testing cylinders of concrete. A total of six test cylinders will be prepared from each sample of concrete to be tested. Two test cylinders will be broken at an age of 7 days, three test cylinders will be broken at an age of 28 days, and the remaining test cylinders will be held in reserve. The minimum number of samples and test cylinders to be taken is as follows:

Total Size of Pour (CY)	Number of Samples	Number of Cylinders
1 – 100	1	6
101 – 200	2	12
201 - 300	3	18
Over 300	1/100 CY	6/100 Cy

3. Test cylinders will normally be laboratory-cured. However, the Engineer may require tests on field-cured specimens to check the adequacy of curing operations.

4. A slump test and an air content test will be performed on each sample of concrete tested for compressive strength.

5. Cement and aggregate will be subject to inspection, sampling, and field testing at the batching plant. Concrete will be subject to inspection, sampling, and field testing at the place of concrete placement.
  6. All field sampling, field testing, making and curing of field test cylinders, and laboratory testing performed during concreting operations for the purpose of determining if the requirements of this specification section are being satisfied shall be conducted by an independent testing laboratory selected by the Owner and paid for directly by the Owner and not as a part of this Contract.
  7. Furnish the testing laboratory representative satisfactory samples of cement, aggregate, and concrete for inspection and testing purposes. The Contractor shall furnish any barrows, shovels, mixing boards, shaded area for preparing test cylinders, and similar equipment required by the testing laboratory representative for securing samples, making test cylinders, and conducting field tests.
- C. Test results will be reported in writing to The Engineer, Ready-Mix Producer, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.
- D. Nondestructive Testing. Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
- E. Additional Tests. The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by The Engineer. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for any and all such tests.

### 3.17 LOADS APPLIED TO NEW CONCRETE

- A. Loads including, but not limited to, earth loads, loads exerted from bracing or shoring, wind loads, hydrostatic or hydraulic loads, equipment or vehicle loads, or loads exerted by stacked materials, shall not be applied to fresh concrete until the concrete has reached its specified 28-day strength.
- B. Concrete which has cracked due to overloading, loading before required strength has developed, or otherwise damaged shall be repaired or replaced as determined by the Engineer.

### 3.18 INSTALLATION OF EPOXY ANCHORS AND DOWELS

- A. Verify number, size, depth, and location of anchors or dowels to be installed.
- B. Drill holes in concrete to the depth specified on the Drawings using methods as instructed by the epoxy manufacturer. The diameter of holes shall be as instructed by the epoxy manufacturer for the anchor or dowel being installed. Clean holes as instructed by the epoxy manufacturer.
- C. Install epoxy in strict accordance with the manufacturer's instructions using guns with self-mixing nozzles provided by the manufacturer. Verify epoxy is mixed prior to placement into the hole using methods per manufacturer's instructions. Insert dowel or anchor into the hole and hold steady as instructed by the manufacturer.

END OF SECTION

**SECTION 05500**  
**METAL FABRICATIONS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

A. This section includes the following metal fabrications:

1. Ladders.
2. Ladder safety cages.
3. Loose bearing and leveling plates.
4. Loose steel lintels.
5. Miscellaneous structural steel framing and supports.
  - a. Applications where framing and supports are not specified in other sections.
6. Miscellaneous steel trim.
7. Metal bar gratings.
8. Floor plate and supports.
9. Pipe railings.
10. Metal stairs.
11. Pipe bollards.
12. Expansion (epoxy-set) anchors.
13. Bird Screen.
14. Metal Castings – trench frames and grated covers.

## 1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions or General Provisions and Supplementary Specifications

## 1.3 DEFINITIONS

- A. Definitions in ASTM E 985 for railing-related terms apply to this section.

## 1.4 SYSTEM PERFORMANCE REQUIREMENTS

- A. Structural Performance. Design, engineer, fabricate, and install the following metal fabrications to withstand the following structural loads without exceeding the allowable design working stress of the materials involved, including anchors and connections. Apply each load to produce the maximum stress in each respective component of each metal fabrication.

1. Top Rail of Handrail Systems: Capable of withstanding the following loads applied as indicated:
  - a. Concentrated load of 300 pounds applied at any point nonconcurrently, vertically downward, or horizontally.
  - b. Uniform load of 100 pounds per linear foot applied vertically and concurrently with a uniform load of 50 lbs/ft applied horizontally.
  - c. Concentrated and uniform loads above need not be assumed to act concurrently.
2. Handrails Not Serving as Top Rails: Capable of withstanding the following loads applied as indicated:
  - a. Concentrated load of 200 pounds applied at any point nonconcurrently, vertically downward, or horizontally.
  - b. Uniform load of 50 pounds per linear foot applied nonconcurrently, vertically downward, or horizontally.
  - c. Concentrated and uniform loads above need not be assumed to act concurrently.
3. Stair Treads: Capable of withstanding a concentrated load of 300 pounds on front 5 inches of tread at the center of the tread length and a deflection of no greater than 1/240 of length.

4. Stair Platforms: Capable of withstanding a uniform load of 100 pounds per square foot.
5. Floor Gratings: Capable of withstanding a uniform load of 250 pounds per square foot or a concentrated load of 300 pounds per foot of grating width, whichever produces the greater stress. No grating shall be installed which deflects more than  $\frac{1}{4}$  inch under a uniform load of 100 pounds per square foot.

#### 1.5 SUBMITTALS

- A. Submit the following in accordance with Conditions of Contract and Supplemental Specifications.
- B. Product data for products used in miscellaneous metal fabrications, including paint products and grout.
- C. Shop drawings detailing fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide templates for anchors and bolts specified for installation under other sections.
  1. Where installed metal fabrications are indicated to comply with certain design loadings, include structural computations, material properties, and other information needed for structural analysis that has been signed and sealed by the qualified professional engineer who was responsible for their preparation.
- D. Welder certificates signed by Contractor certifying that welders comply with requirements specified under "Quality Assurance" article.

#### 1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications. Firm experienced in successfully producing metal fabrications similar to that indicated for this Project, with sufficient production capacity to produce required units without causing delay in the work.
- B. Qualify welding processes and welding operators in accordance with AWS D1.1 "Structural Welding Code - Steel," D1.3 "Structural Welding Code - Sheet Steel," and D1.2 "Structural Welding Code - Aluminum."
  1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.
- C. Engineer Qualifications. Professional engineer licensed to practice in jurisdiction where Project is located and experienced in providing engineering services of the

kind indicated that have resulted in the successful installation of metal fabrications similar in material, design, and extent to that indicated for this Project.

## 1.7 PROJECT CONDITIONS

- A. Field Measurements. Where possible, check actual locations of walls and other construction to which metal fabrications must fit, by accurate field measurements before fabrication; show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of work.
  - 1. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabrication of products without field measurements. Coordinate construction to ensure that actual opening dimensions correspond to guaranteed dimensions. Allow for trimming and fitting.

## 1.8 SEQUENCING AND SCHEDULING

- A. Sequence and coordinate installation of wall handrails as follows:
  - 1. Mount handrails only on completed walls. Do not support handrails temporarily by any means not satisfying structural performance requirements.

## 1.9 MEASUREMENT AND PAYMENT

- A. No separate measurement or payment will be allowed for this work. Payment for all work performed under this section shall be included in other items of work.

## PART 2 - PRODUCTS

### 2.1 FERROUS METALS

- A. Metal Surfaces, General. For metal fabrications exposed to view upon completion of the Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, rolled trade names, roughness, and, for steel sheet, variations in flatness exceeding those permitted by reference standards for stretcher-leveled sheet.
- B. Steel Plates, Shapes, and Bars.
  - 1) W Shapes. ASTM A 992.
  - 2) C and S Shapes. ASTM A 36.

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- 3) CEE and ZEE (purlins and girts). ASTM A 570 Grade 33 (min).
- 4) Steel Plates, Angles, and Bars. ASTM A 36

- C. Rolled Steel Floor Plates. ASTM A 786.
- D. Steel Bars for Gratings. ASTM A 569 or ASTM A 36.
- E. Wire Rod for Grating Cross Bars. ASTM A 510.
- F. Cold-Formed Steel Tubing. ASTM A 500; Grade B, unless otherwise indicated or required for design loading.
- G. Galvanized Steel Sheet. ASTM A 446; Grade A, unless another grade required for design loading, and G90 coating designation unless otherwise indicated.
- H. Steel Pipe. ASTM A 53; finish, type, and weight class as follows:
  - 1. Galvanized finish for exterior installations and where indicated.
  - 2. Type S, Grade B, standard weight (Schedule 40), unless otherwise indicated, or another weight required by structural loads.
- I. Gray Iron Castings. ASTM A 48, Class 25 or better.
- J. Welding Rods and Bare Electrodes. Select in accordance with AWS specifications for the metal alloy to be welded.

## 2.2 STAINLESS STEEL

- A. Bar Stock and Shapes. ASTM A 276, Type 304 or 316.
- B. Plate. ASTM A 240, Type 304 or 316.
- C. Bolts and Nuts. ASTM F 593 and ASTM F 594, Type 304 or 316.
- D. Pipe. ASTM A376, Type 304 or 316, Seamless Schedule 40, unless otherwise indicated on the Drawings.
- E. Bird Screen. Type 304, stainless steel wire cloth, minimum wire diameter 0.063 inch, No. 2 mesh.

## 2.3 ALUMINUM

- A. Extruded Bars and Shapes. ASTM B 221, alloys as follows:

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1. 6061-T6 or 6063-T6 for bearing bars of gratings and shapes.
  2. 6061-T1 for grating cross bars.
- B. Aluminum-Alloy Floor (Tread) Plate. ASTM B 632, Alloy 6061-T6.
- C. Aluminum Sheet. ASTM B 209, Alloy 6061-T6.
- D. Fasteners for Aluminum Gratings. Use fasteners made of same basic metal as fastened metal or stainless steel fasteners. Do not use metals that are corrosive or incompatible with metals joined.
- E. Rolled Sections. ASTM B 308, Alloy 6061-T6.
- F. Pipe. ASTM B 429, Alloy 6061-T6 or 6063-T6.
- G. Castings. ASTM B 26 or B 85.
- H. Handrail. ASTM B 221, Alloy 6105-T5.

## 2.4 GROUT

- A. Nonshrink Nonmetallic Grout. Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with CE CRD-C 621. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.
- B. Available Products. Subject to compliance with requirements, non-shrink nonmetallic grouts that may be incorporated in the work include but are not limited to the following:
1. "Bonsal Construction Grout;" W. R. Bonsal Co.
  2. "Diamond-Crete Grout;" Concrete Service Materials Co.
  3. "Euco N-S Grout;" Euclid Chemical Co.
  4. "Kemset;" Chem-Masters Corp.
  5. "Crystex;" L&M Construction Chemicals, Inc.
  6. "Masterflow 713;" Master Builders.
  7. "Sealtight 588 Grout;" W. R. Meadows, Inc.
  8. "SonogROUT;" Soneeborn Building Products Div., Rexnord Chemical Products, Inc.
  9. "Stonecrete NM1;" Stonhard, Inc.
  10. "Five Star Grout;" U. S. Grout Corp.
  11. "Vibropruf #11;" Lambert Corp.

## 2.5 FASTENERS

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- A. General. Provide zinc-coated steel fasteners unless otherwise indicated. Select fasteners for the type, grade, and class required.
  
- B. Connectors and Accessories
  - 1. High Strength Bolts: ASTM A 325.
  - 2. Unfinished Bolts: ASTM A 307, Grade B, cadmium plated.
  - 3. Self-Locking Nuts: Prevailing torque type; IFI-100, Grade A.
  - 4. Flat Washers: ANSI B 27.2.
  - 5. Lock Washers: Spring type, ANSI B 27.1.
  - 6. Beveled Washers: Table 1 of "Specifications for Structural Joints Using ASTM A 325 or A 490 Bolts," AISC Steel Construction Manual.
  
- C. Connection Requirements
  - 1. Make connections not specifically detailed on Drawings using Tables I and III, Framed Beam Connections, in the latest edition of the AISC manual. The shop fabricated portion of structural connections may be bolted, welded, or riveted. Except for connections detailed on the Drawings or specified otherwise, make all field connections with ASTM A 325 high-strength bolts.
  - 2. Connections for miscellaneous metal work not included in the AISC definition of structural steel may be made with unfinished bolts. All unfinished bolts shall be equipped with self-locking nuts or lock washers.
  - 3. Install high-strength bolts using turn-of-nut tightening as described in "Specifications for Structural Joints Using ASTM A 325 or A 490 Bolts" as set forth in the AISC manual. Beveled washers shall be used when the bearing faces of bolted parts have a slope of 1:20 or greater with respect to a plane perpendicular to the bolt axis. Provide a platform or other means of access at each field connection until the connection has been inspected by the Engineer.
  - 4. Field welded connections will not be acceptable for structural steel unless shown on the Drawings or specifically permitted by the Engineer. Where structural or miscellaneous steel connections are welded, all butt and miter welds shall be continuous and where exposed to view shall be ground smooth. In addition, intermittent welds shall have an effective length of at least 2 inches and shall be spaced not more than 6 inches apart.

## 2.6 PAINT AND GALVANIZING

- A. Shop surface preparation and painting of elements not shown to be galvanized shall comply with applicable requirements of Section 09910, Painting.
- B. Steel members, fabrications, and assemblies shown to be galvanized after fabrication shall be treated as follows:
  - 1. Hot dip galvanize in accordance with ASTM A 123.
  - 2. Zinc used for galvanizing shall conform with ASTM B 6.
  - 3. Weight of zinc coating to conform to requirements specified under "Weight of Coating" in ASTM A 123.
  - 4. Safeguard against steel embrittlement in conformance with ASTM A 143.
  - 5. Safeguard against warpage or distortion of steel members in conformance with ASTM A 384. Notify Engineer of potential warpage problems which may require modification in design before proceeding with fabrication or treating.
  - 6. Finish and uniformity of zinc coating and adherence of coating to comply with ASTM A 123.
  - 7. Give a passivating treatment to galvanized elements which are not to be further coated or which may be stored in open, exterior locations for long periods prior to erection. Do not use chromate passivation on items to be painted after erection.
  - 8. Do not treat galvanized or passivated surfaces which are to be painted with oils or other chemicals which might interfere with coating adhesion.
- C. Protection of Aluminum in Contact with Other Materials
  - 1. Coat aluminum surfaces to be placed in contact with other metals, except stainless steel, or concrete with two coats of a high-build coal tar coating.
  - 2. Coating to be Tnemec "46-465 H.B. Tnemecol," Corchem Corporation "Corchem 146 High Build Coal Tar," or approved equal.
  - 3. Solvent clean and otherwise prepare all surfaces in accordance with the coating manufacturer's recommendations prior to application.

4. Each coat to provide a dry film thickness of at least 10 mils.

## 2.7 LADDERS

- A. General. Fabricate ladders for the locations shown, with dimensions, spacings, details and anchorages as indicated. Comply with requirements of ANSI A14.3.
- B. Side Rails. Continuous channel or similar extruded shape, with eased edges, spaced 18 inches apart unless a specific spacing is shown on the Drawings.
- C. Bar Rungs. Round solid bars or tubes, 3/4-inch diameter, spaced 12 inches on center.
- D. Fit rungs in centerline of side rails, weld and grind smooth on outer rail faces.
- E. Support each ladder at top and bottom and at intermediate points spaced not more than 12'-0" on center, or as shown on Drawings.
  - 1. Size brackets to support design dead and live loads indicated and to hold centerline of ladder rungs clear of the wall surface by not less than 7 inches.
  - 2. Extend side rails and rungs at least 42 inches above top access level. Where "step-through" access is indicated, extend side rail 42 inches. Goose-neck the extended rails back to the structure to provide secure ladder access.
- F. Provide non-slip surface on top of each rung, either by coating the rung with aluminum oxide granules set in epoxy resin adhesive, or by using a "flat top" rung with an abrasive top surface.

## 2.8 LADDER SAFETY CAGES

- A. General. For ladders more than 20 feet in height, fabricate ladder safety cages to comply with ANSI A14.3; assemble by welding or riveting.
- B. Primary Hoops. Aluminum bars, 5/16 inch x 4 inches, for top, bottom, and for cages longer than 20 feet, intermediate hoops spaced not more than 20'-0" on center.
- C. Secondary Intermediate Hoops. Aluminum bars, 5/16 inch x 2 inches, hoops spaced not more than 4'-0" on center between primary hoops.
- D. Vertical Bars. Aluminum bars, 5/16 inch x 2 inches, secured to each hoop, spaced approximately 9 inches on center.

- E. Fasten assembled safety cage to ladder rails and adjacent construction as indicated.

## 2.9 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel 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. Galvanize after fabrication.

## 2.10 LOOSE STEEL LINTELS

- A. Fabricate loose structural steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.
- B. Weld adjoining members together to form a single unit where indicated.
- C. Size loose lintels for equal bearing of one inch per foot of clear span but not less than 8 inches bearing at each side of openings, unless otherwise indicated.
- D. Galvanize loose steel lintels located in exterior walls.
- E. Provide stainless steel shims for movement.

## 2.11 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General. Provide steel framing and supports for applications indicated or which are not a part of structural steel framework, as required to complete work.
- B. Fabricate units to sizes, shapes, and profiles indicated and required to receive adjacent other construction retained by framing and supports. Fabricate from structural steel shapes, plates, and steel bars of welded construction using mitered joints for field connection. Cut, drill, and tap units to receive hardware, hangers, and similar items.
  - 1. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed.
    - a. Except as otherwise indicated, space anchors 24 inches on center and provide minimum anchor units in the form of steel straps 1¼ inches wide x ¼ inch x 8 inches long.

## 2.12 METAL BAR GRATINGS

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- A. General. Produce metal bar gratings of description indicated per metal bar grating standard "Standard Specifications for Metal Bar Grating and Metal Bar Grating Treads" published in ANSI/NAAMM MBG 531-00 "Metal Bar Grating Manual."
- B. Fabricate welded steel and stainless steel gratings to comply with requirements indicated below:
  - 1. Mark/Size: Unless otherwise indicated on the Drawings, W-19-4 (welded with bearing bars 1-3/16 inch on center and cross bars 4 inches on center).
- C. Fabricate pressure-locked rectangular bar aluminum gratings to comply with requirements indicated below:
  - 1. Mark/Size: Unless otherwise indicated on the Drawings, P-19-4 (pressure-locked with bearing bars 1-3/16 inch on center and cross bars 4 inches on center)/rectangular bearing bar or I-bar sizes as indicated.
- D. Steel Finish: Hot-dip galvanized with a coating weight of not less than 1.8 oz. per sq. ft. of coated surface.
- E. Aluminum Finish: Mill.
- F. Fabricate removable grating sections with trim banding. Include anchors and stainless steel fasteners for attachment to supports.
- G. Fabricate cutouts in grating sections for penetrations indicated. Arrange layout of cutouts to permit grating removal without disturbing items penetrating gratings.
  - 1. Edge band openings in grating that interrupt 2 or more bearing bars with bars of same size and material as bearing bars.
  - 2. Do not notch bearing bars at supports to maintain elevation.
- H. Available Manufacturers. Subject to compliance with requirements, manufacturers offering metal bar gratings that may be incorporated in the Work include, but are not limited to, the following:
  - 1. Alabama Metal Industries Corp.
  - 2. Barnett/Bates Corp.
  - 3. Blaw-Knox Grating Div., Blaw-Knox Corp.

4. IKG Industries.
5. Klemp Corp.
6. Ohio Gratings, Inc.
7. Reliance Steel Products, Inc.
8. Seidelhuber Metal Products, Inc.
9. Truweld, Inc.

#### 2.13 PREFABRICATED GRATING TREADS

- A. Fabricate from 1½-inch aluminum I-bar grating to provide a tread width as shown on the Drawings within a tolerance of ±¼-inch.
- B. Tread length to be as shown on the Drawings.
- C. Tread to incorporate a non-slip (grit) nosing.
- D. Mount treads to stringers with stainless steel bolts sized in accordance with the tread manufacturer's recommendations.

#### 2.14 STEEL FLOOR PLATE

- A. Fabricate raised pattern steel floor plates from rolled steel plate ¼-inch in thickness and in pattern as indicated; if not indicated, as selected from manufacturer's standard patterns.
- B. Include steel angle stiffeners and fixed and removable sections as indicated.
  1. Provide two steel bar drop handles for lifting plates, one at each end of each removable section.

#### 2.15 ALUMINUM FLOOR (TREAD) PLATE

- A. Fabricate raised pattern tread plates from aluminum-alloy rolled tread plate in pattern 1 of ¼-inch thickness.
- B. Include aluminum angle stiffeners and fixed and removable sections as indicated.
  1. Provide two (2) aluminum bar drop handles for lifting plates, one at each end of each removable section.

#### 2.16 ALUMINUM PIPE RAILINGS AND HANDRAILS



- A. General. Fabricate pipe railings and handrails to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of pipe, post spacings, and anchorage, but not less than that required to support structural loads.
- B. Aluminum Finish. Class I clear anodized finish, unless otherwise indicated.
- C. Interconnect railing and handrail members by butt-welding, welding with internal connectors, or assembling with flush type fittings using concealed or non-projecting pins and fasteners, at fabricator's option, unless otherwise indicated.
- D. Provide slip joints to facilitate removal of pipe railing at all intersections, changes in direction, or at intervals not to exceed 25 feet in straight runs of railing. The slip joint shall be designed and constructed to provide strength equivalent to a straight section of pipe.
- E. Form changes in direction of railing members as follows:
  - 1. By insertion of prefabricated elbow fittings.
  - 2. By mitering at elbow bends.
  - 3. By bending.
  - 4. By any method indicated above, applicable to change of direction involved.
- F. Form simple and compound curves by bending pipe in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross-section of pipe throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of pipe.
- G. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated.
- H. Close exposed ends of pipe by welding 3/16-inch-thick aluminum plate in place or by use of prefabricated fittings, except where clearance of end of pipe and adjoining wall surface is ¼ inch or less.
- I. Toe Boards. Where indicated, provide toe boards at railings around openings and at the edge of open-sided floors and platforms. Fabricate to dimensions and details indicated, or if not indicated, use 4 inches high x    inch aluminum plate welded to, and centered between, each railing post.
- J. Brackets, Flanges, Fittings, and Anchors. Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnections of pipe and

attachment of railings and handrails to other work. Furnish inserts and other anchorage devices for connecting railings and handrails to concrete or masonry work.

1. For railing posts set in concrete, fabricate sleeves from steel pipe not less than 6 inches long and with an inside diameter not less than  $\frac{1}{2}$  inch greater than the outside diameter of post, with steel plate closure welded to bottom of sleeve.
  2. For surface mounted railing posts, provide prefabricated aluminum mounting brackets with stainless steel anchors. Coat aluminum surfaces in contact with concrete with bituminous coating.
  3. For removable railing posts, fabricate slip-fit sockets from aluminum pipe whose inside diameter is sized for a close fit with posts and to limit deflection of post without lateral load, measured at top, to not more than  $\frac{1}{12}$  of post height. Provide socket covers designed and fabricated to resist accidental dislodgement. Coat exterior surfaces of sleeves with bituminous coating.
- K. Provide guard chains across all pipe railing openings where shown, specified, or required. Chain links shall be  $\frac{1}{4}$ -inch stainless steel of welded construction, 12 links to the foot. One end shall be connected to a  $\frac{1}{4}$ -inch stainless steel eye bolt in the stanchion and the other end shall be connected by means of a heavy, stainless steel swivel eye, snap hook to a similar eye bolt in the opposite stanchion.

## 2.17 STEEL FRAMED STAIRS

- A. General. Construct stairs to conform to sizes and arrangements indicated. Join pieces together by bolting, unless otherwise indicated. Provide complete stair assemblies, including metal framing, hangers, columns, railings, newels, balusters, struts, clips, brackets, bearing plates, and other components necessary for the support of stairs and platforms, and as required to anchor and contain the stairs on the supporting structure.
1. Fabricate treads and platforms of exterior stairs to accommodate slopes to drain in finished traffic surfaces.
- B. Stair Framing. Fabricate stringers of structural steel channels as indicated. Provide closures for exposed ends of stringers. Construct platforms of structural steel channel headers and miscellaneous framing members as indicated. Bolt or weld headers to strings, newels, and framing members to strings and headers; fabricate and join so that bolts, if used, do not appear on finish surfaces.

- C. Floor Grating Treads and Platforms. Provide patterns, spacing, and bar sizes indicated; fabricate to comply with NAAMM "Metal Bar Grating Manual."
- D. Fabricate grating treads with nosing on one edge and with angle or plate carrier at each end for stringer connections. Secure treads to stringers with stainless steel bolts.
- E. Fabricate grating platforms with nosing matching that on grating treads at all landings. Provide toe plates at open-sided edges of grating platform. Secure grating to platform frame with stainless steel clips and bolts.
- F. Stair Railings and Handrails. Comply with applicable requirements specified elsewhere in this section for pipe railings and handrails.

## 2.18 PIPE BOLLARDS

- A. Fabricate pipe bollards from Schedule 40 steel pipe. Cap bollards with ¼- inch minimum thickness steel base plate.
- B. Fabricate sleeves for bollard anchorage from steel pipe with ¼-inch-thick steel plate welded to bottom of sleeve.
- C. Fill bollards with Class A concrete as specified in Section 03300, Cast-In- Place Concrete.

## 2.19 EXPANSION (EPOXY-SET) ANCHORS

- A. Provide adhesive type anchors consisting of an "all-thread" rod or reinforcing bar set in a drilled hole completely filled with an epoxy-based filler.
- B. Materials
  - 1. "All-thread" rod, nuts, and washers shall be AISI 304 stainless steel meeting the requirements of ASTM F593.
  - 2. Reinforcing bars shall comply with all applicable requirements of Section 03300, Cast-In-Place Concrete.
  - 3. Epoxy filler/adhesive shall be a two component, high strength, low deflection, ceramic filled epoxy equivalent to EPCON Ceramic 6 by ITW Ramset/Red Head or equal. Epoxy fillers shipped and installed in glass capsules are NOT acceptable under this specification.

## 2.20 TRENCH FRAMES AND GRATED COVERS

- A. Manufacturers

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1. Neenah Foundry Company, Cat. No. R-4990, Heavy Duty, with Type A grate openings.
2. East Jordan Iron Works, 6950 Series, Heavy Duty, with Type M2 Grate.
3. Or as approved.

B. Trench drain assemblies shall include appropriate frames and end pieces.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, including concrete inserts, sleeves, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.
- B. Center nosings on tread widths with noses flush with riser faces and tread surfaces.
- C. Set sleeves in concrete with tops flush with finish surface elevations; protect sleeves from water and concrete entry.

### 3.2 FABRICATION, GENERAL

- A. Form metal fabrications from materials of size, thickness, and shapes indicated but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of each metal fabrication.
- B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.
- C. Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in the design, fabrication, and installation of installed metal assemblies to prevent buckling, opening up of joints, and overstressing of welds and fasteners. Base design calculations on actual surface temperatures of metals due to both solar heat gain and nighttime sky heat loss.
  1. Temperature Change (Range): 100 degrees F (55.5 degrees C).
- D. Shear and punch metals cleanly and accurately. Remove burrs.

- E. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- F. Remove sharp or rough areas on exposed traffic surfaces.
- G. Weld corners and seams continuously to comply with AWS recommendations and the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.
- H. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.
- J. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- K. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware, screws, and similar items.
- L. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

### 3.3 INSTALLATION, GENERAL

- A. Fastening to In-Place Construction. Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place

construction; include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.

- B. Cutting, Fitting, and Placement. Perform cutting, drilling, and fitting required for installation of miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete masonry or similar construction.
- D. Fit exposed connections accurately together to form hairline joints. Weld or bolt, as indicated, connections that are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.
- E. Field Welding. Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, methods used in correcting welding work, and the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.
- F. Corrosion Protection. Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.
- G. Expansion Anchors. Comply with anchor adhesive manufacturer's recommendations for:
  - 1. Location, spacing, depth of embedment, and installation of anchor.
  - 2. Drilling, cleaning, and preparation of holes to receive anchors.

### 3.4 SETTING LOOSE PLATES

- A. Clean concrete and masonry bearing surfaces of any bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of bearing plates.
- B. Set loose leveling and bearing plates on wedges, or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut off flush with the edge of the bearing plate before packing with grout.
  - 1. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

### 3.5 INSTALLATION OF METAL BAR GRATINGS

- A. General. Install gratings to comply with recommendations of NAAMM grating standard referenced under Part 2 that apply to grating types and bar sizes indicated, including installation clearances and standard anchoring details.
- B. Secure units to supporting members with stainless steel clips and fasteners.

### 3.6 INSTALLATION OF PIPE RAILINGS AND HANDRAILS

- A. Adjust railings prior to anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated, or if not indicated, as required by design loadings. Plumb posts in each direction. Secure posts and railing ends to building construction as follows:
  - 1. Anchor posts in concrete by means of pipe sleeves preset and anchored into concrete. After posts have been inserted into sleeves, fill annular space between post and sleeve solid with non-reactive setting cement, mixed and placed to comply with anchoring material manufacturer's directions.
  - 2. Install removable railing sections where indicated in slip-fit metal sockets cast into concrete. Accurately locate sockets to match post spacing.
- B. Secure handrails to wall with wall brackets and end fittings. Provide bracket with not less than 1½-inch clearance from inside face of handrail and finished wall surface. Locate brackets as indicated, or if not indicated, at spacing required to support structural loads. Secure wall brackets and wall return fittings to building construction as follows:
  - 1. Use type of bracket with pre-drilled hole for exposed bolt anchorage.
  - 2. For concrete and masonry anchorage, use stainless steel epoxy set anchors.

### 3.7 INSTALLATION OF BOLLARDS

- A. Anchor bollards in concrete by means of pipe sleeves preset and anchored into concrete. After bollards have been inserted into sleeves, fill annular space between bollard and sleeve solid with nonshrink, nonmetallic grout, mixed and placed to comply with grout manufacturer's directions.

### 3.8 INSTALLATION OF BIRD SCREENS

- A. Fasten bird screens to openings with collars or frame designed for screen. Provide stainless steel bolts, nuts, and washers for fasteners.
- B. At pipe vent openings, fasten bird screen between fittings or flange plate.
- C. Prior to installation, clean openings to remove dirt and prepare surface for bird screen.

### 3.9 ADJUSTING AND CLEANING

- A. Touch-Up Painting. Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and recoat exposed areas in accordance with Section 09900, Painting.

END OF SECTION



## SECTION 08305

### ACCESS DOORS

#### PART 1 – GENERAL

##### 1.1 WORK INCLUDED

- A. This section covers all equipment, materials, accessories, and labor required to assemble, install, and place into satisfactory service aluminum floor doors as specified herein and shown on the Drawings.

##### 1.2 SYSTEM DESCRIPTION

- A. Aluminum floor doors shall be installed in the areas as shown on the Drawings.

##### B. DESIGN CRITERIA

- 1. All floor doors shall be designed for a live load of not less than 300 pounds per square foot at an extreme fiber stress in bending of not more than 33 percent of the minimum yield strength of material.
- 2. All floor doors shall be designed to withstand axle loading from AASHTO HS-20 loading without exceeding an extreme fiber stress bending of 33 percent of the yield strength of the material.

##### 1.3 QUALITY ASSURANCE

##### A. GENERAL

- 1. The Contractors shall be responsible for ensuring that all equipment installed is properly connected to other related equipment for proper functioning of the plant.

##### B. MANUFACTURER'S QUALIFICATIONS

- 1. The Manufacturer of work of this section shall have five (5) years minimum proven experience in such work and shall have satisfactorily completed three (3) jobs of similar size and type within the last five (5) years.
- 2. Substitutions for all work of this section from Manufacturers not complying with the specified experience period shall include the following:
  - a. Special guarantees and warranties
    - 1) Period: 5 years.
    - 2) Manufacturer's special guarantees and warranties.

3) Contractor's and Installer's special guarantees and warranties.

b. Bond or cash deposit equal to 100% of the equipment cost guaranteeing compliance of the above specified special guarantees and warranties.

## 1.5 SUBMITTALS

### A. SHOP DRAWINGS AND ENGINEERING DATA

Submit complete shop drawings and engineering data to the Engineer in accordance with the Supplemental Specifications.

### B. OPERATION AND MAINTENANCE DATA

1. Submit complete operation and maintenance data on the access doors in accordance with the requirements of Supplemental Specifications

## 1.6 STORAGE AND PROTECTION

A. Store and protect the access doors and accessories in accordance with the Manufacturer's recommendations.

## 1.7 GUARANTEE

A. Provide a guarantee against defective equipment and workmanship.

## 1.8 MEASUREMENT AND PAYMENT

A. No separate measurement or payment will be allowed for this work. Payment for all work performed under this section shall be included in other items of work.

## PART 2 – PRODUCTS

### 2.1 MANUFACTURERS

A. The design has been based on equipment provided by the following Manufacturers:

1. Syracuse Castings Sales Corp.
2. Halliday Products
3. Or Equal

## 2.2 SYSTEM COMPONENTS

### A. FLOOR DOORS

1. Construct floor doors of aluminum with a diamond pattern tread or other acceptable raised nonslip surface. They shall be of the sizes shown on the Drawings.
2. Frames shall be ¼-inch extruded aluminum formed to a channel gutter approximately 3 inches wide, with an anchor flange around the perimeter. Containing frames shall be neatly made. Attach sufficient anchors to the frames for proper anchoring into the concrete. Clear opening must not be reduced. Provide a 1½-inch drainage coupling for plumber's connection in the low corner of the channel frame.
3. Doors shall be provided with a minimum of two (2) heavy forged bronze or type 316 stainless steel hinges with stainless steel pins. Doors shall be equipped with an outside flush lifting handle, hold back safety chains, spring operators for easy operation, and an automatic hold-open arm with vinyl grip release handle.
4. Factory finish for exterior floor doors shall be mill finish with bituminous coating applied to all surfaces in contact with concrete.
5. Floor doors shall be furnished with all stainless steel hardware.
6. Floor doors shall be single-leaf or double-leaf as shown on the Drawings.

## 2.3 FINISHES

### A. GENERAL

1. Paint the exterior of the frames and anchors, or those portions coming in contact with the concrete, with a heavy coating of coal tar epoxy prior to their installation in accordance with Section 05500.

## PART 3 – EXECUTION

### 3.1 INSTALLATION

#### A. GENERAL

1. Install equipment in accordance with Manufacturer's recommendations.
2. Completely assemble all floor doors in the containing frames prior to their delivery to the job.

3. Install door frames so they will project slightly above the elevation of the surrounding concrete. No door shall be at an elevation lower than the adjacent concrete construction. They shall present a uniform, level surface with no indentations or projections. All hinged doors shall operate freely and without binding.
4. Connect gutters on exterior doors to PVC piping extending through concrete slab to well below.

B. TOUCH-UP COATING

1. Touch up all damaged coating surfaces with compatible coating of identical color in such manner that there shall be no evidence of damage.

3.2 START-UP AND OPERATION

A. START-UP SERVICES

1. The Manufacturer shall furnish the services of a factory-trained field engineer specializing in this work to inspect and adjust the equipment after installation.

3.3 SPARE PARTS

A. NONE.

END OF SECTION

## SECTION 09900

### PAINTING

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

- A. Under this section furnish all materials, equipment, and labor to accomplish all painting necessary or convenient to the Contractor for the satisfactory completion of the work included under these Contract Documents. The words "paint" and "painting" used in this specification apply to and also describe the use and application of protective coatings.
- B. In general, the work included under this section shall include the surface preparation, shop priming, field priming, and/or field painting of all surfaces identified in Part 3.5, Protective Coating Schedule, of this section. These surfaces include, but are not limited to, the following:
1. Wood
  2. Ferrous metals (except stainless steel or pre-finished surfaces)
  3. Galvanized metal
  4. Concrete and masonry
  5. Gypsum wallboard and plaster
  6. Piping and pipe insulation, including:
    - a. Aluminum
    - b. Cast or ductile iron
    - c. Copper
    - d. Fiberglass
    - e. PVC
    - f. Stainless steel
    - g. Steel pipe
- C. Aluminum, bronze, copper, stainless steel, and/or other corrosion-resistant metal surfaces (excluding piping) shall not be painted unless specifically called for on the Drawings or in these Contract Documents.

##### 1.2 QUALITY ASSURANCE

- A. Submit to the Engineer for his review the following information concerning the materials the Contractor proposes to use in work covered by this item:
1. A list of all components (paints or other materials) to be used in each painting system required herein.
  2. A complete descriptive specification of each component.
  3. Only those systems and components which are judged acceptable by the Engineer shall be utilized in the work covered by this item. No materials shall be delivered to the job site until the Engineer has evaluated their acceptability.
- B. All products submitted shall be lead- and chromate-free formulations and comply to current VOC emission regulations. Manufacturers technical data sheets must contain the following information:
1. Manufacturer's name
  2. Type of paint or other generic identification
  3. Manufacturer's stock number
  4. Color (if any)
  5. Type of gloss
  6. Minimum flash point
  7. Percent solids by volume
  8. Recommended dry film thickness per coat
  9. Theoretical coverage rates
  10. Instructions for mixing, thinning, or reducing (as applicable)
  11. Manufacturer's application recommendations
  12. Safety and storage information
  13. Viscosity at ambient temperature
  14. Average dry times (dry to touch, dry to recoat) at ambient temperature.
  15. Recommended thinners and maximum thinning permissible to meet current VOC regulations.
  16. Recommended primer if applicable
  17. Application method (brush, roll, conventional or airless spray)
  18. VOC level of coating
  19. Instructions for mixing multiple component materials

- C. Obtain the Engineer's review of the first finished room, space, area, item, or portion of work of each surface type and color specified. The first room, space, area, item, or portion of work which is acceptable to the Engineer shall serve as the project standard for all surfaces of similar type and color. Where spray application is utilized, the area to be reviewed shall not be smaller than 100 square feet.
- D. An authorized representative of the coatings manufacturer shall be present at the start-up and periodically during painting operations. Such representative shall instruct and observe the Contractor's workmanship and shall, at the completion of the work, certify in writing to the Engineer that the manufacturer's application recommendations were followed.
- E. Contractor Qualification. Contractor must provide documentation that he has previously performed this type of work and provide job references as required by the Engineer. Provide a written guarantee against defective materials and workmanship in accordance with these Specifications.

### 1.3 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver all paint, primers, varnishes, and sealers to the job site in their original, unopened containers not exceeding 5-gallon capacity each, unless otherwise specified herein. With the permission of the Engineer, the manufacturer may use and ship in agitator barrels. Paint containers shall not be opened until they have been inspected and approved by the Engineer.
- B. Store paint and related materials and equipment in a suitable location on the project site away from work areas and other storage areas. Strictly adhere to all applicable health, safety, and fire regulations controlling the storage of paint and related materials. Store and handle all materials in accordance with the manufacturer's recommendations.
- C. Each container shall be marked with the manufacturer's name, product number, and batch number. The labels shall also show mixing and thinning instructions, and recommended dry film thickness of each product. Use thinner recommended by the manufacturer. The use of accelerators must be approved by the Engineer. Any substitutions of generic thinners must be approved by the Engineer.

### 1.4 JOB CONDITIONS

- A. Strictly follow the manufacturer's recommendations concerning environmental conditions under which a material can be applied. No finishes shall be applied in areas where dust is being generated.
- B. Cover or otherwise protect the finished work of other trades, surfaces not being painted concurrently, and/or surfaces which are not to be painted. Any injury or damage to such surfaces shall be remedied at Contractor's expense to the satisfaction of the Engineer before final acceptance, and no separate payment therefor will be made.

### 1.5 TESTING EQUIPMENT

A. Furnish and make available to the Engineer the following items of testing equipment for use in determining if the requirements of this Specification section are being satisfied. The specified items of equipment shall be available for the Engineer's use at all times when field painting or surface preparation is in progress.

1. Wet film gauge
2. Surface thermometer
3. Spring micrometer with surface profile tape
4. Set of Steel Structures Painting Council Visual Standards (SSPC-VIS 1-89)
5. Holiday (pin hole) detector (low voltage)
6. Sling-psychrometer and psychrometric tables
7. Magnetic dry film gauge (Type 1 or Type 2) with appropriate calibration shims or plates.

#### 1.6 MEASUREMENT AND PAYMENT

1. No separate measurement or payment will be allowed for this work. Payment for all work performed under this section shall be included in other items of work

### PART 2 - PRODUCTS

#### 2.1 ACCEPTABLE MANUFACTURERS

- A. The specific products and manufacturers listed for each general product classification in Part 2.2, Materials List, of this section are given only to identify the generic type, quality, and general composition required for each product. Furnish similar products of other manufacturers subject to the review of the Engineer in accordance with the provisions of Part 1.2, Quality Assurance, of this section. The utilization of named products as given in Part 2.2, Material List, of this section does not excuse the Contractor from complying with the provisions of Part 1.2.
- B. All materials used in successive field coats shall be produced by the same manufacturer. Material used in the first field coat over shop painted or previously painted surfaces shall cause no wrinkling, lifting, or other damage to underlying paint.

#### 2.2 MATERIAL LIST

Primers and Finishes. Subject to compliance with requirements, provide one of the following:

##### TYPE

- A. Fillers, Sealers, and Surfacing

FS-1 Concrete/Steel



"63-1500 Filler and Surfacer," Tnemec

"Carboguard 501," Carboline

"Steel-Seam FT910," Sherwin-Williams

FS-2 Masonry Filler

"54-660 Masonry Filler," Tnemec

"Sanitile 600," Carboline

"Kem Cati-Coat HS Epoxy Filler/Sealer," Sherwin-Williams

FS-3 Concrete

"Series 434 Perma-Shield H2S," Tnemec

"Steel-Seam FT910," Sherwin-Williams

FS-4 Drywall Sealer

"51-792 PVA Sealer," Tnemec

"Carbocrylic 120," Carboline

"Preprite 200," Sherwin-Williams

FS-5 Concrete Masonry, Block and Brick Sealer

"Series 663 Prime-A-Pell H<sub>2</sub>O," Chemprobe/Tnemec\*

"Enviroseal Double 7 H.D., or PBT," Degussa

"Concrete and Masonry Sealer," THORO

\*Use Series 662 Prime-A-Pell Plus for horizontal applications.

B. Primers

P-1 Waterborne Acrylic

"Carbocrylic 120," Carboline

"DTM Bonding Primer," Sherwin-Williams

P-2 Latex

"DTM Primer/Finish," Sherwin-Williams

P-3 Interior Wood Stain

"Interior Oil Stain," Sherwin-Williams

P-4 High Temperature - Zinc Rich

- "90E-92 Tneme-Zinc," Tnemec
- "Carbozinc 11 or 11HS," Carboline
- "Zinc Clad II Ethyl Silicates," Sherwin-Williams
- P-5 High Levels of Hydrogen Sulfide - Vinyl Ester
  - "Series 120-5002 Vinester," Tnemec
  - "Plastite 4007," Carboline
  - "Corobond Conductive Vinyl Ester Primer," Sherwin-Williams
- P-6 Immersion, Non-potable Water
  - "Series N69 Hi-Build Epoxoline II," Tnemec
  - "Carboguard 671," Carboline
  - "Cor-Cote SC Sewer-Cote," Sherwin-Williams
- P-7 Immersion, Potable Water
  - "Series N140 Pota-Pox," Tnemec
  - "Carboguard 561," Carboline
  - "Macropoxy 646NSF," Sherwin-Williams
- P-8 Non-immersion (Exterior)
  - "Series N69 Hi-Build Epoxoline II," Tnemec
  - "Carboguard 890," Carboline
  - "Tile Clab HS," Sherwin-Williams
- P-9 Concrete Floors - Epoxy
  - "Series 201 Epoxoprime," Tnemec
  - "Semstone 110," Carboline
  - "General Polymers 3579 Clear," Sherwin-Williams

C. Finishes

- F-1 Acrylic
  - "Series 6\*/7\*\*\*-Color Tneme-Cryl\*," Tnemec
  - "Sanitile 155\*\*\* or Carbocrylic 3359\*\*," Carboline
  - "ProMar 200 Flat or 200 S/G," Sherwin-Williams

\*Matte, \*\*Semi-gloss, \*\*\*Satin

- F-2 Latex
  - "A-100 Satin," Sherwin-Williams
- F-3 INTERIOR WOOD VARNISH
  - "Marrethane Satin Varnish," Sherwin-Williams
  - "Wood Classics Polyurethane Varnish," Sherwin-Williams
- F-4 Immersion (Potable Water - NSF Approved)
  - "Series N140 Pota-Pox," Tnemec
  - "Carboguard 561," Carboline
  - "Macropoxy 846NSF," Sherwin-Williams
- F-5 Immersion (Non-potable Water)
  - "Series N69 Hi-Build Epoxoline II," Tnemec
  - "Carboguard 691," Carboline
  - "Dura-Plate 235," Sherwin-Williams
  - "Macropoxy 646," Sherwin-Williams
- F-6 High Levels of Hydrogen
  - "Series 435 Perma-Glaze," Tnemec
  - "Cor-Cote SC Sewer-Cote," Sherwin-Williams
- F-7 High Levels of Hydrogen Sulfide - Novolac Epoxy
  - "Series 275 Stranlock," Tnemec
- F-8 Non-immersion (Exterior/Interior)
  - "Series N69 Hi-Build Epoxoline II," Tnemec
  - "Carboguard 890," Carboline
  - "Macropoxy 646 Fast Cure," Sherwin-Williams
- F-9 Exterior - Urethane
  - "Series 1074\*/1075\*\* Endura-Shield II\*," Tnemec
  - "Carbothane 134HG\* or 133 HB\*\*," Carboline
  - "Arolon 218 HS, PDS 5.22," Sherwin-Williams

\*Gloss, \*\*Semi-gloss (Specify)

- F-10 Below Grade - Coal Tar Epoxy
  - "46H-413 Hi-Build Tneme-Tar," Tnemec
  - "Bitumastic 300M," Carboline
  - "Hi-Mil Sher-Tar PDS 4.71," Sherwin-Williams
- F-11 Exterior Concrete - Modified Epoxy
  - "52-Color Tneme-Crete," Tnemec
  - "Sanitile 755," Carboline
- F-12 Below Grade - Modified Polyurethane
  - "Series 262 Elasto-Shield," Tnemec
  - "Polibrid 705," Carboline
  - "Sher-Flex," Sherwin-Williams
- F-13 Concrete Floors - Epoxy (Light Traffic Only)
  - "Series 205 Terra-Tread FC," Tnemec
  - "Carboguard 890," Carboline
  - "Macropoxy 646 Fast Cure," Sherwin-Williams
- F-14 Concrete Floors - Aggregate Filled Epoxy
  - "Series 237 Power Tread," Tnemec
  - "Sanitile 945SL AFC," Carboline
  - "Armorseal 650 with Broadcast," Sherwin-Williams
- F-15 Concrete Floors - Ceramic/Quartz Filled Epoxy
  - "Series 222 Deco-Tread," Tnemec
  - "Sanitile 925," Carboline
  - "Ceramic Carpet," Sherwin-Williams/General Polymers
- F-16 Concrete Floors - Color Epoxy Finish
  - "Series 280 Tneme-Glaze," Tnemec
  - "Sanitile 945SL," Carboline
  - "Cor-Cote HP," Sherwin-Williams

F-17 Concrete Floors - Clear Epoxy Finish

"Series 284 Deco-Clear," Tnemec

"Sanitile 925," Carboline

"Cor-Cote HP Clear," Sherwin-Williams

F-18 Concrete - Acrylic Emulsion

"Series 180/181 W.B. Tneme-Crete," Tnemec

"UltraCrete Texture (Fine) Coating," Sherwin-Williams

F-19 High Temperature - Silicone (with Primer) (Up to 1000°F)

"Series 39 Silicone Aluminum," Tnemec

"Thermaline 4700 Aluminum," Carboline

"Hi-Temp 1050 ZP Primer and 1000V Series," Sherwin-Williams

2.3 COLORS

- A. Color Cards. Submit color cards for all paints, stains, or other materials to the Engineer for review and color selection. Only those colors which have been reviewed and accepted by the Engineer shall be utilized in work covered by this section.

2.4 PIPE AND EQUIPMENT IDENTIFICATION

- A. Pipe Color Code

1. Pipe: Color code all pipes, including insulated pipe, in accordance with the schedule given below. Where applicable, colors shall comply with the specifications described in Section 3, "Color Definitions," of ANSI Z53.1. Other colors shall be selected by the Engineer in accordance with Part 2.3, Colors, of this section.
2. Stripes where required shall consist of 6-inch-wide bands completely around the pipe located 36 inches on centers. On pipe runs less than 36 inches in length, one color band shall be located at the center of the run.
3. Color Schedule

<b>Material</b>	<b>Color</b>
<u>Hazardous</u>	
Acid	Yellow with Black Stripes
Chlorine	Yellow
Ferric Chloride	Yellow with Red Stripes
Hydraulic Fluid Piping	Yellow with Blue Stripes

Lime Slurry Yellow with Green Stripes

Air Systems

Instrument Air Green with White Stripes

Process Air Green

Vacuum Green with Red Stripes

Flammable

Digester Gas Orange

Fuel Oil Orange with Blue Stripes

Process Water

Plant Water Red with Black Stripes

Seal Water Red

Wash Water (High Pressure) Red with Yellow Stripes

Cooling Water Red with White Stripes

Sludge

Blended Sludge Tan with Blue Stripes

Digested Sludge Tan with Green Stripes

Primary Sludge Tan with Orange Stripes

Return or Recirculated Sludge Tan

Transfer Piping Tan with Red Stripes

Waste Activated Sludge Tan with Black Stripes

Vents

Digester Gas Vents Aluminum with Orange Stripes

Fuel Oil Vents Aluminum with Blue Stripes

Sanitary Vents Aluminum with Black Stripes

Other Vents Aluminum with Green Stripes

Process Piping

Heating and Heat Recovery Piping (Steam) Gray with Red Stripes

Supernatant, Decant, or Filtrate Gray

Overflow Black

Raw Sewage (Sanitary) Black

Miscellaneous

Electrical Conduit Aluminum\*

Oxygen White

Potable Water Blue

Roof Drains Gray with Blue Stripes

\*Where electrical conduit is exposed in a finished room or area, the conduit shall be painted to match room finish.

B. Pipe Labels

1. Legends: After piping has been installed and painting of pipe work has been completed as provided for above, label all pipe work with prefabricated, pre-legended, wrap around plastic/(other material) labels. Labels shall meet ANSI A131. Legends shall be descriptive of the function of the pipe, such as "ACID." Provide two labels, one label on each side of the pipe, at a suitable location along each pipe run. For long runs of pipe, provide labels at intervals not exceeding 20 feet. Locate the label on the pipe so that it will be in direct line of vision. Label may be omitted from one side if view is obstructed from that side. Where the flow in a pipe shall be at all times in one direction only, then a flow arrow shall be placed in front of each label on the pipe. Labels shall be manufactured by Lab Safety or Bradley, Inc. The lettering and arrows shall be of same height. The size of lettering shall be as follows:

<b>Outside Diameter of Pipe or Covering</b>	<b>Size of Letters</b>	
	<b>Letters</b>	
	¾" to 1¼"	½"
	1½" to 2"	¾"
	2½" to 6"	1¼"
	8" to 10"	2½"
	Over 10"	3½"

2. Tag: For pipes smaller than ¾ inch in outside diameter, use a laminated plastic or aluminum tag with the lettering etched or stamped and filled in with black or contrasting enamel.

3. Legends and Flow Arrows: Label background colors shall match piping colors. Legends shall be all capital, block lettering and black in color. Flow arrows shall be black in color. The above outline of intent designates the general extent of the identification work and is not exclusive of other similar work such as identification of pumps and other equipment as may be directed by the Engineer. Following the completion of the work under this item, deliver to the Owner two sets of all labels used.
4. Equipment Labels: Where specified in these Contract Documents or directed by the Engineer, paint stencil legends, in the same manner as a pipe of appropriate size on the individual units of equipment such as blowers, pumps, collector drives, compressors, silencers etc. All push buttons, starters, switches, etc., when remote from the equipment controlled and/or power packs, shall have labels of the engraved plastic type affixed to or adjacent to the remote switch, push button, starter, etc.

## 2.5 MIXING AND TINTING

- A. All paints and other materials shall be mixed and tinted by the paint manufacturer prior to delivery to the job site, when possible.
- B. Strictly adhere to the manufacturer's recommendations when job site mixing and/or tinting is required. The Contractor shall be solely responsible for the proper conduct of all on-site mixing and/or tinting.

## PART 3 - EXECUTION

### 3.1 CONTRACTOR'S INSPECTION

- A. Examine all surfaces scheduled to receive paint or other finishes for conditions that will adversely affect execution, permanence, or quality of work covered by this item. Surfaces which cannot be put into an acceptable condition through preparatory work as included in Part 3.2, Preparation of Surfaces, shall be immediately brought to the attention of the Engineer.
- B. Do not proceed with surface preparation or coating application until surface conditions are suitable.

### 3.2 PREPARATION OF SURFACES

- A. Surface Preparation Specifications
  1. General. Where abrasive blasting is specified, a low free silica abrasive with a silica content of <5% shall be used. Mineral slag by-products may not be used. Abrasive blasting should produce a surface profile of not less than 1.5 mils or greater than 3.5 mils.
  2. SSPC-SP 1 "Solvent Cleaning": Solvent cleaning is a method for removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants from steel surfaces.



3. SSPC-SP 2 "Hand Tool Cleaning": Hand tool cleaning is a method of preparing steel surfaces by the use of non-power hand tools. Hand tool cleaning removes all loose mill scale, loose rust, paint, and other loose detrimental foreign material. It is not intended that adherent mill scale, rust, and paint be removed by this process. Mill scale, rust, and paint are considered tightly adherent if they cannot be removed by lifting them with a dull putty knife.
4. SSPC-SP 3 "Power Tool Cleaning": Power tool cleaning is a method of preparing steel surfaces by the use of power assisted hand tools. Power tool cleaning removes loose rust, paint, and other loose detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Mill scale, rust, and paint are considered adherent if they cannot be removed by lifting with a dull putty knife.
5. SSPC-SP 5 "White Metal Blast Cleaning": A white metal blast cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products and other foreign matter.
6. SSPC-SP 6 "Commercial Blast Cleaning": A commercial blast cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products and other foreign matter, except for staining. Staining shall be limited to no more than 33 percent of each square inch of surface area and may consist of light shadows, slight streaks or minor discolorations caused by stains of rust, stains of mill scale or stains of previously applied paint. Slight residues of rust and paint may also be left in the bottoms of pits if the original surface is pitted.
7. SSPC-SP 7 "Brush-Off Blast Cleaning": A brush-off blast cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, loose mill scale, loose rust and loose paint. Tightly adherent mill scale, rust and paint may remain on the surface. Mill scale, rust and paint are considered tightly adherent if they cannot be removed by lifting with a dull putty knife.
8. SSPC-SP 10 "Near-White Blast Cleaning": A near-white blast cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products and any other foreign matter, except for staining. Staining shall be limited to no more than 5 percent of each square inch of surface area and may consist of light shadows, slight streaks or minor discolorations caused by stains of rust, stains of mill scale or stains of previously applied paint.
9. SSPC-SP 11 "Power Tool Cleaning to Bare Metal": The removal of all visible oil, grease, dirt, mill scale, rust, paint, oxide, corrosion products, and other foreign matter. Slight residues of rust and paint may be left in the lower portion of pits if the original surface is pitted. Differs from SSPC-SP 3 in that it requires more thorough cleaning and a surface profile not less than 1 mil (25 microns).
10. NAPF 500-03-01 "Solvent Cleaning": Solvent cleaning is a method for removing all oil, small deposits of asphalt paint, grease, soil, drawing and cutting compounds and other soluble contaminants from iron surfaces.

11. NAPF 500-03-04 "Abrasive Blast Cleaning of Ductile Iron Pipe": An abrasive blast cleaned, exterior pipe surface when viewed without magnification, shall be free of all visible dirt, dust, loose annealing oxide, loose rust, loose mold coating and other foreign matter. All oils, small deposits of asphalt paint, and grease shall have been removed by solvent cleaning per NAPF 500-03-01. After the entire surface to be coated has been struck by the blast media, tightly adherent annealing oxide, mold coating and rust staining may remain on the surface provided they cannot be removed by lifting with a dull putty knife.
12. SSPC-SP 13/NACE 6 "Surface Preparation of Concrete": A joint standard that gives requirements of the surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of a bonding protective coating system. Use the following methods of surface preparation as recommended by the coatings manufacturer or as specified herein:
  - a. Surface cleaning as described in ASTM D 4258 to include vacuum cleaning, air blast cleaning, and water cleaning to remove dirt, loose material, and/or dust: detergent water cleaning and/or steam cleaning to remove oil and grease from concrete.
  - b. Dry, wet or vacuum-assisted abrasive blasting as described in ASTM D 4259 to remove contaminants, laitance, and weak concrete, to expose subsurface voids, and to produce a sound concrete surface with adequate profile and surface porosity.
  - c. Impact-tool methods including scarifying, scabbing and rotary peening and/or power tool methods including circular grinding, sanding, and wire brushing as described in ASTM D 4259 to remove existing coatings laitance, weak concrete and protrusions in concrete. These methods may require abrasive blasting (b. above) to produce a uniform, sound concrete surface with adequate profile and surface porosity that is suitable for the specified protective coating system.
  - d. Acid-etching will not be approved.

B. Shop Priming and Painting

1. Coat interior, inaccessible surfaces of equipment with an epoxy system suitable for the lifetime of the equipment at anticipated operating conditions and temperatures, unless otherwise specified or accepted.
2. Coat exterior and accessible interior surfaces with an appropriate epoxy system unless otherwise specified or accepted.

C. Wood surfaces to be primed and/or painted shall be prepared in accordance with the following requirements prior to application of primer or paint:

1. Exterior or Interior, Painted: Surface must be dry, clean, and free of contaminants. Rough areas shall be sanded to a smooth, even surface and then vacuum cleaned. Knots, pitch pockets, and/or resinous sapwood shall be sealed with shellac, not over 2 pounds cut, prior to the application of primer. Holes, cracks, open joints, and other defects shall be puttied smooth following the

application of the primer. Putty used shall be compatible in all respects with the primer and finish coating.

2. Interior, Stained: Surface shall be thoroughly cleaned, sanded, and dusted. Final sanding shall be in the direction of the grain only. Dust shall be removed by vacuuming.

D. Ferrous Metal (Excluding Stainless Steel)

1. Immersion Surfaces: "Near-White Blast Cleaning" in accordance with SSPC-SP 10 (NACE No. 2). Abrasive blasting shall achieve an anchor pattern or blast profile of between 30 and 40 percent of the dry film thickness of the first applied coat of primer or paint.
2. Non-Immersion Surfaces: "Commercial Blast Cleaning" in accordance with SSPC-SP 6 (NACE No. 3). Abrasive blasting shall achieve an anchor pattern or blast profile of between 30 and 40 percent of the dry film thickness of the first applied coat of primer or paint.
3. High Temperature System: "Near White Blast Cleaning" in accordance with SSPC-SP 10 (NACE No. 2). Abrasive blasting shall achieve an anchor pattern or blast profile of between 30 and 40 percent of the dry film thickness of the first applied coat of primer or paint.
4. Field Preparation of Shop Primed Surfaces: "Solvent Cleaning" in accordance with SSPC-SP 1. Shop primed ferrous metal surfaces which have been damaged or which show signs of corrosion shall be sand blasted and/or cleaned in accordance with the specification given above for the particular finish coating to be applied prior to the application of the field primer or finish coating.

E. Ductile and Cast Iron

1. Immersion, Interior and Exterior Exposed: "Solvent Cleaning" and "Abrasive Blast Cleaning of Ductile Iron Pipe" in accordance with NAPF 500-03-01 and -04, respectively. Abrasive blasting shall achieve an anchor pattern or blast profile as recommended by the coatings manufacturer.
2. Field Preparation of Shop Primed Surfaces: "Solvent Cleaning" in accordance with NAPF 500-04-01. Shop primed iron surfaces which have been damaged or which show signs of corrosion shall be abrasive blasted and/or cleaned in accordance with the specifications given above for both asphaltic and non-asphaltic coating systems.

F. Nonferrous Metals

1. Galvanized Metal: Surfaces shall be clean, dry, and free of contaminants. Manufacturer or fabricator-applied silicate pretreatment shall be removed by sanding. The surface should always be wiped with an acceptable solvent for removing oil and grease. New galvanized metal should receive a SSPC-SP 7 Brush-Off Blast to ensure good adhesion. The white deposit on weathered galvanized metal should be removed with detergent and water and rinsed well with clean water.

2. Aluminum: The surface should always be wiped with an acceptable solvent for removing oil and grease. Light sanding or light abrasive blast cleaning, and/or a phosphoric etch should be used on aluminum that is not anodized or alodized to assure good adhesion. Etching solutions should be used according to manufacturers recommendations.
  3. Copper Piping: Surfaces shall be cleaned with a mild phosphoric acid cleaner followed by water washing. Dull surfaces shall be buffed or polished to a bright color. Primer shall be applied while surface is clean and bright.
- G. Stainless Steel Piping: Surfaces shall be clean, dry, and free of contaminants. Oils, greases, waxes, etc., shall be removed by solvent cleaning in accordance with SSPC-SP 1. Surfaces shall be roughened by hand sanding or light blast cleaning.
- H. Nonmetallic Piping
1. Polyvinyl Chloride (PVC) Piping: Surface shall be roughened by hand sanding or light blast cleaning. Oils, greases, waxes, etc., shall be removed by solvent cleaning.
  2. Fiberglass Piping: Surfaces shall be roughened by hand sanding or light blast cleaning. Oils, greases, waxes, etc., shall be removed by solvent cleaning.
  3. Pipe Insulation: Surface shall be dry, clean, and free of all contaminants. Soiled areas shall be cleaned by wire brushing, dusting, and vacuum cleaning. Sections of insulation covering contaminated with oil, grease, wax, or other materials which would affect the proper bonding of the finish shall be removed and replaced.
- I. Concrete and Masonry: Surfaces shall be allowed to cure completely before painting. Steel troweled or other smooth concrete surfaces shall be abrasive blast cleaned per SSPC SP 13/NACE 6. Concrete surfaces shall be cleaned of all dust, dirt, form oil, curing compounds and other foreign matter. Concrete floors shall be cleaned with a process equal to Shot Blasting with a Blastrac Unit. Cleaned floors shall have the granular appearance of fine sandpaper and shall be recleaned to attain uniformity, if required. Form release compounds used in poured concrete construction should be removed with a suitable solvent as recommended by the manufacturer of such compounds.
- J. Gypsum Wallboard and Plaster: Surface shall be dry and free of dust, dirt, powdery residues, grease, oil, wax, or other contaminants. Small cracks or holes shall be filled with shackling compound. Shackling compound, where used, shall be thoroughly dry and sanded smooth before the application of any coating.
- ### 3.3 APPLICATION
- A. Apply finish coatings with suitable brushes, rollers, or spray equipment per manufacturers instructions.
1. Rate of application shall not exceed the paint manufacturer's recommendation for the surface being coated.

2. Brushes, rollers, and spraying equipment shall be kept clean, dry, and free of contaminants at all times.
3. Stain shall be applied by brush or clean, dry cloth. Wipe or dry brush until desired toning is achieved. If deeper tone is required, repeat application after first coat is thoroughly dry.
4. Coatings shall be applied in accordance with paint manufacturer's recommendations and may be subject to inspection at all times by representatives of the Owner or manufacturer.
5. All spray equipment may be inspected by the Engineer's resident project representative (RPR) or Owner's representative before paint application begins.
6. A moisture trap shall be placed in air line supply between the compressor and the pressure pot, airless pump, and/or blow down hoses.
7. Operational regulators and gauges shall be provided for pressure tanks or airless pumps.
8. All spent abrasive and dust from blasting operations shall be removed from surfaces prior to painting application.
9. Blasted surfaces shall be coated with one coat of primer during the same day that blasting is done.
10. Priming shall not be applied closer than 6 inches to a non-blasted area. Any subsequent blasting operation shall not result in abrasive particles embedded in the paint film.
11. No painting shall take place when the temperature is below 50 F, or when the surface temperature is within 5 F of the dewpoint, or when the relative humidity is above 85%, unless approved by the Engineer.
12. Spray gun must be held perpendicular to the surface being coated, and handled in such a manner that dry over spray is held to a minimum.
13. When paint is being applied to the interior of tanks or confined areas, sufficient explosion proof blowers or fans shall be installed to provide adequate ventilation. Adhere to the paint manufacturer's recommendations for forced air ventilation during application and curing. When isocyanate catalyzed coatings are being applied, positive pressure air supplied respirators must be used.
14. Cover or otherwise protect the finished work of other trades and surfaces which are not to be painted. Any injury or damage to such surfaces shall be remedied to the satisfaction of the Engineer at the expense of the Contractor before final acceptance and payment will be made.
15. All materials used in successive field coats shall be produced by the same manufacturer.

- B. Field painting shall be in the number of coats specified in Part 3.5, Painting Schedule, of this section. Shop or field-applied priming coats shall not be considered as one of the required field finish coats.
  - 1. Individual field finish coats shall be tinted differently in order to distinguish each coat from preceding or succeeding coats.
  - 2. Strictly comply with the coating manufacturer's recommendation for drying time between coats.
  - 3. The Engineer shall inspect each coat before additional coats are applied. Only inspected coats will be considered in determining the number of coats applied.
- C. Finish Coats. Finish coats shall be smooth, free of brush marks, streaks, runs, laps or pile-up of paint, and skipped or missed areas. Moldings, trim, and other ornaments shall be left clean and true to details with no undue amount of paint in corners and depressions. The edges of paint adjoining other materials or colors shall be clean and sharp with no overlapping. Where any portion of the finish of a wall has been damaged or is not acceptable, the entire wall shall be refinished.

#### 3.4 TESTING AND INSPECTION

- A. Ambient Conditions. Prior to and during paint application, the following ambient conditions shall be measured to confirm that all conditions are within specified limits:
  - 1. Air temperature and relative humidity to be measured with a sling or battery operated psychrometer. The dew point shall be determined from approved psychrometric tables using measured wet- and dry- bulb thermometer readings.
  - 2. Surface temperature to be measured with a surface temperature thermometer.
- B. Surface Profile. Prior to paint application and after abrasive blasting, the surface to be painted shall be checked with surface profile tape to determine if the depth of profile specified has been achieved.
- C. Film Thickness
  - 1. Wet Film Thickness. The wet film thickness of each coat of paint shall be verified by measuring with an approved wet film thickness gauge as it is applied.
  - 2. Dry Film Thickness. The dry film thickness (DFT) of each coat of paint and the entire system shall be measured with a Type 1 or Type 2 magnetic dry film thickness gauge in accordance with SSPC-PA 2. Five spot measurements (3 readings constitute 1 spot measurement) shall be taken for each 100 square feet area as outlined in SSPC-PA 2, Section 3.
- D. Holiday Testing. The paint on all interior tank surfaces and submerged steel shall be tested with a Tinker & Razor, or equivalent, low voltage, wet sponge holiday detector after the paint has cured for at least 5 days. Locations where holidays are detected shall be marked for repair and retested and after repair work has been completed.

#### 3.5 PROTECTIVE COATING SCHEDULE

1. Primers and finishes shall be applied in accordance with the following schedule for the surface and exposure specified:





<b>PROTECTIVE COATING SCHEDULE</b>										
	<b>Generic Type</b>	<b>Surface Preparation</b>	<b>First Coat (Primer)</b>	<b>DFT Mils</b>	<b>Second Coat</b>	<b>DFT Mils</b>	<b>Third Coat</b>	<b>DFT Mils</b>	<b>Total DFT Mils (min)</b>	<b>Total Coats</b>
<b>Plaster and Gypsum Wallboard</b>										
Interior Exposed	Acrylic Emulsion	Clean and Dry	F-1, P-2	2-3	F-1	2-3	F-1	2-3	5	2-3
	Epoxy	Clean and Dry	FS-4	1-2	F-8	2-3	F-8	2-3	7	3
<b>Wood</b>										
Interior or Exterior Exposed	Acrylic Emulsion	Clean and Dry	F-1, P-1	2-3	F-1	2-3	F-1	2-3	8, 7	3
	Latex	Clean and Dry	P-2	1.5-2	F-2	1.5-2	F-2	1.5-2	5	3
<b>Ferrous Metal<sup>1</sup></b>										
Exterior Exposed <sup>2</sup>	Epoxy/Polyurethane	SSPC-SP6	P-8	4-6	F-8	4-6	F-9 <sup>7</sup>	2-3	10	3
Interior Exposed <sup>2</sup>	Epoxy	SSPC-SP6	F-8	3-5	F-8	4-6	F-8	4-6	11	3
Immersion	Epoxy	SSPC-SP10	P-6, P-7 <sup>3</sup>	3-5	F-4 <sup>3</sup> , F-5	4-6	F-4 <sup>3</sup> , F5	4-6	11	3
Below Grade/Underground	Coal Tar Epoxy	SSPC-SP10	P-6 <sup>7</sup> Optional	3-5	F-10	16-20			22	1 or 2
Interior/Immersion Severe	Vinyl Ester	SSPC-SP5	P-5	12-18	F-6	12-18			28	2
	Novolac Epoxy	SSPC-SP10	F-7	40					40	1
Interior/Exterior Exposed High Temperature <sup>2</sup>	Silicone Aluminum	SSPC-SP10	P-4	2-4	F-19	1-1.5	F-19 <sup>9</sup>	1-1.5	5.5	2 or 3
<b>Galvanized Steel</b>										
Exterior Exposed <sup>2</sup>	Epoxy/Polyurethane	ASTM D6386	F-8	3-5	F-9 <sup>7</sup>	2-3			6	2
Interior Exposed <sup>2</sup>	Epoxy	ASTM D6386	F-8	2-3	F-8	2-3			5	2
Immersion	Epoxy	ASTM D6386	P-6	3-5	F-4 <sup>3</sup> , F-5	2-3			6	2
<b>Ductile or Cast Iron</b>										
Exterior Exposed <sup>2</sup>	Epoxy/Polyurethane	NAPF 500-03-04 <sup>4</sup>	F-8	3-5	F-8	4-6	F-9	2-3	12	3

Interior Exposed <sup>2</sup>	Epoxy	NAPF 500-03-04 <sup>4</sup>	F-8	3-5	F-8	4-6			9	2
Immersion	Epoxy	NAPF 500-03-04 <sup>4</sup>	F-4 <sup>3</sup> ,F-5	3-5	F-4 <sup>3</sup> ,F-5	4-6			9	2
Below Ground	Coal Tar Epoxy	NAPF 500-03-04 <sup>4</sup>	F-10 Optional	3-5	F-10	16-20			19-25	2 or 1
	Modified Polyurethane	NAPF 500-03-04 <sup>4</sup>	F-5 <sup>7</sup>	3-5	F-12	50			55	2
<b>PVC, Fiberglass</b>										
Exterior Exposed <sup>2</sup>	Epoxy/Polyurethane	Scarify	F-8	2-3	F-9	2-3			4-6	2
<b>PROTECTIVE COATING SCHEDULE</b>										
	<b>Generic Type</b>	<b>Surface Preparation</b>	<b>First Coat (Primer)</b>	<b>DFT Mils</b>	<b>Second Coat</b>	<b>DFT Mils</b>	<b>Third Coat</b>	<b>DFT Mils</b>	<b>Total DFT Mils (min)</b>	<b>Total Coats</b>
Interior Exposed <sup>2</sup>	Epoxy	Scarify	F-5	2-3	F-5	2-3			4-6	2
<b>Insulated Pipe</b>										
Interior Exposed	Acrylic Emulsion	Clean and Dry	F-1,P-2	2-3	F-1	2-3			5	2
<b>Concrete</b>										
Exterior Exposed	Modified Epoxy	Clean and Dry	F-11	8-10						1
Interior Exposed	Epoxy	Clean and Dry	F-4 <sup>3</sup>	4-6	F-4 <sup>3</sup>	4-6			10	2
Immersion	Epoxy	Brush-Off Blast	FS-3	As needed	P-6	12-18	F-6	12-18	30	3
	Epoxy/Modified Polyurethane	SSPC-SP7	F-5 , P-7	4-6,3-5	F-12	50			55	2
Below Grade/Wet Wells	Coal Tar Epoxy	Clean and Dry	F-10	16-20					18	1
Interior/Immersion Severs	Vinyl Ester	Brush-Off Blast	FS-3	As Needed	P-6	12-18	F-6	12-18	30	3
	Novolac Epoxy	Abrasive Blast	P-6	3-5	F-7	40			48	2
<b>Masonry</b>										

Exterior Exposed	Water-Based Sealer	Clean and Dry	FS-5	125-175 <sup>6</sup> (ft <sup>2</sup> /gal)						
Exterior Exposed	Modified Epoxy	Clean and Dry	F-11	8-10	F-11	8-10			18	2
Interior Exposed	Epoxy	Clean and Dry	FS-2	75-100 <sup>6</sup> (ft <sup>2</sup> -gal)	F-4	4-6	F-4	4-6	10	3

**Concrete Floors**

Interior Exposed	Epoxy/Polyurethane	SSPC-SP13	F-13	2-3	F-13	2-3	F-9	2	7	3
	Epoxy (High Solids)	SSPC-SP13	P-9	6-8	F-13	6-8	F-16	6-8	20	3
	Aggregate Filled Epoxy	SSPC-SP13	P-9	6-8	F-14	1/8" Double Broadcast	F-16	6-8	1/8"+	4
	Ceramic Filled Decorative Epoxy	SSPC-SP13	P-9	9-8	F-15	1/8" Double Broadcast	F-17	8-10	1/8"+	3

**NOTES:**

<sup>1</sup>Field priming of shop-primed ferrous metal surfaces is required only where the shop primer has been removed because of damage or apparent corrosion and the surface has been re-prepared in accordance with Part 3.2, Preparation of Surfaces, of this section.

<sup>2</sup>Where piping is to be striped, 2 full coats of the base color shall be applied prior to the application of the contrasting color of strip.

<sup>3</sup>NSF approved for potable water service.

<sup>4</sup>Provide additional cleaning per NAPF 500-03-01 "Solvent Cleaning" where required.

<sup>5</sup>Exposures subject to aggressive chemical solutions such as inorganic and organic acids and high concentrations of hydrogen sulfide gas.

<sup>6</sup>The spreading rate will depend of the porosity of the surface.

<sup>7</sup>Depending on the method of application and color of the primer or intermediate coat, certain colors may require multiple coats for complete

hiding.

<sup>8</sup>Not required by Carboline.

<sup>9</sup>Additional coat depends on operating conditions.

**Some film thickness ranges listed are only achievable by spray applications. Roller applications may require additional coats.**

END OF SECTION

## SECTION 09900

### PAINTING

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

- A. Under this section furnish all materials, equipment, and labor to accomplish all painting necessary or convenient to the Contractor for the satisfactory completion of the work included under these Contract Documents. The words "paint" and "painting" used in this specification apply to and also describe the use and application of protective coatings.
- B. In general, the work included under this section shall include the surface preparation, shop priming, field priming, and/or field painting of all surfaces identified in Part 3.5, Protective Coating Schedule, of this section. These surfaces include, but are not limited to, the following:
1. Wood
  2. Ferrous metals (except stainless steel or pre-finished surfaces)
  3. Galvanized metal
  4. Concrete and masonry
  5. Gypsum wallboard and plaster
  6. Piping and pipe insulation, including:
    - a. Aluminum
    - b. Cast or ductile iron
    - c. Copper
    - d. Fiberglass
    - e. PVC
    - f. Stainless steel
    - g. Steel pipe
- C. Aluminum, bronze, copper, stainless steel, and/or other corrosion-resistant metal surfaces (excluding piping) shall not be painted unless specifically called for on the Drawings or in these Contract Documents.

##### 1.2 QUALITY ASSURANCE

- A. Submit to the Engineer for his review the following information concerning the materials the Contractor proposes to use in work covered by this item:
1. A list of all components (paints or other materials) to be used in each painting system required herein.
  2. A complete descriptive specification of each component.
  3. Only those systems and components which are judged acceptable by the Engineer shall be utilized in the work covered by this item. No materials shall be delivered to the job site until the Engineer has evaluated their acceptability.
- B. All products submitted shall be lead- and chromate-free formulations and comply to current VOC emission regulations. Manufacturers technical data sheets must contain the following information:
1. Manufacturer's name
  2. Type of paint or other generic identification
  3. Manufacturer's stock number
  4. Color (if any)
  5. Type of gloss
  6. Minimum flash point
  7. Percent solids by volume
  8. Recommended dry film thickness per coat
  9. Theoretical coverage rates
  10. Instructions for mixing, thinning, or reducing (as applicable)
  11. Manufacturer's application recommendations
  12. Safety and storage information
  13. Viscosity at ambient temperature
  14. Average dry times (dry to touch, dry to recoat) at ambient temperature.
  15. Recommended thinners and maximum thinning permissible to meet current VOC regulations.
  16. Recommended primer if applicable
  17. Application method (brush, roll, conventional or airless spray)
  18. VOC level of coating
  19. Instructions for mixing multiple component materials

- C. Obtain the Engineer's review of the first finished room, space, area, item, or portion of work of each surface type and color specified. The first room, space, area, item, or portion of work which is acceptable to the Engineer shall serve as the project standard for all surfaces of similar type and color. Where spray application is utilized, the area to be reviewed shall not be smaller than 100 square feet.
- D. An authorized representative of the coatings manufacturer shall be present at the start-up and periodically during painting operations. Such representative shall instruct and observe the Contractor's workmanship and shall, at the completion of the work, certify in writing to the Engineer that the manufacturer's application recommendations were followed.
- E. Contractor Qualification. Contractor must provide documentation that he has previously performed this type of work and provide job references as required by the Engineer. Provide a written guarantee against defective materials and workmanship in accordance with these Specifications.

### 1.3 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver all paint, primers, varnishes, and sealers to the job site in their original, unopened containers not exceeding 5-gallon capacity each, unless otherwise specified herein. With the permission of the Engineer, the manufacturer may use and ship in agitator barrels. Paint containers shall not be opened until they have been inspected and approved by the Engineer.
- B. Store paint and related materials and equipment in a suitable location on the project site away from work areas and other storage areas. Strictly adhere to all applicable health, safety, and fire regulations controlling the storage of paint and related materials. Store and handle all materials in accordance with the manufacturer's recommendations.
- C. Each container shall be marked with the manufacturer's name, product number, and batch number. The labels shall also show mixing and thinning instructions, and recommended dry film thickness of each product. Use thinner recommended by the manufacturer. The use of accelerators must be approved by the Engineer. Any substitutions of generic thinners must be approved by the Engineer.

### 1.4 JOB CONDITIONS

- A. Strictly follow the manufacturer's recommendations concerning environmental conditions under which a material can be applied. No finishes shall be applied in areas where dust is being generated.
- B. Cover or otherwise protect the finished work of other trades, surfaces not being painted concurrently, and/or surfaces which are not to be painted. Any injury or damage to such surfaces shall be remedied at Contractor's expense to the satisfaction of the Engineer before final acceptance, and no separate payment therefor will be made.

### 1.5 TESTING EQUIPMENT

A. Furnish and make available to the Engineer the following items of testing equipment for use in determining if the requirements of this Specification section are being satisfied. The specified items of equipment shall be available for the Engineer's use at all times when field painting or surface preparation is in progress.

1. Wet film gauge
2. Surface thermometer
3. Spring micrometer with surface profile tape
4. Set of Steel Structures Painting Council Visual Standards (SSPC-VIS 1-89)
5. Holiday (pin hole) detector (low voltage)
6. Sling-psychrometer and psychrometric tables
7. Magnetic dry film gauge (Type 1 or Type 2) with appropriate calibration shims or plates.

#### 1.6 MEASUREMENT AND PAYMENT

1. No separate measurement or payment will be allowed for this work. Payment for all work performed under this section shall be included in other items of work

### PART 2 - PRODUCTS

#### 2.1 ACCEPTABLE MANUFACTURERS

- A. The specific products and manufacturers listed for each general product classification in Part 2.2, Materials List, of this section are given only to identify the generic type, quality, and general composition required for each product. Furnish similar products of other manufacturers subject to the review of the Engineer in accordance with the provisions of Part 1.2, Quality Assurance, of this section. The utilization of named products as given in Part 2.2, Material List, of this section does not excuse the Contractor from complying with the provisions of Part 1.2.
- B. All materials used in successive field coats shall be produced by the same manufacturer. Material used in the first field coat over shop painted or previously painted surfaces shall cause no wrinkling, lifting, or other damage to underlying paint.

#### 2.2 MATERIAL LIST

Primers and Finishes. Subject to compliance with requirements, provide one of the following:

##### TYPE

- A. Fillers, Sealers, and Surfacer

FS-1 Concrete/Steel



"63-1500 Filler and Surfacer," Tnemec

"Carboguard 501," Carboline

"Steel-Seam FT910," Sherwin-Williams

FS-2 Masonry Filler

"54-660 Masonry Filler," Tnemec

"Sanitile 600," Carboline

"Kem Cati-Coat HS Epoxy Filler/Sealer," Sherwin-Williams

FS-3 Concrete

"Series 434 Perma-Shield H2S," Tnemec

"Steel-Seam FT910," Sherwin-Williams

FS-4 Drywall Sealer

"51-792 PVA Sealer," Tnemec

"Carbocrylic 120," Carboline

"Preprite 200," Sherwin-Williams

FS-5 Concrete Masonry, Block and Brick Sealer

"Series 663 Prime-A-Pell H<sub>2</sub>O," Chemprobe/Tnemec\*

"Enviroseal Double 7 H.D., or PBT," Degussa

"Concrete and Masonry Sealer," THORO

\*Use Series 662 Prime-A-Pell Plus for horizontal applications.

B. Primers

P-1 Waterborne Acrylic

"Carbocrylic 120," Carboline

"DTM Bonding Primer," Sherwin-Williams

P-2 Latex

"DTM Primer/Finish," Sherwin-Williams

P-3 Interior Wood Stain

"Interior Oil Stain," Sherwin-Williams

P-4 High Temperature - Zinc Rich

- "90E-92 Tneme-Zinc," Tnemec
- "Carbozinc 11 or 11HS," Carboline
- "Zinc Clad II Ethyl Silicates," Sherwin-Williams
- P-5 High Levels of Hydrogen Sulfide - Vinyl Ester
  - "Series 120-5002 Vinester," Tnemec
  - "Plastite 4007," Carboline
  - "Corobond Conductive Vinyl Ester Primer," Sherwin-Williams
- P-6 Immersion, Non-potable Water
  - "Series N69 Hi-Build Epoxoline II," Tnemec
  - "Carboguard 671," Carboline
  - "Cor-Cote SC Sewer-Cote," Sherwin-Williams
- P-7 Immersion, Potable Water
  - "Series N140 Pota-Pox," Tnemec
  - "Carboguard 561," Carboline
  - "Macropoxy 646NSF," Sherwin-Williams
- P-8 Non-immersion (Exterior)
  - "Series N69 Hi-Build Epoxoline II," Tnemec
  - "Carboguard 890," Carboline
  - "Tile Clab HS," Sherwin-Williams
- P-9 Concrete Floors - Epoxy
  - "Series 201 Epoxoprime," Tnemec
  - "Semstone 110," Carboline
  - "General Polymers 3579 Clear," Sherwin-Williams

C. Finishes

- F-1 Acrylic
  - "Series 6\*/7\*\*\*-Color Tneme-Cryl\*," Tnemec
  - "Sanitile 155\*\*\* or Carbocrylic 3359\*\*," Carboline
  - "ProMar 200 Flat or 200 S/G," Sherwin-Williams

\*Matte, \*\*Semi-gloss, \*\*\*Satin

- F-2 Latex  
"A-100 Satin," Sherwin-Williams
- F-3 INTERIOR WOOD VARNISH  
"Marrethane Satin Varnish," Sherwin-Williams  
"Wood Classics Polyurethane Varnish," Sherwin-Williams
- F-4 Immersion (Potable Water - NSF Approved)  
"Series N140 Pota-Pox," Tnemec  
"Carboguard 561," Carboline  
"Macropoxy 846NSF," Sherwin-Williams
- F-5 Immersion (Non-potable Water)  
"Series N69 Hi-Build Epoxoline II," Tnemec  
"Carboguard 691," Carboline  
"Dura-Plate 235," Sherwin-Williams  
"Macropoxy 646," Sherwin-Williams
- F-6 High Levels of Hydrogen  
"Series 435 Perma-Glaze," Tnemec  
"Cor-Cote SC Sewer-Cote," Sherwin-Williams
- F-7 High Levels of Hydrogen Sulfide - Novolac Epoxy  
"Series 275 Stranlock," Tnemec
- F-8 Non-immersion (Exterior/Interior)  
"Series N69 Hi-Build Epoxoline II," Tnemec  
"Carboguard 890," Carboline  
"Macropoxy 646 Fast Cure," Sherwin-Williams
- F-9 Exterior - Urethane  
"Series 1074\*/1075\*\* Endura-Shield II\*," Tnemec  
"Carbothane 134HG\* or 133 HB\*\*," Carboline  
"Arolon 218 HS, PDS 5.22," Sherwin-Williams

\*Gloss, \*\*Semi-gloss (Specify)

- F-10 Below Grade - Coal Tar Epoxy  
"46H-413 Hi-Build Tneme-Tar," Tnemec  
"Bitumastic 300M," Carboline  
"Hi-Mil Sher-Tar PDS 4.71," Sherwin-Williams
- F-11 Exterior Concrete - Modified Epoxy  
"52-Color Tneme-Crete," Tnemec  
"Sanitile 755," Carboline
- F-12 Below Grade - Modified Polyurethane  
"Series 262 Elasto-Shield," Tnemec  
"Polibrid 705," Carboline  
"Sher-Flex," Sherwin-Williams
- F-13 Concrete Floors - Epoxy (Light Traffic Only)  
"Series 205 Terra-Tread FC," Tnemec  
"Carboguard 890," Carboline  
"Macropoxy 646 Fast Cure," Sherwin-Williams
- F-14 Concrete Floors - Aggregate Filled Epoxy  
"Series 237 Power Tread," Tnemec  
"Sanitile 945SL AFC," Carboline  
"Armorseal 650 with Broadcast," Sherwin-Williams
- F-15 Concrete Floors - Ceramic/Quartz Filled Epoxy  
"Series 222 Deco-Tread," Tnemec  
"Sanitile 925," Carboline  
"Ceramic Carpet," Sherwin-Williams/General Polymers
- F-16 Concrete Floors - Color Epoxy Finish  
"Series 280 Tneme-Glaze," Tnemec  
"Sanitile 945SL," Carboline  
"Cor-Cote HP," Sherwin-Williams

F-17 Concrete Floors - Clear Epoxy Finish

"Series 284 Deco-Clear," Tnemec

"Sanitile 925," Carboline

"Cor-Cote HP Clear," Sherwin-Williams

F-18 Concrete - Acrylic Emulsion

"Series 180/181 W.B. Tneme-Crete," Tnemec

"UltraCrete Texture (Fine) Coating," Sherwin-Williams

F-19 High Temperature - Silicone (with Primer) (Up to 1000°F)

"Series 39 Silicone Aluminum," Tnemec

"Thermaline 4700 Aluminum," Carboline

"Hi-Temp 1050 ZP Primer and 1000V Series," Sherwin-Williams

2.3 COLORS

- A. Color Cards. Submit color cards for all paints, stains, or other materials to the Engineer for review and color selection. Only those colors which have been reviewed and accepted by the Engineer shall be utilized in work covered by this section.

2.4 PIPE AND EQUIPMENT IDENTIFICATION

A. Pipe Color Code

1. Pipe: Color code all pipes, including insulated pipe, in accordance with the schedule given below. Where applicable, colors shall comply with the specifications described in Section 3, "Color Definitions," of ANSI Z53.1. Other colors shall be selected by the Engineer in accordance with Part 2.3, Colors, of this section.
2. Stripes where required shall consist of 6-inch-wide bands completely around the pipe located 36 inches on centers. On pipe runs less than 36 inches in length, one color band shall be located at the center of the run.
3. Color Schedule

<b>Material</b>	<b>Color</b>
<u>Hazardous</u>	
Acid	Yellow with Black Stripes
Chlorine	Yellow
Ferric Chloride	Yellow with Red Stripes
Hydraulic Fluid Piping	Yellow with Blue Stripes

Lime Slurry Yellow with Green Stripes

Air Systems

Instrument Air Green with White Stripes

Process Air Green

Vacuum Green with Red Stripes

Flammable

Digester Gas Orange

Fuel Oil Orange with Blue Stripes

Process Water

Plant Water Red with Black Stripes

Seal Water Red

Wash Water (High Pressure) Red with Yellow Stripes

Cooling Water Red with White Stripes

Sludge

Blended Sludge Tan with Blue Stripes

Digested Sludge Tan with Green Stripes

Primary Sludge Tan with Orange Stripes

Return or Recirculated Sludge Tan

Transfer Piping Tan with Red Stripes

Waste Activated Sludge Tan with Black Stripes

Vents

Digester Gas Vents Aluminum with Orange Stripes

Fuel Oil Vents Aluminum with Blue Stripes

Sanitary Vents Aluminum with Black Stripes

Other Vents Aluminum with Green Stripes

Process Piping

Heating and Heat Recovery Piping (Steam) Gray with Red Stripes

Supernatant, Decant, or Filtrate Gray

Overflow Black

Raw Sewage (Sanitary) Black

Miscellaneous

Electrical Conduit Aluminum\*

Oxygen White

Potable Water Blue

Roof Drains Gray with Blue Stripes

\*Where electrical conduit is exposed in a finished room or area, the conduit shall be painted to match room finish.

B. Pipe Labels

1. Legends: After piping has been installed and painting of pipe work has been completed as provided for above, label all pipe work with prefabricated, pre-legended, wrap around plastic/(other material) labels. Labels shall meet ANSI A131. Legends shall be descriptive of the function of the pipe, such as "ACID." Provide two labels, one label on each side of the pipe, at a suitable location along each pipe run. For long runs of pipe, provide labels at intervals not exceeding 20 feet. Locate the label on the pipe so that it will be in direct line of vision. Label may be omitted from one side if view is obstructed from that side. Where the flow in a pipe shall be at all times in one direction only, then a flow arrow shall be placed in front of each label on the pipe. Labels shall be manufactured by Lab Safety or Bradley, Inc. The lettering and arrows shall be of same height. The size of lettering shall be as follows:

<b>Outside Diameter of Pipe or Covering</b>	<b>Size of Letters</b>	
	<b>Letters</b>	
	¾" to 1¼"	½"
	1½" to 2"	¾"
	2½" to 6"	1¼"
	8" to 10"	2½"
	Over 10"	3½"

2. Tag: For pipes smaller than ¾ inch in outside diameter, use a laminated plastic or aluminum tag with the lettering etched or stamped and filled in with black or contrasting enamel.

3. Legends and Flow Arrows: Label background colors shall match piping colors. Legends shall be all capital, block lettering and black in color. Flow arrows shall be black in color. The above outline of intent designates the general extent of the identification work and is not exclusive of other similar work such as identification of pumps and other equipment as may be directed by the Engineer. Following the completion of the work under this item, deliver to the Owner two sets of all labels used.
4. Equipment Labels: Where specified in these Contract Documents or directed by the Engineer, paint stencil legends, in the same manner as a pipe of appropriate size on the individual units of equipment such as blowers, pumps, collector drives, compressors, silencers etc. All push buttons, starters, switches, etc., when remote from the equipment controlled and/or power packs, shall have labels of the engraved plastic type affixed to or adjacent to the remote switch, push button, starter, etc.

## 2.5 MIXING AND TINTING

- A. All paints and other materials shall be mixed and tinted by the paint manufacturer prior to delivery to the job site, when possible.
- B. Strictly adhere to the manufacturer's recommendations when job site mixing and/or tinting is required. The Contractor shall be solely responsible for the proper conduct of all on-site mixing and/or tinting.

## PART 3 - EXECUTION

### 3.1 CONTRACTOR'S INSPECTION

- A. Examine all surfaces scheduled to receive paint or other finishes for conditions that will adversely affect execution, permanence, or quality of work covered by this item. Surfaces which cannot be put into an acceptable condition through preparatory work as included in Part 3.2, Preparation of Surfaces, shall be immediately brought to the attention of the Engineer.
- B. Do not proceed with surface preparation or coating application until surface conditions are suitable.

### 3.2 PREPARATION OF SURFACES

- A. Surface Preparation Specifications
  1. General. Where abrasive blasting is specified, a low free silica abrasive with a silica content of <5% shall be used. Mineral slag by-products may not be used. Abrasive blasting should produce a surface profile of not less than 1.5 mils or greater than 3.5 mils.
  2. SSPC-SP 1 "Solvent Cleaning": Solvent cleaning is a method for removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants from steel surfaces.



3. SSPC-SP 2 "Hand Tool Cleaning": Hand tool cleaning is a method of preparing steel surfaces by the use of non-power hand tools. Hand tool cleaning removes all loose mill scale, loose rust, paint, and other loose detrimental foreign material. It is not intended that adherent mill scale, rust, and paint be removed by this process. Mill scale, rust, and paint are considered tightly adherent if they cannot be removed by lifting them with a dull putty knife.
4. SSPC-SP 3 "Power Tool Cleaning": Power tool cleaning is a method of preparing steel surfaces by the use of power assisted hand tools. Power tool cleaning removes loose rust, paint, and other loose detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Mill scale, rust, and paint are considered adherent if they cannot be removed by lifting with a dull putty knife.
5. SSPC-SP 5 "White Metal Blast Cleaning": A white metal blast cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products and other foreign matter.
6. SSPC-SP 6 "Commercial Blast Cleaning": A commercial blast cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products and other foreign matter, except for staining. Staining shall be limited to no more than 33 percent of each square inch of surface area and may consist of light shadows, slight streaks or minor discolorations caused by stains of rust, stains of mill scale or stains of previously applied paint. Slight residues of rust and paint may also be left in the bottoms of pits if the original surface is pitted.
7. SSPC-SP 7 "Brush-Off Blast Cleaning": A brush-off blast cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, loose mill scale, loose rust and loose paint. Tightly adherent mill scale, rust and paint may remain on the surface. Mill scale, rust and paint are considered tightly adherent if they cannot be removed by lifting with a dull putty knife.
8. SSPC-SP 10 "Near-White Blast Cleaning": A near-white blast cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products and any other foreign matter, except for staining. Staining shall be limited to no more than 5 percent of each square inch of surface area and may consist of light shadows, slight streaks or minor discolorations caused by stains of rust, stains of mill scale or stains of previously applied paint.
9. SSPC-SP 11 "Power Tool Cleaning to Bare Metal": The removal of all visible oil, grease, dirt, mill scale, rust, paint, oxide, corrosion products, and other foreign matter. Slight residues of rust and paint may be left in the lower portion of pits if the original surface is pitted. Differs from SSPC-SP 3 in that it requires more thorough cleaning and a surface profile not less than 1 mil (25 microns).
10. NAPF 500-03-01 "Solvent Cleaning": Solvent cleaning is a method for removing all oil, small deposits of asphalt paint, grease, soil, drawing and cutting compounds and other soluble contaminants from iron surfaces.

11. NAPF 500-03-04 "Abrasive Blast Cleaning of Ductile Iron Pipe": An abrasive blast cleaned, exterior pipe surface when viewed without magnification, shall be free of all visible dirt, dust, loose annealing oxide, loose rust, loose mold coating and other foreign matter. All oils, small deposits of asphalt paint, and grease shall have been removed by solvent cleaning per NAPF 500-03-01. After the entire surface to be coated has been struck by the blast media, tightly adherent annealing oxide, mold coating and rust staining may remain on the surface provided they cannot be removed by lifting with a dull putty knife.
12. SSPC-SP 13/NACE 6 "Surface Preparation of Concrete": A joint standard that gives requirements of the surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of a bonding protective coating system. Use the following methods of surface preparation as recommended by the coatings manufacturer or as specified herein:
  - a. Surface cleaning as described in ASTM D 4258 to include vacuum cleaning, air blast cleaning, and water cleaning to remove dirt, loose material, and/or dust: detergent water cleaning and/or steam cleaning to remove oil and grease from concrete.
  - b. Dry, wet or vacuum-assisted abrasive blasting as described in ASTM D 4259 to remove contaminants, laitance, and weak concrete, to expose subsurface voids, and to produce a sound concrete surface with adequate profile and surface porosity.
  - c. Impact-tool methods including scarifying, scabbing and rotary peening and/or power tool methods including circular grinding, sanding, and wire brushing as described in ASTM D 4259 to remove existing coatings laitance, weak concrete and protrusions in concrete. These methods may require abrasive blasting (b. above) to produce a uniform, sound concrete surface with adequate profile and surface porosity that is suitable for the specified protective coating system.
  - d. Acid-etching will not be approved.

B. Shop Priming and Painting

1. Coat interior, inaccessible surfaces of equipment with an epoxy system suitable for the lifetime of the equipment at anticipated operating conditions and temperatures, unless otherwise specified or accepted.
2. Coat exterior and accessible interior surfaces with an appropriate epoxy system unless otherwise specified or accepted.

C. Wood surfaces to be primed and/or painted shall be prepared in accordance with the following requirements prior to application of primer or paint:

1. Exterior or Interior, Painted: Surface must be dry, clean, and free of contaminants. Rough areas shall be sanded to a smooth, even surface and then vacuum cleaned. Knots, pitch pockets, and/or resinous sapwood shall be sealed with shellac, not over 2 pounds cut, prior to the application of primer. Holes, cracks, open joints, and other defects shall be puttied smooth following the

application of the primer. Putty used shall be compatible in all respects with the primer and finish coating.

2. Interior, Stained: Surface shall be thoroughly cleaned, sanded, and dusted. Final sanding shall be in the direction of the grain only. Dust shall be removed by vacuuming.

D. Ferrous Metal (Excluding Stainless Steel)

1. Immersion Surfaces: "Near-White Blast Cleaning" in accordance with SSPC-SP 10 (NACE No. 2). Abrasive blasting shall achieve an anchor pattern or blast profile of between 30 and 40 percent of the dry film thickness of the first applied coat of primer or paint.
2. Non-Immersion Surfaces: "Commercial Blast Cleaning" in accordance with SSPC-SP 6 (NACE No. 3). Abrasive blasting shall achieve an anchor pattern or blast profile of between 30 and 40 percent of the dry film thickness of the first applied coat of primer or paint.
3. High Temperature System: "Near White Blast Cleaning" in accordance with SSPC-SP 10 (NACE No. 2). Abrasive blasting shall achieve an anchor pattern or blast profile of between 30 and 40 percent of the dry film thickness of the first applied coat of primer or paint.
4. Field Preparation of Shop Primed Surfaces: "Solvent Cleaning" in accordance with SSPC-SP 1. Shop primed ferrous metal surfaces which have been damaged or which show signs of corrosion shall be sand blasted and/or cleaned in accordance with the specification given above for the particular finish coating to be applied prior to the application of the field primer or finish coating.

E. Ductile and Cast Iron

1. Immersion, Interior and Exterior Exposed: "Solvent Cleaning" and "Abrasive Blast Cleaning of Ductile Iron Pipe" in accordance with NAPF 500-03-01 and -04, respectively. Abrasive blasting shall achieve an anchor pattern or blast profile as recommended by the coatings manufacturer.
2. Field Preparation of Shop Primed Surfaces: "Solvent Cleaning" in accordance with NAPF 500-04-01. Shop primed iron surfaces which have been damaged or which show signs of corrosion shall be abrasive blasted and/or cleaned in accordance with the specifications given above for both asphaltic and non-asphaltic coating systems.

F. Nonferrous Metals

1. Galvanized Metal: Surfaces shall be clean, dry, and free of contaminants. Manufacturer or fabricator-applied silicate pretreatment shall be removed by sanding. The surface should always be wiped with an acceptable solvent for removing oil and grease. New galvanized metal should receive a SSPC-SP 7 Brush-Off Blast to ensure good adhesion. The white deposit on weathered galvanized metal should be removed with detergent and water and rinsed well with clean water.

2. Aluminum: The surface should always be wiped with an acceptable solvent for removing oil and grease. Light sanding or light abrasive blast cleaning, and/or a phosphoric etch should be used on aluminum that is not anodized or alodized to assure good adhesion. Etching solutions should be used according to manufacturers recommendations.
  3. Copper Piping: Surfaces shall be cleaned with a mild phosphoric acid cleaner followed by water washing. Dull surfaces shall be buffed or polished to a bright color. Primer shall be applied while surface is clean and bright.
- G. Stainless Steel Piping: Surfaces shall be clean, dry, and free of contaminants. Oils, greases, waxes, etc., shall be removed by solvent cleaning in accordance with SSPC-SP 1. Surfaces shall be roughened by hand sanding or light blast cleaning.
- H. Nonmetallic Piping
1. Polyvinyl Chloride (PVC) Piping: Surface shall be roughened by hand sanding or light blast cleaning. Oils, greases, waxes, etc., shall be removed by solvent cleaning.
  2. Fiberglass Piping: Surfaces shall be roughened by hand sanding or light blast cleaning. Oils, greases, waxes, etc., shall be removed by solvent cleaning.
  3. Pipe Insulation: Surface shall be dry, clean, and free of all contaminants. Soiled areas shall be cleaned by wire brushing, dusting, and vacuum cleaning. Sections of insulation covering contaminated with oil, grease, wax, or other materials which would affect the proper bonding of the finish shall be removed and replaced.
- I. Concrete and Masonry: Surfaces shall be allowed to cure completely before painting. Steel troweled or other smooth concrete surfaces shall be abrasive blast cleaned per SSPC SP 13/NACE 6. Concrete surfaces shall be cleaned of all dust, dirt, form oil, curing compounds and other foreign matter. Concrete floors shall be cleaned with a process equal to Shot Blasting with a Blastrac Unit. Cleaned floors shall have the granular appearance of fine sandpaper and shall be recleaned to attain uniformity, if required. Form release compounds used in poured concrete construction should be removed with a suitable solvent as recommended by the manufacturer of such compounds.
- J. Gypsum Wallboard and Plaster: Surface shall be dry and free of dust, dirt, powdery residues, grease, oil, wax, or other contaminants. Small cracks or holes shall be filled with shackling compound. Shackling compound, where used, shall be thoroughly dry and sanded smooth before the application of any coating.
- ### 3.3 APPLICATION
- A. Apply finish coatings with suitable brushes, rollers, or spray equipment per manufacturers instructions.
1. Rate of application shall not exceed the paint manufacturer's recommendation for the surface being coated.

2. Brushes, rollers, and spraying equipment shall be kept clean, dry, and free of contaminants at all times.
3. Stain shall be applied by brush or clean, dry cloth. Wipe or dry brush until desired toning is achieved. If deeper tone is required, repeat application after first coat is thoroughly dry.
4. Coatings shall be applied in accordance with paint manufacturer's recommendations and may be subject to inspection at all times by representatives of the Owner or manufacturer.
5. All spray equipment may be inspected by the Engineer's resident project representative (RPR) or Owner's representative before paint application begins.
6. A moisture trap shall be placed in air line supply between the compressor and the pressure pot, airless pump, and/or blow down hoses.
7. Operational regulators and gauges shall be provided for pressure tanks or airless pumps.
8. All spent abrasive and dust from blasting operations shall be removed from surfaces prior to painting application.
9. Blasted surfaces shall be coated with one coat of primer during the same day that blasting is done.
10. Priming shall not be applied closer than 6 inches to a non-blasted area. Any subsequent blasting operation shall not result in abrasive particles embedded in the paint film.
11. No painting shall take place when the temperature is below 50 F, or when the surface temperature is within 5 F of the dewpoint, or when the relative humidity is above 85%, unless approved by the Engineer.
12. Spray gun must be held perpendicular to the surface being coated, and handled in such a manner that dry over spray is held to a minimum.
13. When paint is being applied to the interior of tanks or confined areas, sufficient explosion proof blowers or fans shall be installed to provide adequate ventilation. Adhere to the paint manufacturer's recommendations for forced air ventilation during application and curing. When isocyanate catalyzed coatings are being applied, positive pressure air supplied respirators must be used.
14. Cover or otherwise protect the finished work of other trades and surfaces which are not to be painted. Any injury or damage to such surfaces shall be remedied to the satisfaction of the Engineer at the expense of the Contractor before final acceptance and payment will be made.
15. All materials used in successive field coats shall be produced by the same manufacturer.

- B. Field painting shall be in the number of coats specified in Part 3.5, Painting Schedule, of this section. Shop or field-applied priming coats shall not be considered as one of the required field finish coats.
  - 1. Individual field finish coats shall be tinted differently in order to distinguish each coat from preceding or succeeding coats.
  - 2. Strictly comply with the coating manufacturer's recommendation for drying time between coats.
  - 3. The Engineer shall inspect each coat before additional coats are applied. Only inspected coats will be considered in determining the number of coats applied.
- C. Finish Coats. Finish coats shall be smooth, free of brush marks, streaks, runs, laps or pile-up of paint, and skipped or missed areas. Moldings, trim, and other ornaments shall be left clean and true to details with no undue amount of paint in corners and depressions. The edges of paint adjoining other materials or colors shall be clean and sharp with no overlapping. Where any portion of the finish of a wall has been damaged or is not acceptable, the entire wall shall be refinished.

### 3.4 TESTING AND INSPECTION

- A. Ambient Conditions. Prior to and during paint application, the following ambient conditions shall be measured to confirm that all conditions are within specified limits:
  - 1. Air temperature and relative humidity to be measured with a sling or battery operated psychrometer. The dew point shall be determined from approved psychrometric tables using measured wet- and dry- bulb thermometer readings.
  - 2. Surface temperature to be measured with a surface temperature thermometer.
- B. Surface Profile. Prior to paint application and after abrasive blasting, the surface to be painted shall be checked with surface profile tape to determine if the depth of profile specified has been achieved.
- C. Film Thickness
  - 1. Wet Film Thickness. The wet film thickness of each coat of paint shall be verified by measuring with an approved wet film thickness gauge as it is applied.
  - 2. Dry Film Thickness. The dry film thickness (DFT) of each coat of paint and the entire system shall be measured with a Type 1 or Type 2 magnetic dry film thickness gauge in accordance with SSPC-PA 2. Five spot measurements (3 readings constitute 1 spot measurement) shall be taken for each 100 square feet area as outlined in SSPC-PA 2, Section 3.
- D. Holiday Testing. The paint on all interior tank surfaces and submerged steel shall be tested with a Tinker & Razor, or equivalent, low voltage, wet sponge holiday detector after the paint has cured for at least 5 days. Locations where holidays are detected shall be marked for repair and retested and after repair work has been completed.

### 3.5 PROTECTIVE COATING SCHEDULE

1. Primers and finishes shall be applied in accordance with the following schedule for the surface and exposure specified:





<b>PROTECTIVE COATING SCHEDULE</b>										
	<b>Generic Type</b>	<b>Surface Preparation</b>	<b>First Coat (Primer)</b>	<b>DFT Mils</b>	<b>Second Coat</b>	<b>DFT Mils</b>	<b>Third Coat</b>	<b>DFT Mils</b>	<b>Total DFT Mils (min)</b>	<b>Total Coats</b>
<b>Plaster and Gypsum Wallboard</b>										
Interior Exposed	Acrylic Emulsion	Clean and Dry	F-1, P-2	2-3	F-1	2-3	F-1	2-3	5	2-3
	Epoxy	Clean and Dry	FS-4	1-2	F-8	2-3	F-8	2-3	7	3
<b>Wood</b>										
Interior or Exterior Exposed	Acrylic Emulsion	Clean and Dry	F-1, P-1	2-3	F-1	2-3	F-1	2-3	8, 7	3
	Latex	Clean and Dry	P-2	1.5-2	F-2	1.5-2	F-2	1.5-2	5	3
<b>Ferrous Metal<sup>1</sup></b>										
Exterior Exposed <sup>2</sup>	Epoxy/Polyurethane	SSPC-SP6	P-8	4-6	F-8	4-6	F-9 <sup>7</sup>	2-3	10	3
Interior Exposed <sup>2</sup>	Epoxy	SSPC-SP6	F-8	3-5	F-8	4-6	F-8	4-6	11	3
Immersion	Epoxy	SSPC-SP10	P-6, P-7 <sup>3</sup>	3-5	F-4 <sup>3</sup> , F-5	4-6	F-4 <sup>3</sup> , F5	4-6	11	3
Below Grade/Underground	Coal Tar Epoxy	SSPC-SP10	P-6 <sup>7</sup> Optional	3-5	F-10	16-20			22	1 or 2
Interior/Immersion Severe	Vinyl Ester	SSPC-SP5	P-5	12-18	F-6	12-18			28	2
	Novolac Epoxy	SSPC-SP10	F-7	40					40	1
Interior/Exterior Exposed High Temperature <sup>2</sup>	Silicone Aluminum	SSPC-SP10	P-4	2-4	F-19	1-1.5	F-19 <sup>9</sup>	1-1.5	5.5	2 or 3
<b>Galvanized Steel</b>										
Exterior Exposed <sup>2</sup>	Epoxy/Polyurethane	ASTM D6386	F-8	3-5	F-9 <sup>7</sup>	2-3			6	2
Interior Exposed <sup>2</sup>	Epoxy	ASTM D6386	F-8	2-3	F-8	2-3			5	2
Immersion	Epoxy	ASTM D6386	P-6	3-5	F-4 <sup>3</sup> , F-5	2-3			6	2
<b>Ductile or Cast Iron</b>										
Exterior Exposed <sup>2</sup>	Epoxy/Polyurethane	NAPF 500-03-04 <sup>4</sup>	F-8	3-5	F-8	4-6	F-9	2-3	12	3

Interior Exposed <sup>2</sup>	Epoxy	NAPF 500-03-04 <sup>4</sup>	F-8	3-5	F-8	4-6			9	2
Immersion	Epoxy	NAPF 500-03-04 <sup>4</sup>	F-4 <sup>3</sup> ,F-5	3-5	F-4 <sup>3</sup> ,F-5	4-6			9	2
Below Ground	Coal Tar Epoxy	NAPF 500-03-04 <sup>4</sup>	F-10 Optional	3-5	F-10	16-20			19-25	2 or 1
	Modified Polyurethane	NAPF 500-03-04 <sup>4</sup>	F-5 <sup>7</sup>	3-5	F-12	50			55	2
<b>PVC, Fiberglass</b>										
Exterior Exposed <sup>2</sup>	Epoxy/Polyurethane	Scarify	F-8	2-3	F-9	2-3			4-6	2
<b>PROTECTIVE COATING SCHEDULE</b>										
	<b>Generic Type</b>	<b>Surface Preparation</b>	<b>First Coat (Primer)</b>	<b>DFT Mils</b>	<b>Second Coat</b>	<b>DFT Mils</b>	<b>Third Coat</b>	<b>DFT Mils</b>	<b>Total DFT Mils (min)</b>	<b>Total Coats</b>
Interior Exposed <sup>2</sup>	Epoxy	Scarify	F-5	2-3	F-5	2-3			4-6	2
<b>Insulated Pipe</b>										
Interior Exposed	Acrylic Emulsion	Clean and Dry	F-1,P-2	2-3	F-1	2-3			5	2
<b>Concrete</b>										
Exterior Exposed	Modified Epoxy	Clean and Dry	F-11	8-10						1
Interior Exposed	Epoxy	Clean and Dry	F-4 <sup>3</sup>	4-6	F-4 <sup>3</sup>	4-6			10	2
Immersion	Epoxy	Brush-Off Blast	FS-3	As needed	P-6	12-18	F-6	12-18	30	3
	Epoxy/Modified Polyurethane	SSPC-SP7	F-5 , P-7	4-6,3-5	F-12	50			55	2
Below Grade/Wet Wells	Coal Tar Epoxy	Clean and Dry	F-10	16-20					18	1
Interior/Immersion Severs	Vinyl Ester	Brush-Off Blast	FS-3	As Needed	P-6	12-18	F-6	12-18	30	3
	Novolac Epoxy	Abrasive Blast	P-6	3-5	F-7	40			48	2
<b>Masonry</b>										

Exterior Exposed	Water-Based Sealer	Clean and Dry	FS-5	125-175 <sup>6</sup> (ft <sup>2</sup> /gal)						
Exterior Exposed	Modified Epoxy	Clean and Dry	F-11	8-10	F-11	8-10			18	2
Interior Exposed	Epoxy	Clean and Dry	FS-2	75-100 <sup>6</sup> (ft <sup>2</sup> -gal)	F-4	4-6	F-4	4-6	10	3

**Concrete Floors**

Interior Exposed	Epoxy/Polyurethane	SSPC-SP13	F-13	2-3	F-13	2-3	F-9	2	7	3
	Epoxy (High Solids)	SSPC-SP13	P-9	6-8	F-13	6-8	F-16	6-8	20	3
	Aggregate Filled Epoxy	SSPC-SP13	P-9	6-8	F-14	1/8" Double Broadcast	F-16	6-8	1/8"+	4
	Ceramic Filled Decorative Epoxy	SSPC-SP13	P-9	9-8	F-15	1/8" Double Broadcast	F-17	8-10	1/8"+	3

**NOTES:**

<sup>1</sup>Field priming of shop-primed ferrous metal surfaces is required only where the shop primer has been removed because of damage or apparent corrosion and the surface has been re-prepared in accordance with Part 3.2, Preparation of Surfaces, of this section.

<sup>2</sup>Where piping is to be striped, 2 full coats of the base color shall be applied prior to the application of the contrasting color of strip.

<sup>3</sup>NSF approved for potable water service.

<sup>4</sup>Provide additional cleaning per NAPF 500-03-01 "Solvent Cleaning" where required.

<sup>5</sup>Exposures subject to aggressive chemical solutions such as inorganic and organic acids and high concentrations of hydrogen sulfide gas.

<sup>6</sup>The spreading rate will depend of the porosity of the surface.

<sup>7</sup>Depending on the method of application and color of the primer or intermediate coat, certain colors may require multiple coats for complete

hiding.

<sup>8</sup>Not required by Carboline.

<sup>9</sup>Additional coat depends on operating conditions.

**Some film thickness ranges listed are only achievable by spray applications. Roller applications may require additional coats.**

END OF SECTION

## SECTION 11261

### CHEMICAL FEED SYSTEM

#### PART 1 - GENERAL

##### 1.1 WORK INCLUDED

- A. This section covers all equipment, materials, accessories, and labor required to assemble, install, test, and place into satisfactory service the Sulfa-Clear feed system at the Faircrest Lift Station as specified herein and shown on the Drawings.
- B. Attention is called to the fact that all tubing, piping, fittings, and accessories are not necessarily shown complete on the Drawings, which are more or less schematic. Contractor shall furnish and install all tubing and piping indicated or required for proper operation of the equipment or for services requiring such piping.

##### 1.2 RELATED WORK

- A. Division 16 – Electrical

##### 1.3 SYSTEM DESCRIPTION

- A. The Contractor shall provide and install a chemical feed system for automatic feeding of Sulfa-Clear solution. The Sulfa-Clear feed system shall include a peristaltic type chemical feed pump, injection check valve, polyethylene weather proof hard cover containment deck and ramp (with ramp extender), mechanical agitator, and all tubing, valves, and fittings.

##### 1.4 QUALITY ASSURANCE

###### A. GENERAL

- 1. All pumping equipment, tubing, piping, valves, and fittings furnished under this section shall be new, unused, and the Manufacturer's current production model. Units must conform to the best practice known to the trade in design, quality of material, and workmanship. Assemblies, subassemblies, and component parts shall be standard and completely interchangeable. The equipment must comply with all applicable federal, state, and local regulations.
- 2. The Contractor shall be responsible for ensuring that all equipment installed is properly connected to other related equipment for proper functioning of the system.

## B. MANUFACTURER'S QUALIFICATIONS

1. The Manufacturer of work of this section shall have five (5) years minimum proven experience in such work and shall have satisfactorily completed three (3) jobs of similar size and type within the last five (5) years.

## 1.5 REFERENCES

- A. National Electrical Manufacturers Association (NEMA).

## 1.6 SUBMITTALS

### A. SHOP DRAWINGS AND ENGINEERING DATA

1. Submit complete shop drawings and engineering data to the Owner's Representative in accordance with the requirements of the Supplemental Specifications.
2. Engineering data shall include detailed equipment and electrical diagrams and a functional description of the Sulfa-Clear feed system, as indicated on the Drawings and described herein.
  - a. Information shall include but not be limited to:
    - 1) Complete detailed equipment and control diagrams, electrical diagrams, and specifications.
    - 2) Sulfa-Clear pump and timer data.
    - 3) Sulfa-Clear agitator data.
    - 4) Chemical containment system data.
    - 5) Complete parts list with exploded schematics.
    - 6) Complete wiring schematics for motors, motor controls, and other electrical components supplied with the pump systems, including interface details of the motor control system starting equipment.

### B. OPERATION AND MAINTENANCE INFORMATION

1. Submit complete operation and maintenance data on the Sulfa-Clear Feed System to the Owner's Representative in accordance with the requirements of the Supplemental Specifications..

## 1.7 STORAGE AND PROTECTION

- A. Store and protect the Sulfa-Clear Feed System and accessories in accordance with the requirements of the Supplemental Specifications.

## 1.8 GUARANTEE

- A. Provide a guarantee against defective equipment and workmanship in accordance with the requirements of the Supplemental Specifications.

## 1.9 MEASUREMENT AND PAYMENT

- A. No separate measurement or payment will be allowed for this work. Payment for all work performed under this section shall be included in Faircrest Lift Station, Complete.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. The design has been based on equipment provided by the following manufacturers:
  - 1. Sulfa-Clear Feed Pump
    - a. Blue-White Industries, Ltd. Flexflo Model A1N30V-7T Variable Speed Peristaltic Injector Pump.
    - b. Or approved equal.
  - 2. Batch Mixer
    - a. USA Bluebook, Neptune Series JG-2.0. Stock# MC-75251
    - b. Or approved equal.
  - 3. Batch Mixer Floor Stand
    - a. USA Bluebook. Stock# MC-25558 w/ corrosion resistant coating
    - b. Or approved equal.
  - 4. Polyethylene Weatherproof Hardcover (2-Drum)
    - a. USA Bluebook. Stock# 41547
    - b. Or approved equal.
  - 5. Ramp for Weatherproof Hardcover

- a. USA Bluebook Stock # 42663
  - b. Or approved equal.
6. Ramp Extender for Weatherproof Hardcover
- a. USA Bluebook Stock # 42661
  - b. Or approved equal

## 2.2 SYSTEM COMPONENTS

### A. Sulfa-Clear Feed Pumps

1. The Contractor shall provide one (1) positive displacement peristaltic type chemical feed pumps. One pump shall be installed complete with wall mounting brackets and hardware.
2. The pump shall be capable of manually adjusting the chemical feed rate. The pump shall be flow paced from a signal from the magnetic flow meter on the discharge of the Faircrest Lift Station.
3. Pumps shall be capable of pumping 60% Sulfa-Clear solution at 3 gpd at a maximum pressure of 100 psig.
4. Pump shall be mounted in the weatherproof hardcover above the chemical storage tank.
5. Pumps shall be provided with 7/16-inch injection check valves.
6. Pumps shall be provided with flexible tubing connections.
7. Wetted parts shall be resistant to the solution being pumped.
8. Each pump and motor shall have a name plate giving the manufacturer's model serial number, rating, range, speed, and other pertinent data.
9. Drive shall be rated for continuous 24-hour operation at ambient temperature to 40° C (104° F).

### C. Tubing

1. Pump suction and discharge tubing shall be low density polyethylene (LDPE) resistant to Sulfa-Clear with 7/16-inch outside diameter.
2. Sulfa-Clear pump discharge tubing shall be provided and installed inside PVC conduit from the chemical weatherproof hardcover and feed pump to the lift station wet well.



E. Sulfa-Clear Batch Mixer

1. Mixer shall include a 3/4" diameter stainless steel shaft (48 inches in length), stainless steel propeller, and mounting flange bracket.
2. Electric Motor: 1/3 HP, 120 volt, single phase, 60 Hz, 350 rpm.
3. Mixer shall operate when selected based on a 24 hour manually adjustable timer. The mixer receptacle will be remotely powered based on an adjustable timer provided and installed by the Electrical Contractor.

F. Sulfa-Clear Polyethylene Weatherproof Hardcover

1. 2 Drum- size 60"L x 36"W x 72"H.
2. Roll top design with spill pallet and drain.
3. Built in hasp for padlock.

G. Ramp for Polyethylene Weatherproof Hardcover

1. Size 68"L x 30.5"W x 12.75"H.
2. 1,000 lb capacity.

H. Ramp Extender for Polyethylene Weatherproof Hardcover

1. Size 8.5"L x 29.5"W x 5.5"H.

J. Sulfa-Clear

1. Contractor shall provide one (1) - 50 gallon drum of Sulfa-Clear at the time of chemical feed system start-up.

## PART 3 – EXECUTION

### 3.1 INSTALLATION

A. General

1. Install equipment in accordance with the Manufacturer's recommendations.

### 3.2 START-UP AND OPERATION

#### A. START-UP SERVICES

1. The Contractor shall provide the services of qualified factory trained technician(s) who shall inspect the placement and wiring of each chemical feed system appurtenance, perform field tests as specified herein, and instruct the Owner's personnel in the operation and maintenance of the equipment before the equipment is accepted by the Owner. All equipment and materials necessary to perform testing shall be the responsibility of the installer. This will include, as a minimum, one (1) drum of Sulfa-Clear.
2. The Contractor shall coordinate start-up so that the Consulting Engineer and Owner may be present. Operation and Maintenance Manuals shall be supplied to Owner at or prior to start-up.

### 3.3 SPARE PARTS

- A. Five spare tube assemblies with ends shall be provided for each chemical feed pump.

END OF SECTION

## SECTION 11280

### PROCESS VALVES AND GATES

#### PART 1 – GENERAL

##### 1.1 SCOPE

- A. The work covered by this section includes furnishing all labor, equipment, and materials required to furnish and install all metal valves and gates, including operators, boxes, and accessories, as specified herein, shown on the Drawings, or required for proper completion of the work under these Contract Documents.
- B. The Contractor's attention is called to the fact that all valves, especially in the smaller sizes, are not necessarily shown completely on the Drawings, which are more or less schematic. Furnish and install all valves indicated or required for proper operation of the equipment or services requiring such valves.

##### 1.2 SHOP DRAWINGS AND ENGINEERING DATA

- A. Submit complete shop drawings and engineering data to the Engineer in accordance with the requirements of the Supplemental Specifications

##### 1.3 STORAGE AND PROTECTION

- A. Store and protect valves, gates, and accessories in accordance with the requirements of the manufacturer or as directed by the Engineer.
- B. Completely drain valves prior to shipment. Protect ends of flanged and mechanical joint valves and gates with full size wooden baffles securely bolted to the valve and gate ends. Size of baffles shall be at least equal to outside diameter of flange. Secure valves 24 inches in size and larger to a wooden skid to facilitate handling and storage.

##### 1.4 SHOP PAINTING

- A. Clean, shop prime, and shop paint valves and accessories in accordance with the requirements of these Specifications.
- B. All interior and exterior nonmachined, nonbearing ferrous surfaces on iron body valves, gates, and accessories shall be blast-cleaned and painted at the factory with two coats of asphaltic varnish conforming to Federal Specification TT-V-51c, unless otherwise specified. Exterior nonmachined, nonbearing ferrous surfaces on valve operators and on nonsubmerged or nonburied butterfly and eccentric plug valves shall be blast-cleaned and painted at the factory with one coat of zinc chromate primer conforming to Federal Specification TT-P-645 and one coat of compatible alkyd enamel. Other paint systems may be proposed by the valve supplier, subject to the Engineer's approval.

## 1.5 OPERATION AND MAINTENANCE DATA

- A. Submit complete operation and maintenance data on the valves in accordance with the requirements the Supplemental Specifications

## 1.6 QUALITY ASSURANCE

- A. The manufacturers shall furnish a written certification to the Engineer that all valves, gates and operators furnished comply with all applicable requirements of the governing AWWA standards specified herein.
- B. Manufacturers Affidavit: Submit manufacturers affidavit indicating each valve, gate, and operator type have been manufactured and tested in accordance with the requirements of the referenced standards.

## 1.7 GUARANTEE

- A. Provide a guarantee against defective equipment and workmanship.

## 1.8 SOLE SOURCE RESPONSIBILITY

- A. The valve and gate manufacturer shall have sole source responsibility for the proper sizing and mounting of the electric motor operators and pneumatic operators.

## 1.9 MEASUREMENT AND PAYMENT

- A. Payment for the air/vacuum release valve located inside the manhole will include all equipment, materials and labor necessary to perform the work under this specification as shown on the Drawings and specified herein and included in the Contract. The payment for this work shall be included in the unit price for Air/Vacuum Release Valve with 5 Foot Manhole.
- B. No separate measurement or payment will be allowed for all other work. Payment for all work performed under this section shall be included in other items of work.

## PART 2 - PRODUCTS

### 2.1 GENERAL

- A. All castings, regardless of material, shall be free from surface defects, swells, lumps, blisters, sandholes, or other imperfections.
- B. All valves and gates shall have the name of the manufacturer, rated working pressure, and size cast upon the body or bonnet in raised letters. Alternately, the name of the manufacturer, rated working pressure, and size may be stamped on a stainless steel identification plate permanently attached to the valve or gate

body or bonnet. Valves specified to conform with AWWA requirements shall have the letters "AWWA" cast upon the valve body or bonnet in raised letters.

- C. Valves, gates and operating mechanisms shall be of the proper size and dimensions to fit the pipe connections thereto and shall be installed in the position and within the space shown on the Drawings.
- D. The direction of rotation of the operator to open the valve or gate shall be to the left (counterclockwise), unless otherwise specified. Each valve body or operator shall have cast thereon the word OPEN and an arrow indicating the direction to open.
- E. All exposed bolts and nuts on buried or submerged valves, gates and operators shall be brass or stainless steel for corrosion resistance. Exposed bolts and nuts on exposed valves and operators shall be of corrosion-resistant materials or shall be zinc or cadmium plated.
- F. Valves, gates and operators shall be of the proper size to fit the pipe connections and shall fit in the position and space as shown on the Drawings.
- G. Valve and gate operators shall be of sufficient size and capacity to seat, unseat, and operate the valve or gate under the maximum specified differential pressure. Where no maximum differential pressure is specified, the operator shall be designed for a differential pressure equal to the maximum working pressure of the valve. Additional allowances shall be made for the lubricating and/or scale-forming tendencies of the fluid.

## 2.2 GATE VALVES

- A. Gate valves larger than 12 inches shall be of the single disc, double sealed, solid tapered wedge type, unless otherwise specified. Gate valves in sizes 2 through 12 inches shall be of the single disc, resilient seated type, conforming in all respects to the current AWWA C-509 specification unless otherwise specified. Valves shall have non-rising stems and be capable of being repacked under pressure when valve is fully open. Gate valves for potable water lines larger than 12 inches shall be of the double disc type.
- B. Gate valves larger than 12 inches in water and wastewater shall be iron body, bronze mounted valves conforming in all respects to the applicable material and dimensional requirements of AWWA C500. Minimum working pressures shall be 200 psi for valves 3 inches and 14 inches in size and 150 psi for valves 16 inches and larger. Gate valves shall have an O-ring or self-adjusting chevron packing stem seal, and 125-pound flanged ends per ANSI B16.1, except for valves to be buried underground, which shall have mechanical joint ends per ANSI A21.11 (AWWA C111). Body seat rings shall be ASTM B 62 bronze and be screwed into the body so as to be field replaceable. Disc faces and all moving parts shall be bronze or bronze mounted. Cast iron for body and bonnet shall conform to ASTM A 126, Grade B. Iron body gate valves with solid wedge discs shall be

M&H (Dresser) Fig. 2067, or equal. Iron body gate valves with double discs shall be M&H (Dresser) Fig. 67, Mueller Fig. A-2380, or equal.

- C. Gate valves in sizes 2 through 12 inches for use in water and wastewater shall be of the ductile iron body, resilient seated type, manufactured in conformance with AWWA C509. Gate shall be of ductile iron with bonded resilient seat and integral flush drain. Minimum working pressure shall be 200 psi when unbalanced pressure is applied to either side of the gate. Gate valves shall have a minimum of two O-ring stem seals; one above and one below the integral stem collar. The area between the O-rings shall be filled with permanent lubricant. Valve shall have no metal fasteners or screws exposed in the wetted portion of the valve. All ferrous surfaces shall be shot-blasted to a white metal finish. All interior and exterior valve surfaces, including the interior of the gate and all bolt holes shall be coated with an epoxy coating in accordance with AWWA C550. The minimum thickness of the coating shall be 8 mils. Valve ends shall be of the type required for the installation as specified herein or shown on the Drawings and meet the requirements as specified in Paragraph B of this section.
- D. Gate valves 3 inches in size and larger in steam service shall have 125-pound cast iron body, bronze trim, and outside stem and yoke.
- E. Furnish gate valves with nut, wrench, chain, or handwheel operators as shown on the Drawings. Unless otherwise shown or specified, valves shall have operators as specified in this section. Extension stems, floor stands, and valve boxes and covers shall be furnished where shown or required.

### 2.3 BUTTERFLY VALVES

- A. Unless otherwise shown or specified, butterfly valves shall be of the resilient seated, tight-closing type and conform in all respects to the applicable material, tight-closing type and conform in all respects to the applicable material and dimensional requirements of AWWA C504. All wafer-type butterfly valves 20 inches and smaller shall meet the requirements of AWWA C504. Wafer-type butterfly valves in sizes 24 inches and larger shall conform to all general requirements of AWWA C504 except laying length. Butterfly valves shall operate from fully open to fully closed with a 90-degree rotation of the valve stem.
- B. Valves shall be designed for the working pressures and/or pressure class designations shown on the Drawings or specified in these Specifications. If a working pressure or pressure rating is not given, the following requirements shall apply:

Service	AWWA Pressure Rating
Low Pressure Air	25B
Wastewater or Sludge	150B
Potable or Plant Water	150B

Wafer type valves shall have a pressure rating of not less than 150 psi. Valves shall be drip-tight and bubble-tight at rated pressure differential across the valve in both directions.

- C. Valve body shall be one-piece, constructed of cast iron conforming to ASTM A 126, Class B. The diameter of the opening shall be not less than the diameter of the corresponding pipe size. Unless otherwise specified, valve body shall be of the short-body style in accordance with Table 2 of AWWA C504. This requirement shall not apply to wafer type valves. No part of the valve internals shall extend beyond the valve ends when the valve is in the closed position. Short-body valves shall have 125-pound flanged ends per ANSI B16.1. Wafer type valves shall be designed to fit between 125-pound flanges per ANSI B16.1.
- D. Disc shall be cast bronze conforming to ASTM B 143, Alloy 1A, cast iron conforming to ASTM A 126, Class B, Ni-resist cast iron conforming to ASTM A 436, Type 1 or 2, or Ni-resist ductile iron conforming to ASTM A 439, Type D2. When used in wastewater or raw water, disc shall be streamlined with no exterior ribbing or openings.
- E. Shafts shall be polished stainless steel conforming to ASTM A 276, Type 304 or Type 316. All keys and pins used in securing valve disc to shafts shall be stainless steel or monel.
- F. Valve seat shall be one-piece, molded synthetic rubber, Buna-N (Hycar) for wastewater, and EPDM for air. Retaining rings, if used, shall be stainless steel. The method of mounting valve seat shall conform to the applicable requirements of AWWA C504, Section 3.5. Valve seats in sizes 24 inches and larger shall be field replaceable without necessity of chipping, burning, or cutting. Seats secured with retaining rings shall be fully adjustable. Metal seat mating surfaces shall be smoothly contoured and polished 18-8 stainless steel or monel. Alloy cast iron will not be acceptable as a seat mating surface. Sprayed or plated seat mating surfaces will not be acceptable.
- G. Shaft seals shall be O-ring or self-adjusting chevron packing of Buna-N or neoprene. Shaft seals shall conform to the requirements of AWWA C504, Section 3.7, and shall be of a design that allows replacement of the seal without removing the valve shaft. Alternately, pull-down packing is acceptable if the packing is adjustable and replaceable without removing valve operator. Shaft seals for air service shall be EPDM packing material.
- H. Valve bearings shall be self-lubricating, sleeve-type bearings of corrosion resistant materials. Bearing load shall not exceed 2,500 psi. Provide valves 24 inches in size and larger with an adjustable, two-way thrust bearing to center the disc in the valve and allow the valve to be installed with the valve stem vertical. Bearing shall be easily accessible for adjustment. Bearings for air service shall be high temperature bearings for 250°F air service conditions.

- I. Where the valve is installed adjacent to a fitting, flow meter, another valve, or similar items, furnish a spool piece or adaptor coupling as a spacer so that valve disc does not interfere with the operation of the adjacent meter or valve or contact cement linings on pipe or fittings.
- J. Furnish valve with a lever operator, rotary manual operator, electric motor operator, or pneumatic cylinder operator as shown on the Drawings. Unless otherwise shown or specified, furnish a lever operator on valves 6 inches and smaller and a rotary manual operator on valves 8 inches and larger. Furnish extension stem and floorstand where shown or required.
- K. Butterfly valves for drinking water service shall be coated interior and exterior with 10 mils, minimum, of TNEMEC Potapox 20, fully compliant with AWWA C550. Provide high temperature paint for valves for air service conditions.
- L. Butterfly valves shall be as manufactured by Dezurik, Pratt, or equal.

#### 2.4 TWO-WAY PLUG VALVES

- A. Two-way plug valves, unless otherwise shown or specified, shall be of the eccentric, non-lubricated type with resilient, neoprene-faced or epoxy-coated plugs providing drip-tight shut-off at rated pressure. Port area shall not be less than 80 percent of the corresponding full pipe area in sizes 16 inches and smaller and 100 percent of the corresponding full pipe area in valves 18 inches and larger. Two-way valves shall operate from fully open to fully closed with a 90 degree rotation of the valve stem.
- B. Valves shall be designed for a working pressure of not less than 175 psi in sizes through 16 inches and 150 psi in sizes 18 inches and larger. Valves shall be drip-tight at rated pressure differential in both directions.
- C. Valves shall have bodies of ASTM A126, Grade B or ASTM A48, Grade 40 cast iron. Valves 4 inches and larger in size shall have bolted bonnet.
- D. Body seats for resilient-faced plugs shall be welded in and contain a minimum of 90 percent nickel. Welded-in seats shall conform to the applicable requirements of AWWA C507, Section 3.2 and AWWA C504, Section 3.5.
- E. Plugs without a resilient coating or facing shall be epoxy coated and shall have a field replaceable, full-circle rubber seat securely attached to the plug. Body seats shall be nylon coated.
- F. Shaft seal shall be of the self-adjusting or split-V type of Buna-N and shall comply with the applicable requirements of AWWA C504, Section 3.7 and AWWA C507, Section 3.2. Seals requiring adjustment shall be adjustable and replaceable without bonnet or shaft removal.
- G. Supply bearings in both the upper and lower journals. Bearings shall be permanently lubricated and replaceable with stainless steel, bronze, or specially



coated corrosion-resistant sleeves and bushings. Bearings shall conform to the applicable requirements of AWWA C504, Section 9 and AWWA C507, Section 8.

- H. Valves sized 2½ inches and smaller shall have threaded ends per ANSI B2.1. End connections for valves sized 3 inches and larger shall be 125-pound flanged per ANSI B16.1, except for valves to be buried underground, which shall have mechanical joint ends per ANSI A21.11 (AWWA C111). Flanged end valves in sizes 12 inches and smaller shall have a laying length equal to that of an AWWA gate valve of the same size.
- I. Valves intended for buried or submerged service shall be sealed against the entrance of water and dirt.
- J. Furnish valves with a lever operator, rotary manual operator, or electric motor operator as shown on the Drawings. Unless otherwise shown or specified, a lever operator shall be furnished on valves 6 inches and smaller, and a rotary manual operator with handwheel shall be furnished on valves 8 inches and larger. Extension stem, floorstand, and valve box shall be furnished where shown or required.
- K. Two-way plug valves shall be DeZurik "Series 100 Eccentric Plug Valve", or equal.

## 2.5 COMBINATION AIR RELEASE VALVE

- A. Combination type sewage air release valve for solids bearing media. Combination air valve shall incorporate the functions of an air and vacuum valve with an air release valve in a single housing. Air release valve shall allow large volumes of air to escape or enter through the large diameter air and vacuum orifice during pipe filling and draining. Valve shall include a smaller diameter air release orifice to allow small pockets of air accumulation to escape automatically and independently of the large orifice.
- B. Valve body shall be A276 Type 316 stainless steel with threaded NPT connections. Float, stem and all non-sealing internal metal components shall be fabricated from Type 316 stainless steel.
- C. Air release valve shall have 3/16-inch diameter orifice and air release operating pressure rating of 200 psig. Valves 2 inches and smaller shall have NPT screwed inlet. Seat shall be Buna-N.
- D. Accessories shall include a 2-inch stainless steel ball valve for isolation of the air release valve. Provide stainless steel nipples for ball valve connections and all adapters, fittings, etc. for piping connections to process and vent piping.
- E. Manufacturer:
  - 1. Crispin, Model UX 20 Combination Air Release Valve or equal.

## 2.6 PRESSURE REDUCING VALVES FOR WATER

- A. Pressure reducing valves shall automatically reduce a higher inlet pressure to a preset, steady outlet pressure. The reducing valve shall be very sensitive to slight pressure changes and immediately control the main valve to maintain the desired pressure. Valve outlet pressure shall be adjustable between 3 and 30 psi.
- B. The main valve shall be direct acting, single seated, spring-loaded, diaphragm-actuated, globe type valve. When the downstream pressure exceeds the pressure setting, the main valve shall close drip-tight. Piston actuators will not be acceptable. Main valve shall be guided at two locations. No external packing glands shall be used and the diaphragm shall not be used as a seating surface.
- C. Pressure reducing valves sized 2 inches and smaller shall have cast bronze body; stainless steel seat ring; Teflon, Buna-N, or composition disc and diaphragm; and outside screw adjustment. Valves shall be suitable for 230-psi inlet pressure. Valves shall be furnished with threaded ends per ANSI B2.1. Bronze pressure reducing valves shall be Watts Regulator No. 223S-LP, or equal.
- D. Pressure reducing valves 2½ inches and larger shall have cast iron body, bronze trim, bolted cover, and pilot-controlled main valve. The pilot control system shall be external, connected to the valve with union fittings. Pressure setting shall be adjustable by a single screw adjustment enclosed in a tamperproof housing. Valve shall be suitable for an inlet pressure of not less than 175 psi. Valves sized 2½ inches shall have threaded ends per ANSI B2.1. Valves 3 inches and larger shall have 125-pound, flanged ends per ANSI B16.1. Valve body and cover shall be of cast iron conforming to ASTM A 48. Valve trim and pilot control shall be of ASTM B 61 or B 62 bronze. Pilot control trim shall be stainless steel. Valve shall be supplied with an integral strainer constructed of heavy and fine mesh monel screens to protect the pilot control system from foreign particles. Pilot-controlled valves shall be Clayton Fig. 90G-01, GA Industries Fig. 45-D, or equal.
- E. A separate Y-pattern strainer with threaded or bolted cleanout shall be furnished and installed immediately upstream of each pressure reducing valve. Area through the screen shall be not less than 4 times the full pipe area. Strainers shall have a pressure rating not less than that of the protected pressure regulating valve.
- F. A 2-inch pressure gauge with tee-head, bronze gauge cock shall be installed on the upstream and downstream side of each pressure regulating valve unit. Pressure gauges on the upstream side shall have a range of approximately 0 to 160 psi. Pressure gauges on the downstream side shall have a range of approximately 0 to 80 psi.

## 2.7 CHECK VALVES

- A. Check valves shall be of the swing type suitable for use in either horizontal or vertical piping, unless otherwise shown or specified. Disc shall swing entirely clear of the path of flow when in the open position. All internal parts shall be readily accessible and easily replaced in the field.
- B. Check valves in sizes 2½ inches and smaller shall be Y-pattern, regrinding, bronze body, bronze mounted valves. Valves shall have 200-pound cast bronze body, renewable bronze disc, screwed cap, and threaded ends per ANSI B2.1. Bronze for body and cap shall conform to ASTM B 61. Brass nuts and pin shall conform to ASTM B 16. Valves shall have a hinge bumper capable of preventing the valve from sticking in the open position and an arrow cast on the valve body to indicate direction of flow. Bronze check valves shall be Powell Fig. 560Y, Stockham Fig. B-345, Nibco Fig. T-453-B, or equal.
- C. Check valves in sizes 3 inches and larger shall be iron body, bronze mounted valves conforming to AWWA C508, epoxy-coated inside and outside. Valves shall have 125-pound cast iron body, bolted and gasketed cover, stainless steel or bronze hinge pin, rubber faced, renewable, bronze or cast iron disc, renewable bronze seat ring, outside lever and adjustable weight, and 125-pound flanged ends per ANSI B16.1. Cast iron for body and cap shall conform to ASTM A 126, Grade B. Bronze for disc and seats shall conform to ASTM B 584. Iron body check valves shall be Mueller Fig. A2600-6-01, Clow F-5345, or equal.
- D. Valves shall be installed with pressure under the disc.
- E. Check valves in air or gas piping sized 2½ inches or smaller shall be bronze, swing type check valves conforming to the requirements of Item B above, except that the disc shall have a replaceable, resilient seat of Buna-N or Teflon. Bronze check valves for air or gas service shall be Nibco Fig. T-453-W, Kennedy Fig. 442, or equal.
- F. Check valves in air or gas piping sized 3 inches and larger shall be of the double plate, spring-loaded, clapper type with cast iron body, aluminum bronze or bronze plates, stainless steel hinge pin and springs, and Buna-N seats. When operating temperatures exceed 180°F, Viton seats shall be used. Check valves shall be wafer style bodies suitable for mounting between two 125-pound ANSI B16.1 flanges. Check valves shall be rated for a working pressure of not less than 150 psi. Clapper style check valves shall be Mission "Duo-Check," FMC, or equal. Install clapper style check valves in horizontal piping with the pin in a vertical position.

## 2.8 TELESCOPING VALVES

- A. Telescoping valves shall a keyed aluminum torque plate, 1-1/2" diameter operating stem, stainless steel bail welded to stem and bolted to the slip tube. The stainless steel slip tube shall have a neoprene seal. The stem shall also have an integral clear plastic vented stem cover.

- B. The operator shall be constructed of high strength cast aluminum housing, aluminum horizontal handwheel, bronze operating nut, roller bearings, and rising stem type.
- C. Telescoping valves shall be Whipps, Inc. Type 101; FMC Corp; or approved equal.

## 2.9 RUBBER FLAPPER CHECK VALVE

- A. The discharge pipe run shall include a rubber flapper check valve manufactured in accordance with ANSI/AWWA C508. The body shall be constructed of ASTM A 126 Class B cast iron. The valve shall be provided with flanges in accordance with ANSI B16.1, Class 125. The valve body shall be full flow equal to the nominal pipe diameter at all points through the valve. The 4 inch check valve shall be capable of passing a 3 inch solid.
- B. The seating surface shall be on a 45 degree angle to minimize disc travel. A threaded port with pipe plug shall be provided on the bottom of the valve to allow for field installation of a backflow actuator or oil cushion, without special tools or removing the valve from the line. The top access port shall be full size, allowing removal of the disc without removing the valve from the line. The access cover shall be domed in shape to provide flushing action over the disc for operating in lines containing high solids content. The disc shall be precision molded Buna-N according to ASTM D2000-BG. The disc shall be of one-piece construction, precision molded with an integral O-ring type sealing surface and reinforced with alloy steel. The flex portion of the disc contains nylon reinforcement and shall be warranted for twenty-five years. Non-Slam closing characteristics shall be provided through a short 35 degree disc stroke and a memory disc return action to provide a cracking pressure of 0.25 psig. The valve disc shall be cycle tested 1,000,000 times in accordance with ANSI/AWWA C508 and show no signs of wear, cracking, or distortion to the valve disc or seat and shall remain drop tight at both high and low pressures.
- C. The valve body and cover shall be constructed of ASTM A536 Grade 65-45-12 ductile iron. A mechanical indicator shall be provided to provide disc position indication. The indicator shall have continuous contact with the disc under all operating conditions to assure accurate disc position indication.
- D. A screw type backflow actuator shall be provided to allow opening of the valve during no-flow conditions. The backflow device shall be of the rising stem type to indicated position. A stainless steel T-handle shall be provided for ease of operation.
- E. The exterior and interior of the valve shall be coated with an ANSI/NSF 61 approved fusion bonded epoxy coating.
- F. Check valve shall be Val-Matic Swing-Flex Series 500 or Crispin Rubber Flapper Model RF41.

## 2.10 BACKPRESSURE SUSTAINING AND CHECK VALVES

- A. The backpressure sustaining and check valve shall consist of a main valve assembly and a pilot system, completely assembled and tested as a unit and ready for field installation.
- B. Main valve body shall be globe style, constructed of high-strength cast iron conforming to ASTM A126 Class B with integral flanges, faced and drilled per ANSI B16.1 Class 125. The valve shall be “full-ported” with a flow area through the valve no less than the area of its nominal pipe size. Valve shall have an integral bottom pad or feet permitting support directly under the valve body.
- C. The valve piston shall be fully guided on its outside diameter and all guiding and sealing surfaces shall be bronze. To minimize the consequences of throttling, throttling shall be by long, stationary vee-ports located downstream of the seat and not by the seat itself. Sawtooth attachments or other add-on devices are not permitted.
- D. The valve shall be fully capable of operating in any position without the need of springs and shall not incorporate stems, stem guides or spokes in the waterway. A visual position indicator shall be provided.
- E. The main valve shall be serviceable in the line through a single flanged cover which provides easy access to all internal components.
- F. The valve shall be provided with a “stop-check piston” to positively close the valve immediately upon pressure reversal independent of pilot controls.
- G. Provide a system of pilots and controls to enable the valve to perform the function listed below. All controls and control piping shall be non-corrosive and suitable for the working pressure.
- H. The system shall include a normally closed, direct-acting, diaphragm operated, spring loaded bronze backpressure sustaining pilot. Pilot shall be easily field adjustable from near zero to a minimum of 10% above the factory setting. Controls shall include adjustable closing speed control, y-strainer and pilot isolating valves.
- I. The valve shall throttle as necessary in order to maintain a pre-set minimum pressure on the upstream side of the valve. In the event upstream pressure falls below the pre-set minimum pressure the valve shall close tight.
- J. Backpressure sustaining and check valves shall be GA Industries, Inc. Figure 6700-DRC.

## 2.11 CURB STOPS AND CORPORATION STOPS

- A. curb stops shall be of all-bronze construction with straight-through unobstructed pattern flow, Teflon-coated plug, top and bottom O-ring plug seals, O-ring port seals, and solid tee handle. Valves shall be suitable for 175-psi minimum working pressure. A quarter turn shall operate the valve from fully open to fully closed position. Valves shall comply with the applicable requirements of AWWA C800.
- B. Furnish curb boxes with cast iron foot pieces to permit the curb box to rest on a solid surface without bearing on the curb stop or piping.
- C. Curb boxes shall be of cast iron, have a 2-inch inside diameter, and be of the extension type with lid and plug. One compatible steel shut-off rod of suitable length shall be furnished. Coat curb boxes and bases with a suitable bituminous coating.
- D. Corporation stops for service line connections shall be precision fitted, individually lapped, ground joint key stops of all bronze construction. For tapped connections to water mains, inlet threads shall be of the steep taper, corporation stop type. Corporation stops shall conform to the applicable requirements of AWWA C800.

## 2.12 PINCH VALVES

- A. Jacket pinch type with flanged joint ends on sleeve and metal body. Valve design shall provide 100 percent full port opening.
- B. Double wall valve sleeve shall be fabricated from pure gum rubber. Sleeve resistant to organic acids and weak chemicals over a temperature range from - 50°F to 180°F. All sleeves provided with positive opening tabs to expand the sleeve at the pinching mechanism for a full round configuration, unless specified otherwise. Valve shall be designed to operate installed in any orientation under vacuum applications. Provide additional supports or feet for valve body to prevent valve from hanging off-center when oriented other than vertical
- C. Two (2) piece split cast iron body. Sleeve and cast iron flanges drilled to ANSI Class 125 pound standard.
- D. Valves shall be complete with pinching mechanism; manual handwheel mechanism; positive opening tabs; and appurtenances. Manual handwheel mechanism shall include non-rising stem, position indicator rod at stem or handwheel. Bevel gear operators on all valves over 8-inch. Lifting eyelets on top of valve body.
- E. Manufacturers:
  - 1. Red Valve Company, Inc., Series 75.
  - 2. Larox.

## 2.13 KNIFE GATE VALVES

- A. Knife gate valves shall be of the flanged wafer type with outside stem and yoke and a metal-seated, knife-blade gate with a beveled edge designed to push aside or cut through solids in its path. Knife gate valve shall have full round port opening and shall have a working pressure of at least 125 psi in sizes 24 inches and smaller and 50 psi in sizes 30 inches and larger. Valves shall be capable of providing bi-directional, drip tight shutoff.
- B. Knife gate valves shall have a heavy, one-piece body and end flanges of steel or cast iron. Valves shall be lined throughout with stainless steel, including the chest and packing areas. Liner shall extend beyond flange to form raised face mating surface. Knife gate shall be of ground and polished stainless steel of sufficient thickness to resist deformation of rated pressure across the gate. A full circle, raised-face seat with machined gate jambs at the sides and bottom shall be provided to hold the gate and assure positive seating. Seat shall have a neoprene or BNA-N elastomer D shaped ring recessed into the face of the valve seat for a driptight shutoff. All wetted parts of the valve shall be of Type 304 stainless steel.
- C. Knife gate shall be sealed with a minimum of four rings of Teflon or neoprene-impregnated asbestos packing. Gland shall be of corrosion-resistant material or shall be specially coated for corrosion resistance. Gland bolts and nuts shall be stainless steel.
- D. A heavy, fabricated, angular steel yoke assembly with stainless steel rising stem and bronze yoke sleeve shall be provided on the valve. Valve shall be provided with handwheel operator or extension stem and floorstand as shown on the Drawings. Valves 24 inches and larger shall have a geared operator.
- E. Ends of the valve shall be flanged and shall be drilled to mate with 125-pound cast iron flanges per ANSI B16.1.
- F. Knife gate valves shall be Dezurik, Fabri-Valve "Figure 371," or equal.

## 2.14 PLUG DRAIN VALVE

- A. Plug drain valves shall be iron body type, bronze mounted with non-rising stems, flanged ends, and extension stem.
- B. The frame, yoke, and gate shall be sturdily proportioned for strength and rigidity and be of cast iron conforming to ASTM specifications A126, Class B.
- C. The stem, stem nut, and seats shall be bronze. The stem shall be machined with accurately cut modified ACME threads.
- D. The gate seat shall be rolled into a dovetailed groove under pressure to make one inseparable unit. The body (frame) seat ring shall be threaded and screwed into place in the frame.

- E. Both gate and body seat ring faces shall be machined to a smooth finish.
- F. Valves shall be provided with an extension stem extending from the operating stem to the floor box frame located in the concrete floor above the valves.
- G. Manufacturer
  - 1. Clow Corporation (mud valves) Model F-3075.
  - 2. Or equal.

## 2.15 FABRICATED SLIDE GATES AND WEIR GATES

### A. Slide Gates and Weir Gates

1. Slide gates shall be self-contained, rising stem unless noted otherwise with flush bottom seals. Weir gates shall be self-contained, downward opening rising stem.
  - a. Gates shall be manufactured of fiberglass reinforced polyester with a UV stabilizer, and shall consist of frame, slide, and plate reinforcing.
  - b. Gates shall be reinforced to withstand the maximum head with a deflection at the maximum operating head of less than 1/360 of the gate width, or 1/4 inch, whichever is less. Gates with unseating heads shall be designed for a maximum deflection of 1/16 inch.
  - c. Seals shall be of molded resilient neoprene material securely mounted on the gate or frame.
  - d. Frames shall be face mount as called shown on the Drawings. Embedded frames shall be fabricated from 1/4-inch thickness minimum aluminum or stainless steel alloy structural shapes, continuous weld at frame blockout. All aluminum surfaces in contact with concrete shall receive factory applied bituminous coating.
  - e. Head frames, guides, reinforcing members, and operator support yoke pultruded reinforced polyester structural characteristics in the longitudinal direction shall meet the following physical properties:

Tensile strength	30,000 psi
Flexural strength	30,000 psi
Flexural modulus	$3.1 \times 10^6$ psi
Impact strength	20.0 ft-lbs/in
Water absorption	0.7% (in 24 hrs)



- f. Gates structural characteristics for an 1/8 inch glass mat laminate shall meet the following minimum physical properties:

Tensile strength	14,700 psi
Flexural strength	23,300 psi
Flexural modulus	800,000 psi
Impact strength	9.0 ft-lbs/in
Water absorption	0.13% (in 24 hrs)

- g. Anchor bolts and fasteners shall be stainless steel. Anchor bolts shall be provided by the gate manufacturer.
- h. Stems shall be stainless steel, ASTM F593/F594, Alloy Group 1. Stems shall have a minimum diameter of 1½ inches.
- i. Manual lifts shall include cast iron handwheel per ASTM A-126 Class B designed for a maximum of 40 pound force to provide adequate lifting for the gate. Operator housing shall be cast aluminum. Operators shall include transparent butyrate or lexan plastic stem pipe cover with position indicator markings.
- j. All contact surfaces shall be fitted with bearing bars of Ultra High Molecular Weight Polyethylene (UHMWP) continuously and mechanically locked in place. The frame guides and gates shall incorporate fiberglass reinforced polyester with a coefficient of friction:  $f_o=0.38$ ,  $f_s= 0.25$ , and have a minimum thickness of ¼ inch. The guide corners shall be capable of withstanding a torque of 300 foot pounds pull applied parallel to the gate slot in either direction. The UHMWP bearing bars shall extend the full depth of the guide grooves and shall be notched to form a tight seal.
- k. Where guides extend above the operating floor level to form a bench stand for the lift mechanism they must be suitably strong and rigid enough to extend a maximum unsupported length of 3'-6" without the use of additional stiffening members. The head rail shall have a maximum deflection of ¼ inch when subjected to a horizontal force of four times the 40 pound maximum handwheel pull. Guides to extend below the invert of the wall opening as shown on the Drawings.
- l. Manufacturers:
- 1) Plasti-Fab, Inc.
  - 2) Or Equal.

## 2.16 SLUICE GATES

- A. Sluice gate shall be heavy duty, cast iron, bronze mounted, flanged back or flat back, rising stem, and have all contact surfaces machined. Sluice gates shall conform to AWWA C501.
1. Iron castings for thimbles, frames, and discs shall conform to ASTM A126, Class B.
  2. Bronze casts for wedges, thrust nut, lift nut, and stem couplings shall conform to ASTM B584.
  3. Bronze for seat facings in frame and disc to conform to ASTM B21.
  4. Bronze for studs, nuts, adjusting screws, and other fasteners shall conform to ASTM B98.
  5. Stainless steel for stems and stem guides shall conform to ASTM A276, Type 304.
  6. Flanges shall be Class 25 and drilled in accordance with ANSI B16.1. Bolt spacing to be 12-inch maximum centers for rectangular gates. Bolts, nuts, and studs embedded in concrete to be Type 316 stainless steel. All other bolts and nuts to conform to ASTM A307, Grade B; or ASTM A354. Hexagon heads and nuts shall be furnished.

B. Construction:

1. Gates to be designed to exceed the seating or unseating head specified in the valve schedule. Maximum leakage shall be 0.1 gpm per foot of seating perimeter at design head.
2. Frames shall be flat type of one piece cast iron construction. Dovetail grooves are to be machined on the front face into which bronze seal facings shall be driven and then machined. The back mounting flange of the frame shall be machined so as to bolt directly to the machined face of the wall thimble. Frames shall have integrally cast pads machined with keyways to receive top and bottom wedge seats. Drill frame for attachment to thimble or wall pipe as shown, specified, or otherwise required for proper connection. Gaskets or mastic shall be furnished as required by manufacturer.
3. Disc shall be rectangular of one piece cast iron construction with integrally cast vertical and horizontal ribs. A reinforcing rib along each side to ensure rigidity between the side wedges. Dovetailed grooves are to be machined on the seating face into which bronze seat facings shall be driven and then machined. Disc to be provided with integrally cast heavily reinforced nut pocket on the vertical centerline and above the horizontal center to receive the thrust nut. Integrally cast wedge pads for the side, top, and bottom wedges on the disc shall be machined to receive

adjustable bronze wedges. Side wedge pads to be located at the ends of horizontal ribs.

4. Guides to be one or two piece, cast iron construction designed to withstand the total thrust caused by water pressure and wedging action. Two piece guides shall have flanged upper and lower sections which shall be machined, bolted, and doweled for perfect alignment of the guide grooves. All contact surfaces at guides to be machined. Guides shall be able to retain and support at least one-half of the disc in the full open position. Attach guides to the frame with silicon bronze or Type 316 stainless steel studs and nuts, and dowel to prevent any relative motion between the guides and the frame. Guides shall be bolted to the frame or cast integrally with the frame.
5. Wedges to be of solid cast bronze construction. Side wedges shall be furnished for seating head. Side, top, and bottom wedges to be furnished for unseating head. Machine all contact surfaces and key to the cast iron pads to maintain adjustment by preventing undesirable rotation or lateral motion. Attach wedges to the disc with silicon bronze studs and nuts. Silicon bronze adjusting screws with lock nuts shall be provided. Bronze wedge seats to be securely attached to machined pads on the guides.
6. Bronze thrust nut shall be provided for connecting stem to disc. Thrust nut shall be designed to prevent turning in the pocket of the disc. Rising stem gates shall be supplied with thread thrust nut, keyed, or pinned to stem.
7. Provide gate with flush bottom type closure where specified to valve schedule. Natural or synthetic rubber seals shall be provided. Attach seal to bottom of disc with bronze or Type 316 stainless steel bar and fasteners. Machined Type 316 stainless steel bar set flush with gate invert shall be provided for seating surface.
8. One piece cast iron wall thimbles shall be provided. See schedule for thimble types. Thimble depth shall be the full width of wall. Thimble to be of adequate thickness and section to withstand operational and installation stresses. A wider flange or thimble than on gate frame shall be provided to ensure proper fit. Front flange shall be machined with tapped holes for studs and stamp metal with vertical centerlines and the word "top" for correct alignment. Integral cast iron water stop shall be supplied with thimble. Gasket or mastic shall be provided in accordance with manufacturer's recommendations. Thimbles shall be secured with stainless steel anchor bolts or fasteners.
9. Type 304 stainless steel operating stems of manufacturer's recommended size shall be furnished. Stem shall be designed to transmit in compression at least 2½ times the rated output of the operating mechanism with a 40 pound effort on the crank. Stems shall be threaded and matched to bronze lift nuts. Stems of more than one section shall be jointed by manganese bronze couplings threaded and keyed or bored and

pinned to the stems. All threaded and keyed couplings of the same size shall be interchangeable. Rising stems with an adjustable stop collar shall be provided on the stem above the floor stand lift nut

10. Stem guides shall be stainless steel, fully adjustable, and bronze bushed and complete with bronze or stainless steel anchor bolts. Stem guides shall be spaced as required by the Engineer and shall not exceed 10 feet.
11. Lifts shall be crank operated Type 304L stainless steel floor stands, suitable for occasional submergence, right angle type with gearing appropriate for the load not exceeding 40 pounds crank effort. Floor stands shall include Schedule 40, transparent butyrate plastic stem pipe cover with position indicating marks. Crank operator shall be suitable for use with a portable electric operator. Provide gear operator with vertical input shaft when indicated. The gear operator shall be mounted on the yoke.
12. Manufacturer:
  - a. Rodney Hunt.
  - b. Waterman.

## 2.17 BUTTERFLY GATES

- A. Butterfly gates shall be square or rectangular of the size shown in the "Gate Schedule" and/or in the Contract Drawings. Each gate shall be complete with frame, leaf, actuator, and all necessary attaching bolts. Each gate shall be self-contained and, when installed in accordance with the manufacturer's recommendations, shall be watertight up to a differential head of 20 feet on the horizontal centerline of the gate.
- B. Gate Leaf
  1. The gate leaf shall be fabricated from ASTM A36 carbon steel. It shall be designed for the maximum head shown in the "Gate Schedule." Design stresses for all structural parts shall have a safety factor of 3.0 on the yield strength or 5.0 on ultimate strength, whichever is less. A stainless steel seating face shall be furnished around the periphery of the leaf. The four corners of the leaf shall be rounded with a radius not to exceed 7.25 inches to seal with similar rounded corners in the gate frame.
- C. Gate Frame
  1. The gate frame shall be fabricated from ASTM A36 carbon steel to the size shown in the "Gate Schedule" and shall be arranged to bolt to the front face of a concrete wall, either attached to a thimble or installed within steel liners as shown in the Contract Drawings or in the "Gate Schedules."

2. A resilient, neoprene seal shall be attached firmly to the gate frame to provide a watertight contact with the stainless steel seating face on the gate leaf when the gate is in the fully closed position. All stainless steel parts shall be per ASTM A582, Type 303; or ASTM A276, Type 304 or 304L.
3. The stainless steel back-up angle for the seal shall be positioned accurately and welded to the gate frame. Stainless steel studs shall be welded to the back-up angle on a center-to-center spacing as required to hold the seal in place and provide field adjustment when required. Adjusting segments shall be furnished to contain the downstream side of the resilient seal and push uniformly against the seal for adjustment and to hold it in place. Adjusting fasteners and segments shall be Type 303 or Type 304 stainless steel. The neoprene seal shall be adjustable from the downstream side of the leaf after the gate is installed.
4. Shaft bearing housings shall be bored and supplied with vertical shaft bearings of the self-lubricating type. The maximum unit pressure on the bearing shall not exceed 2,500 psi when the gate is subjected to the design head shown in the "Gate Schedule."

#### D. Adjustable Thrust Bearing

1. A stainless steel thrust collar shall be located at the top of the gate opening and shall be designed to take the load that is developed during gate operation.
2. The thrust collar shall be supported in its own housing and will have a self-lubricating thrust bearing below its surface. It shall be adjustable after the gate is installed and shall provide for centering of the leaf within the gate frame.

#### E. Gate Shafting

1. The gate shaft shall be Type 304 stainless steel and be of a diameter necessary to operate the gate under the maximum specified head. The shaft shall be of the stub type and shall extend into the gate leaf for a minimum  $1\frac{1}{2}$  diameters. It shall be removable from the top of the gate frame without dismounting the gate from the wall. O-ring gaskets shall be installed around the shafting at the top and bottom of the gate opening to prevent water from leaking past the shaft in either direction.

#### F. Gate Actuator

1. The actuator shall be mounted above the gate opening. It shall be supported on a fabricated-steel bonnet and shall be capable of opening and closing the gate leaf through an arc of  $90^\circ$  and holding the leaf in any intermediate position. It shall be manual type with handwheel operation,

hydraulically actuated, or with an electric actuator to supply power to the manual unit in place of the handwheel as shown in the "Gate Schedule". The latter type shall move the gate from the fully opened to the fully closed position, or vice versa, within one minute or less.

G. Materials

1. Materials shall conform to the requirements of the following ASTM Standards.
  - a. Cast Iron  
ASTM A126, Class B or C
  - b. Carbon Steel (Leaf, Frame, Fabricated Slot)  
ASTM A36
  - c. Stainless Steel (Shaft, Seating Face)  
ASTM A582, Type 303; or ASTM A276, Type 304 or 304L
  - d. Stainless Steel (Anchors, Studs)  
ASTM A276, Type 304
  - e. Resilient Seal  
ASTM D2000, Grade 1AA625
  - f. Stainless Steel (Fasteners)  
ASTM F594, Alloy Group 1 for Nuts

H. Manufacturer:

1. Pratt.
2. Rodney Hunt.

2.18 PRESSURE RELIEF VALVES

A. Hydrostatic:

1. Valves shall be designed to operate on a hydrostatic differential.
2. Floor type valves shall be cast iron body with resilient seats.
3. Wall type valves shall be flanged, cast iron body, bronze mounted, with resilient seat.
4. Valves shall come complete with corrosion resistant strainer, strainer plug, and tapped flange wall pipe.
5. Manufacturers:
  - a. Clow.
  - b. American Flow Control.
  - c. Or equal.

## 2.19 MANUAL OPERATORS

- A. Valves shall be furnished with manual operators as follows, unless otherwise shown or specified:
- |    |                                    |  |
|----|------------------------------------|--|
| 1. | Buried                             | Extension stem and valve box with standard operating nut |
| 2. | Submerged or Located in Deep Vault | Extension stem with floor stand and handwheel operator   |
- B. Operating nuts for buried or submerged valves shall be standard 2-inch-square nuts and shall conform to AWWA C500, Section 19. Extension stems, valve boxes, and stem guides shall be furnished where shown, specified, or required for proper operation.
- C. Manual rotary operators for buried or submerged service shall be totally enclosed and completely sealed to prevent the entrance of water and dirt. Buried or submerged operators shall be finished on the outside with a bituminous or other approved coating. Rotary operators for buried or submerged service shall be capable of withstanding 300 foot-pounds of torque on the operating nut or handwheel. A corrosion-resistant, dial type valve position indicator shall be provided at the operating nut on the extension stem of buried operators to provide a remote indication of valve position.
- D. All manual rotary and lever operators shall be capable of seating or unseating the valve disc under the most adverse conditions in the particular application with not more than an 80-pound pull on the handwheel or lever. Valve operators shall be capable of holding the valve in any position between fully open and fully closed without creeping or fluttering. Operators shall be provided with adjustable, mechanical, stop-limiting devices to prevent over-travel of the valve disc or valve plug in the open and closed positions. Manual rotary and lever operators shall comply with all applicable requirements of AWWA C540, Sections 11.1, 11.2, and 11.3.

## 2.20 VALVE BOXES

- A. All buried valves shall be provided with three-piece, cast iron, extension sleeve type valve boxes suitable for the depth of cover. Verify conditions before ordering valve extension stem and other components for buried valves.
- B. Valve boxes shall not be less than 5 inches in diameter, shall have a minimum thickness of 3/16 inch at any point, and shall be provided with suitable cast iron bases and covers. Covers shall have cast thereon an appropriate name designating the service for which the valve is intended ("W" for water, "S" for drain or waste lines). Covers in roadways shall be of the deep locking type.
- C. All parts of valve boxes, bases, and covers shall be heavily coated with a suitable bituminous finish.

- D. Valves and boxes shall be set plumb. Each valve box shall be placed directly over the valve it serves with the top of the box flush with the finished grade.

#### 2.21 T-HANDLE OPERATING WRENCH

- A. Furnish two (2) T-handle, steel valve operating wrenches with sockets compatible with standard 2-inch-square valve operating nuts.
- B. The operating wrenches shall be at least 36 inches in length.

#### 2.22 EXTENSION STEMS

- A. Constructed of extra strength steel rod for buried valves and Type 304 stainless steel rod for the stems inside the concrete tanks.
- B. Length shall be as required for proper operation of the valve or as specified in valve schedule.
- C. Extension stems shall be securely fastened to the valve stem.
- D. Extension stems for buried valves shall extend to within 3½ feet of finished grade unless noted otherwise.

#### 2.23 OPERATING NUTS

- A. Operating nuts shall be provided for all valves and as called for in the valve list.
- B. All operating nuts shall be 2 inches square.

#### 2.24 STEM GUIDES

- A. Stem guides shall be cast iron with bronze bushing, fully adjustable, and complete with bronze or stainless steel anchor bolts.
- B. Stem guides shall be spaced as required by the Engineer and shall not exceed 10 feet.

#### 2.25 FLOOR BOXES

- A. Floor boxes shall be of the bronze bushing type complete with cover. Boxes shall be designed for installation in floors and slabs as shown.

#### 2.26 FLOOR STANDS

- A. Floor stands shall be right angle type, nonrising, crank operated, straight or offset as required, be rigidly anchored, and include position indicator.
- B. Operators shall turn counterclockwise to open.



- C. Single or double gear reduction shall be provided as required.
- D. Antifriction bearings shall properly support both opening and closing thrust to floor stand.
- E. Floor stand shall operate the valve or gate under all operating conditions with 40 pound maximum pull on the crank.
- F. All components shall be enclosed in a cast aluminum or stainless steel weatherproof housing with positive mechanical seals to exclude moisture and dirt and prevent lubricant leakage.
- G. Lubrication fittings shall be furnished for all gears and bearings.
- H. Floor stand pedestal shall position the input shaft approximately 30 inches above the base.
- I. A permanently attached or cast arrow with the word "OPEN" on the floor stand shall be furnished indicating the direction of rotation to open the valve or gate.
- J. Floor stands shall be suitable for occasional submergence.

#### 2.27 HAND OPERATORS

- A. Operators shall be sized for 40 pound pull force unless noted otherwise on the valve schedule.
- B. Provide chain wheel and chain for valves over 6 feet above floor.

#### 2.28 ELECTRIC MOTOR OPERATORS

- A. "Motor operated open-close and modulating mechanisms sized to handle the specific valve or gate shall be furnished as follows unless specified elsewhere in detailed equipment specifications. Electric actuator shall include the electric motor, gearing, valve stem drive nut/bushing, position limit switches, mechanical overload torque switches, ductile iron gear case and automatic declutchable handwheel. Comply with AWWA C540, Section 3.
- B. Electric motors sized to be specifically designed for valve or gate actuator service, and be totally enclosed, nonventilated. The enclosure shall meet minimum NEMA 4 rating unless specified or required for the location. Motor shall be capable of operation under maximum specified loads when voltage to the motor is  $\pm 10$  percent of the nominal voltage. Provide space heater in motor, minimum rating 10 watts, connect to 120 volt power supply. Motor shall have Class F insulation with thermal overload sensors imbedded in the motor windings. The valve and gate manufacturer shall be responsible for proper sizing and mounting.

- C. Limit switches shall be geared to the drive mechanism and in step with actual valve or gate position at all times, whether operation is by power or manual mode. Switches shall be activated by a rotor type design. Contacts shall be silver and have a rating of 10 amps at 120 volts AC. A minimum of three (3) N.O. and three (3) N.C. contacts shall be provided for each direction of travel, factory set to the full open and full closed positions. The limit switchgear mechanism shall be enclosed to prevent entrance of foreign matter or wire entanglement.
- D. Torque Switches. The actuator shall include an adjustable torque switch to interrupt the motor power circuit when an obstruction is encountered in either direction of travel or when torque seating of valves or gates is required for tight shut off. The torque switch shall have a calibrated dial for adjustment and have means to ensure maximum actuator rating is not exceeded. Contacts shall be same construction and rating as limit switch. Mechanical torque springs for load control shall be field replaceable without need of actuator dismantling or removal of the worm assembly.
- E. Position Indication. Provide mechanically coupled indicator for valve or gate position indication. Open, closed, and mid position indication stamped on enclosure. Provide a stainless steel band, graduated in 10-degree increments and fastened to actuator.
- F. Electrical Controls. As a minimum, the actuator shall be furnished with power and control terminal strips, space heater (25 watt), limit switches, torque switches, all housed in a control compartment meeting NEMA 4. The controls shall be rigidly mounted on a steel plate and be easily removable through the use of plug-in connectors.
- G. Open-close and throttling service controls shall include as a minimum:
1. Reversing Contactor. Control voltage shall be 120 volts, 60 hertz. N.O. seal-in contacts for momentary contact pushbutton control and N.C. contacts for electrical interlock shall be supplied. The contactor shall be both electrically and mechanically interlocked. It shall be completely wired as an assembly and plug connected to the modular package. A time delay shall be incorporated into the reversing contactor to prevent high current surges caused by rapid motor reversal.
  2. Control Power Transformer. The transformer assembly shall provide 115, 18 and 12 volt AC. It shall be epoxy impregnated and encapsulated to prevent moisture incursion and shall be completely wired as an assembly and plug connected to the modular package.
  3. Pushbuttons. Each actuator shall be supplied with open-stop-close pushbuttons furnished integrally mounted. Pushbuttons shall be double O-ring sealed and include a protective silicon boot. Seal material shall be resistant to ozone and ultraviolet light.

4. Indicating Lights. The actuator shall include two (2) long life, high density LED pilot lights to indicate open, closed and intermediate valve position (both lights on). Red shall indicate valve or gate open and green shall indicate valve or gate closed. An additional LED pilot light shall be furnished to indicate power is on. A fourth LED pilot light shall be furnished to indicate torque switch trip.
  5. Selector Switch. The actuator shall include a 3-position selector switch, for local (hand) and off-remote (auto) control. The switch shall be padlockable in any position.
  6. Monitor Relay. A monitor relay with a N/O and N/C contact shall be included and shall trip when the actuator is not available for remote operation. Power OFF, selector switch in local, loss of control power, and motor thermostat trip shall all trip the monitor relay. The relay shall be rated 250 Volts/5 Amps.
  7. Provide momentary type remote controls for throttling service.
- H. Provide temporary electrical service for operator controls during storage period and until permanent electrical service is provided.
  - I. All connections shall be located in a terminal chamber that is separately sealed from all other actuator components. Site wiring shall not expose actuator components to the environment. The internal sealing within the terminal chamber must be suitable for NEMA 4, 6, and IP 68.
  - J. The actuator shall be coated with a high-solids epoxy primer and then finish coated with a polymer powder coat. The combined coating system shall exceed the requirements of NEMA 4X and be suitable for an ASTM B117 salt spray test of 1500 hours.
  - K. Electric motor actuator shall be as manufactured by Limitorque Model Accutronix MX, Rotork Model IQ.

## 2.29 PNEUMATIC OPERATORS

- A. Pneumatic operated actuator mechanism sized to handle the specific valve or gate shall be furnished. Pneumatic actuator shall include the actuator, gearing, valve stem drive nut/bushing, pneumatic positioner, position monitor, angle transducer, visual indicator, and manual override. Comply with AWWA C540, Section 3. All pneumatic operators and control accessories shall be sized, mounted, calibrated, and supplied by the valve manufacturer to ensure proper operation.
- B. Actuator shall be a double acting pneumatic vane type actuator. Actuator shall be sized for torque and modulating requirements for process valves. Maximum 100 psig air pressure required for actuator operation. Maximum displaced air volume requirements per schedule.

- C. Pneumatic positioner shall be an electrical pneumatic type for smooth accurate control in response to a 4-20 mA signal with integral air porting. Angle transducer for position indication/readout shall output a 4-20 mA signal for proportional angular position between 0° and 90°. Nominal supply voltage of 24 volts. Zero and span shall be adjustable.
- D. Position monitor shall be cone shaped for 360 degree visibility, all round position monitoring. Provide indicator sealed inside a chemical resistant clear polycarbonate cover and mounted on top of the positioner.
- E. Provide mounting bracket for valve type and location. Provide direct mounted manual geared override. Geared override shall be declutchable type rated for the same torque as the actuator, located between the actuator and the valve. The actuator assembly shall be provided with Auto/Manual isolation/equalization valves to allow the operator to switch from automatic mode to manual mode. The declutchable manual override shall allow the operator to position the valve in the manual mode.
- F. Actuator casing shall be die cast zinc alloy. Vane and output shaft shall be annealed spheroidal iron, zinc plated, with molded double polyurethane seals. Vane shaft seals are to be double opposed, consisting of stainless steel spring expanders encased in molded polyurethane. Single seals and o-ring type seals are not allowed. Working temperature range shall be from -5°F to 175°F. Actuator maximum working pressure shall be 100 psi; and maximum overload pressure shall be 150 psi.
- G. Finish on external surfaces shall be epoxy enamel finish for corrosion resistant finish. Finish for internal surfaces shall be epoxy or PTFE.
- H. Actuator positioner assembly shall operate to give counter clockwise rotary movement, with mounted fail-hold I/P transducer. A 4–20 mA rising input control signal shall give linearly proportional rising 3–15 psig output signal to positioner. Valve over-travel shall be limited by mechanical stops built into the operator.

Failure of 4–20 mA control signal, or control signal below 3.5 mA shall result in a constant psig output signal to the positioner and the valve position shall not change.

Actuator positioner shall have two (2) mounted pressure sensing switching valves to control air paths between the positioner and actuator. Pressure sensing switching valves shall seal air path if the air supply to the positioner falls below 60 psig.

- I. Pneumatic actuators and accessories shall be as manufactured by Kinetrol.

## 2.30 SPARE PARTS

- A. Furnish the following spare parts where applicable for the valves/gates specified herein:
- |    |   |   |
|----|---|---|
| 1. | Stem packing                                  | One set each type and size of valve/gate              |
| 2. | Renewable stainless steel or bronze seat ring | One each type and size of valve/gate                  |
| 3. | O-ring stem or shaft seals                    | One set each type and size of valve/gate              |
| 4. | Resilient seat or disc                        | One each type and size of valve/gate                  |
| 5. | Shaft bearings or bushings                    | One set each type and size of valve/gate              |
| 6. | Hinge pin, disc, spring, and bolts valve      | One set each type and size of check disc              |
| 7. | Gaskets                                       | One set each type and size of valve/gate              |
| 8. | Special tool or seat wrench                   | One each required for valve servicing and maintenance |
- B. Suitably protect spare parts against corrosion and impact to withstand long-term storage. All parts shall be clearly labeled and identified by manufacturer's name and number and the valve to which they belong.
- C. Each electric motor operator and pneumatic operator shall be supplied with a startup kit with spare cover screws, gaskets, and seals.

### PART 3 - EXECUTION

#### 3.1 FACTORY TESTS

- A. Test all valves/gates at the point of manufacture for proper and unobstructed operation and for leakage and adequacy of design.
- B. Test iron body gate valves in accordance with AWWA C500, Section 5.
- C. Test butterfly and plug valves in accordance with AWWA C504, Section 5.
- D. Test iron body check valves in accordance with AWWA C508, Section 5.
- E. All other valves/gates shall be given an operation test, a leakage test at rated pressure differential, and a hydrostatic test at two times rated pressure. During the hydrostatic test, there shall be no leakage through the metal, the end joints, or the shaft or stem seal, nor shall any part be permanently deformed. During the leakage test, leakage shall not exceed that permitted by ANSI B16.104, Class IV for metal seated valves and Class VI for resiliently seated valves.

### 3.2 PREPARATION

- A. Verify conditions, intended valve service, and inspect for damage prior to installation.
- B. Remove debris from inside piping system.
- C. Follow manufacturer's instructions.

### 3.3 INSTALLATION

- A. Install all valves/gates in strict conformance with the Drawings and approved shop drawings and manufacturer's instructions.
- B. Install all underground valves using a concrete valve box with cast iron frame and cover or in a cast iron valve box as specified herein.
- C. Install valves in such a way that operators and packing are easily accessible. Valves with field replaceable seats shall be installed with sufficient clearance to permit removal of valve bonnet and stem without removing valve from the line.
- D. Provide initial lubrication to valves, operators, and accessories.
- E. Provide field touchup bituminous coating to all aluminum surfaces in contact with concrete.
- F. Provide non-shrink, non-corrosive grout at all formed openings and recesses for embedded gate sections or frames, in accordance with manufacturers recommendations.

### 3.4 FIELD TESTING

- A. Following installation, test all valves under the anticipated operating conditions. The ability of the valves to operate properly without leakage, binding, sticking, fluttering, or excessive operating torque shall be demonstrated to the satisfaction of the Engineer. At Contractor's expense, adjust and/or replace any valve as necessary to ensure satisfactory operation.

### 3.5 VALVE AND GATE SCHEDULES

- A. The valve and gate schedules are for the convenience of the Contractor. The Contractor is required to provide all the valves and gates shown on the plans, and the omission of any valve or gate from the schedule does not release the Contractor from the responsibility to provide any valves or gates.
- B. Valves 4 inches and larger are included in the valve schedule. Valves integral with other equipment, or not shown and numbered on the plans, are not included with the valve schedule.

C. Abbreviations used in the Schedule are as follows:

### VALVE AND GATE SCHEDULE ABBREVIATION LEGEND

<b>Type</b>		<b>Valve Joint</b>	
AC	-	Air Check Valve	FJ - Flange Joint
AL	-	Altitude Valve	GC - Grooved Coupling
AN	-	Angle Valve	MJ - Mechanical Joint
AR	-	Air Release Valve	POJ - Push-On Joint
AV	-	Air and Vacuum Valve	TJ - Threaded Joint
BA	-	Ball Valve	
BF	-	Butterfly Valve	
BG	-	Butterfly Gate	
BK	-	Backpressure Valve	<b>Operators</b>
BFP	-	Backflow Preventer	BG - Buried Gear
CK	-	Check Valve	CL - Class
CO	-	Cone Valve	CPE - Crank with Pedestal & Enclosed Gear
DBL CK	-	Double Check Valve	CW - Chainwheel
ED	-	Energy Dissipating Valve	CWG - Gear with Chainwheel
FG	-	Fabricated Slide Gate	ES - Extension Stem Shaft
GA	-	Gate Valve	FB - Floor Box
GL	-	Globe Valve	FS - Floor Stand
HB	-	Hose Bibb	G - Gear
KG	-	Knife Gate Valve	H - Handwheel
KN	-	Knife Valve	L - Lever
PD	-	Plug Drain Valve	M - Motor
PRV	-	Pressure Relief	NRS - Nonrising Stem
PG	-	Pressure Regulator	ON - Operating Nut
PI	-	Pinch Valve	P - Positioner
PL	-	Plug Valve	PI - Post Indicator
PR	-	Pressure Reducing Valve	PL - Position Level
PSC	-	Backpressure Sustaining Check	PN - Pneumatic
PT	-	Pressure Temperature Relief	RS - Rising Stem
RF	-	Rate-of-Flow Controller	SG - Submerged Gear
SC	-	Sampling Cock	TN - Traveling Nut
SG	-	Sluice Gate	TSC - Graduated Transparent Stem Cover
SO	-	Solenoid Valve	
SU	-	Surge Valve	THW - "T" Handle Wrench
TE	-	Telescoping Valve	VB - Valve Box
WG	-	Fabricated Weir Gate	

#### Gate Joint/Frame Mount

EL	-	Embedded Liner
SM	-	Surface Mount
WP	-	Wall Pipe
WT	-	Wall Thimble





### VALVE SCHEDULE

LOCATION	MARK	TYPE	SIZE (IN.)	JOINT	OPERATOR	PRESSURE RATING (PSI)	REMARKS
Faircrest Lift Station Valve Vault	V1	PL	4	FJ	L	175	4" discharge from submersible pumps
Faircrest Lift Station Valve Vault	V2	PL	4	FJ	L	175	4" discharge from submersible pumps
Faircrest Lift Station Valve Vault	V3	PL	4	FJ	L	175	4" discharge from submersible pumps
Faircrest Lift Station Valve Vault	V4	CK	4	FJ		250	4" discharge from submersible pumps. Rubber flapper check valve
Faircrest Lift Station Valve Vault	V5	CK	4	FJ		250	4" discharge from submersible pumps. Rubber flapper check valve
Faircrest Lift Station Air/Vacuum Release Valve	V6	AV	2	TJ		200	4" discharge from submersible pumps located in lift station valve vault
Faircrest Lift Station Air/Vacuum Release Valve	V7	AV	2	TJ		200	6" force main discharge from lift station located in air/vacuum release manhole



## SECTION 11313

### SUBMERSIBLE NON-CLOG PUMP STATION

#### PART 1 - GENERAL

##### 1.1 WORK INCLUDED

- A. This section covers all equipment, materials, accessories, and labor required to assemble, install, test, and place into satisfactory service the Faircrest Street duplex submersible non-clog pump station as specified herein and shown on the Drawings.

##### 1.2 RELATED WORK

- A. Section 02570 – Monolithic or Sectional Precast Concrete Vault Structures.
- B. Division 15 – Mechanical.
- C. Division 16 – Electrical.

##### 1.3 SYSTEM DESCRIPTION

- A. The system shall consist of two (2) sewage non-clog explosion proof pumps, hydraulic sealing flanges, black iron discharge elbows, stainless steel guide rails including intermediate supports, stainless steel lifting cable, floats, lifting hoist, and electrical control panel.
- B. Each pump shall be capable of handling a 3-inch spherical solid. Each pump shall be non-overloading throughout the entire range of operation without employing a service factor. Each pump shall reserve a minimum service factor of 1.2.
- C. Operating Conditions

Pump Station	Capacity per pump GPM	TDH in feet	HP	Phase of power	Voltage	RPM	Hertz
Faircrest Street Lift Station	268	97	25	3	480	1750	60

## 1.4 QUALITY ASSURANCE

### A. GENERAL

1. The Contractor shall be responsible for ensuring that all equipment installed is properly connected to other related equipment for proper functioning of the pump station.
2. The pump motors and all electrical components shall be listed by Underwriter Laboratories, and shall have a U.L. label affixed. Pump stations tested to U.L. specifications by anyone other than Underwriters Laboratories will not be considered equal.

### B. MANUFACTURER'S QUALIFICATIONS

1. The Manufacturer of work of this section shall have five (5) years minimum proven experience in such work and shall have satisfactorily completed three (3) jobs of similar size and type within the last five (5) years.

### C. WARRANTY

1. The Manufacturers shall submit in writing a detailed list of those components that may be excluded from the warranty and the conditions of those exclusions.
2. The pump manufacturers shall provide all parts and labor warranty on the station pumps and accessories, including, but not limited to, control panel and level control, for a period of one year (1) after Notice of Owner's Acceptance. Any defects found during the warranty period will be reported to the Manufacturer by the Owner.

## 1.5 SUBMITTALS

### A. SHOP DRAWINGS AND ENGINEERING DATA

1. Submit complete shop drawings to the Engineer in accordance with the requirements of the Supplemental Specifications.
2. Submit complete engineering data to the Engineer in accordance with the requirements of the Supplemental Specifications.

### B. TESTING

1. Commercial testing shall be required and include the following:
  - a. The pump shall be visually inspected to confirm that it is built in accordance with the specification as to HP, voltage, phase and hertz.
  - b. The stator motor leads shall be tested for integrity using a megohmmeter at the highest setting.
  - c. Pump shall be allowed to run dry to check for proper rotation.
  - d. Discharge piping shall be attached, the pump submerged in water, and amp readings shall be taken in each leg to check for an imbalanced stator winding. If there is a significant difference in readings, the stator windings shall be checked with a bridge to determine if an unbalanced resistance exists. If so, the stator shall be replaced.
  - e. The pump shall be removed from the water, megohmmeter tested again, dried and the motor housing filled with dielectric oil.
2. A non-witnessed Hydraulic Institute performance test shall be performed. This shall include the following:
  - a. The pump shall be tested at the design point as well as at least 4 other points to develop a curve. Data shall be collected to plot the head capacity curve as well as a KW input and amperage curve.
  - b. In making these tests, no minus tolerance or margin shall be allowed with respect to capacity, total head or efficiency at the specified design condition. Pump shall be held within a tolerance of 10% of rated capacity or at rated capacity with a tolerance of 5% of rated head. The pump shall be tested at shutoff, but not be plotted, and only used as a reference point when plotting the performance curve.
  - c. Complete records shall be kept of all information relevant to the test, as well as the Manufacturer's serial number, type and size of pump, as well as any impeller modifications made to meet the design conditions.
  - d. A written test report shall be prepared, signed and dated by the test engineer incorporating 3 curves (head-capacity, KW input, and amperage) along with the pump serial number, test number, date, speed, volts, phase, impeller diameter, and certification number. The performance curve submitted for approval shall state in

addition to head and capacity performance, the pump efficiency, solids handling capacity, and reflect motor service factor. This report shall then be submitted to the Engineer.

#### C. OPERATION AND MAINTENANCE DATA

1. Submit complete operation and maintenance data on the equipment to the Owner in accordance with the requirements of the Supplemental Specifications.

#### 1.6 STORAGE AND PROTECTION

- A. Store and protect the pump equipment and accessories in accordance with the Manufacturer's recommendations.

#### 1.7 GUARANTEE

- A. Provide a guarantee against defective equipment and workmanship.

#### 1.8 MEASUREMENT AND PAYMENT

- A. Payment for this work will include all equipment, materials and labor necessary to perform the work under this specification as shown on the Drawings and specified herein and included in the Contract. The payment for this work shall be included in the lump sum price of Faircrest Street Lift Station, Complete.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. The design has been based on equipment provided by the following manufacturers:
  1. The Hydromatic Pump Company, Model S4KX2500FC.
  2. Or approved system meeting this specification.

#### 2.2 SYSTEM COMPONENTS

## A. PUMPS

1. Pumps shall be centrifugal, submersible, non-clog, wastewater type. Pump volute, motor and seal housing shall be gray cast iron, ASTM A-48, Class 30. Pump discharge shall be fitted with a 4-inch standard ASA 125 lb. flange, faced and drilled. All external-mating parts shall be machined and Buna N Rubber O-ring sealed on a beveled edge. All fasteners exposed to the pumped liquids shall be 300 series stainless steel.

## B. CASINGS

1. Each casing shall be of the end suction volute and horizontal discharge type having sufficient strength and thickness to withstand all stress and strain from service at full operating pressure and load. Casings shall be accurately machined and bored for register fits with the suction and casing covers.
2. A volute case-wearing ring shall be provided to minimize impeller wear. The wear ring shall be 80-10-10 bronze and held by 300 series stainless steel fasteners. The wear ring shall be easily replaceable in the field.
3. Though the pumps may not require feet to support the units while installed, the pump volute must have feet to support the units when removed for service.

## C. IMPELLERS

1. Each impeller shall be multi-vane, enclosed non-clogging design and have pump-out vanes on the front and backside of the impeller. The impellers shall be designed so that it can be factory or field trimmed to meet specific performance conditions. Wear or field trimming shall not deter the factory balance. Impellers shall be dynamically balanced.
2. Impeller shall not require coating. Efficiency and other performance data submitted shall be based on performance of an uncoated impeller. The impellers shall be manufactured from ASTM A-48, Class 30 or 40B material.
2. Tolerance values shall be listed below according to the International Standard Organization grade 6.3 for rotors in rigid frames. The tolerance is to be split between the two balance planes, which are the two impeller shrouds.
  - a. Tolerance: .02 in. - oz./lb. of impeller weight @ RPM of 1.750

## D. MOTORS

1. The stator, rotor and bearings shall be mounted in a sealed submersible type housing. The stator windings shall have a minimum of Class F insulation, (155°C or 311°F), and dielectric oil motor, NEMA B design (3 phase motors), and NEMA L design for single phase. Air-filled designs shall not be acceptable. Further protection shall be provided by on-winding thermal sensors.
2. Pumps and motors shall be specifically designed so that they may be operated partially or completely submerged in the liquid being pumped. Pumps shall be suitable for operation in Class 1, Division 1 Groups C& D areas. The pumps shall not require cooling water jackets. Dependence upon, or use of, water jackets for supplemental cooling shall not be acceptable.
3. The pump motors shall be equipped with heat sensors. The heat sensors (one on single phase and two on three phase) shall be a low resistance, bi-metal disk that is temperature sensitive. They shall be mounted directly on the stator windings and sized to open at 120°C and automatically reset at 30-35°C differentials. The sensors shall be connected in series with motor starter coil so that the pump will cease operation when an over-temperature condition is sensed. The starter shall be equipped with 3-pole overload relay with heaters sized for the pump's full load amps. The pump shall cease operation when the overload is tripped. The overload shall be manually reset.

#### E. BEARINGS AND SHAFT

1. An upper radial bearing and a lower thrust bearing shall be required. These shall be heavy-duty single row ball bearings, which are permanently lubricated by the dielectric oil, which fills the motor housing or double row, double sealed grease packed bearings. Bearings that require lubrication according to a prescribed schedule shall not be acceptable. The upper radial bearing shall have a minimum B-10 life at the specified condition of 40,000 hours. Bearings shall be locally available.
2. The shaft shall be machined from a solid 400 series stainless steel forging and is a large diameter design with minimum overhang to reduce shaft deflection and prolong bearing life.

#### F. SEALS

1. Each pump shall have two mechanical seals, mounted in tandem, with an oil chamber between the seals. Seals shall be used with the rotating seal faces being carbon and the stationary seal faces to be ceramic. The lower seal shall be replaceable without disassembly of the seal chamber and



without the use of special tools. Units that require the use of foreign manufactured seals shall not be acceptable. Seals shall be locally available.

2. Each pump shall be equipped with a seal leak detection probe and warning system. This shall be designed to alert maintenance personnel of lower seal failure without having to take the unit out of service for inspection or requiring access for checking seal chamber oil level and consistency.
3. There shall be an electric probe or seal failure sensor installed in the seal chamber between the two tandem mechanical seals. If the lower seal fails, contaminants which enter the seal chamber shall be detected by the sensor and send a signal to operate the specified warning device. Units equipped with opposed mechanical seals shall not be acceptable.

#### G. ELECTRICAL POWER CORD

1. Electrical power cords shall be 500W, W, or GGC water resistant 600 V, 60°C., UL and CSA listed and applied dependent on amp draw for size.
2. Each pump station shall be supplied with watertight quick disconnects at the electrical trough between the control panel and pumps. Each pump shall have a quick disconnect installed on the power cable and sensor cable. The quick disconnect shall be a Pin and Sleeve type connector compatible with the provided pump as manufactured by Hubbell, or equal. The pump cord from the pump to the quick disconnect shall be long enough to reach the electrical trough. A cap shall be provided on each pin and sleeve type connector to seal the end of the disconnected pump power supply cord and prevent entry of moisture and corrosion when pumps are removed from the wet well for extended periods of time.
3. The power cable entry into the cord cap assembly shall first be made with a compression fitting. Each individual lead shall be stripped down to bare wire at staggered intervals, and each strand shall be individually separated. This area of the cord cap shall then be filled with an epoxy compound potting which will prevent water contamination to gain entry even in the event of wicking or capillary attraction.
4. The power cord leads shall then be connected to the motor leads with extra heavy connectors having brass inserts with a screwed wire to wire connection, rather than a terminal board that allows for possible leaks.
5. There shall be an additional epoxy compound potting area separating the motor housing from the cord cap assembly.

6. The cord cap assembly where bolted to the connection box assembly and the connection box assembly where bolted to the motor housing shall each be sealed with a Buna N Rubber O-ring on a beveled edge to assure proper sealing.

#### H. DISCHARGE BASE ELBOW

1. A discharge elbow designed to mount directly to the wet well floor shall be supplied for each pump. It shall be equivalent to 4-inch steel piping in size and have a standard 125-pound flange faced and drilled on the outlet side, with an inlet connection flange faced only. The inlet side shall have a flange face sprayed with zinc. The design shall be such that the pump to discharge connection is made without the need for any nuts, bolts, or gaskets. The base elbow shall also anchor and align the two, FRP guide rails. The elbow shall be painted with waterborne hybrid acrylic/alkyd paint.

#### I. CONNECTING FLANGE

1. A cast iron connecting flange/rail bracket shall be mounted on each pump discharge. It shall have a machined mating flange, which matches the base elbow discharge connection. Sealing of this discharge connection shall be accomplished by a simple linear downward motion of the pump culminating with the entire weight of the pumping unit supported entirely by the base elbow.

#### J. PULTRUDED GUIDE RAIL SYSTEM

1. The guide rail used to direct the pump in proper alignment with the stationary discharge piping shall be of single rail design. The single rail shall be non-corrosive, non-spraking, FRP pultrusion formed in the shape of an I-beam. FRP pultrusion (one-piece) shall bolt directly to the base elbow on the sump floor and extend up and bolt directly to the access frame. Dual rail systems utilizing a material such as galvanized piping or stainless steel piping shall not be acceptable
2. The pump shall be automatically connected to the discharge connection elbow then lowered into place, and shall be easily removed for inspection or service. There shall be no need for personnel to enter the pump well. Sealing the pumping unit to the discharge connection elbow shall be accomplished by a single down in motion of the pump.

#### K. UPPER GUIDE BRACKET

1. A sliding guide connector shall be an integral part of the pump unit. No other carrier shall be required. The sliding guide connector shall be 300 series stainless steel wire formed. When the pump approaches the bottom of the non-corrosive FRP I-beam pultrusion, two D-shaped rods cast into the hydraulic sealing flange shall connect two (2) 300 series stainless steel arms flanking the discharge elbow. The downward sliding action of the rod shall clean the arms of any sewage debris and align the sealing flange. A small crescent-shaped peg on the bottom of the base elbow flange shall ensure proper spacing of the sealing faces, and thus eliminate the potential for further metal-to-metal contact.

#### L. LIFTING CABLE

1. Each pumping unit shall be provided with a stainless steel lifting cable and be of sufficient length to extend from the pump to the bail on the pump hoist located on top of the wet well. The access frame shall provide a hook to attach the cable when not in use. The lifting cable shall be sized to the pump weight and compatible with the pump lifting hoist as specified. The lifting cable shall be secured to the pump lifting handle with a stainless steel shackle that ensures correct lifting of the pump regardless of pump installation, motor positioning or slack in the lifting cable.

#### M. FLOAT MOUNTING BRACKET

1. A float-mounting bracket shall be provided with strain relief that supports and holds the level control cords. Continuous cords are to run from pump(s) and level controls to a control panel or junction box. No splices shall be made in the wiring. The bracket shall be fabricated from stainless steel. The float bracket shall be attached to the access frame with 300 series stainless steel fasteners. A dielectric spacer shall be installed when bolting to an aluminum access frame.

#### N. SUBMERSIBLE TRANSDUCER SYSTEM

1. The level control system shall utilize a submersible transducer. It shall be a strain gauge transducer with a pressure sensor housed in a 316 SST or Titanium case designed to extend into the wet well. The pressure transducer shall provide a proportional signal for distribution to the display and electronic comparators of the electronic pressure switch, and remainder of the level control system. Sensor range shall be 0-25 ft. W.C. minimum with an over-pressure rating 3 times full scale. The transducer shall have output capability of 1.5-7.5VDC or 4-20mA. The transducer's polyurethane jacketed shielded cable shall be of suitable length for proper installation into the wet well without splicing.

2. The level control systems shall utilize the alternator relay to select first one pump, and then the second pump, to run as lead pump for a pumping cycle. Alternation shall occur at the end of a pumping cycle.

#### O. MERCURY FLOAT SWITCH TYPE LEVEL CONTROLS

1. Intrinsically safe float switches shall be supplied to control the wet well level and alarm signal. The switches shall be sealed in a solid polypropylene float for corrosion and shock resistance. There shall be float switches as follows:
  - a. The "Pumps Off" float shall turn the pumps off.
  - b. The "Lead Pump On" float shall turn the lead pump on.
  - c. The "High Level" float shall turn on the alarm and light.
  - d. The "Lag Pump On" float shall turn on both pumps (lead and lag pump).
2. Each float switch shall include a mercury switch potted and sealed in a chemically, resistant polypropylene housing. Each switch shall have a component rating of 4.5 A @ 120V. Heavy duty, STO, PVC cable of an adequate length shall extend out of the housing to the control panel. The cable shall contain 18 gauge copper wire with 41 strands of #34 copper for longer flex life. The float switches shall be provided by The Anchor Scientific Company model S40N0 or equal. The entire assembly shall be UL listed and rated for a type 6P, submersible environment.
3. Floats shall be internally weighted and be suspended on its own cable. The actuation level shall be adjusted from above the wet well.
4. There shall not be a junction box at the wet well. The float control cords shall extend through the wetwell lid to the electrical trough for all float conductor connections before entering the control panel. A watertight pin and sleeve quick disconnect Hubbell or equal connector and plug shall be installed in each float switch cord at the base of the electrical trough to provide easy access for the removal of the floats.

#### P. ELECTRICAL CONTROL PANEL

1. The motor control panel shall be assembled and tested by a shop meeting U.L. Standard 508 for industrial controls. The motor and control panel shall be assembled and tested by the same manufacturer supplying the pumps so as to insure suitability and assurance of experience in matching

controls to motors and to insure single source responsibility for the equipment.

2. The control panel shall comply with NEC regulations and have a UL label. The panel shall contain all components required by the pump manufacturer for starting, operating and protection of the motor. Any features required by the pump manufacturer for warranty of the pumps shall be included in the control panel.
3. The controls for the pumps shall be contained in an enclosure meeting NEMA 1 requirements with a hinged door, and padlock hasp. A circuit breaker or fused main disconnect shall disconnect panel from incoming power. A nameplate shall be permanently affixed to the panel and include the model number, voltage, phase, hertz, ampere rating and horsepower rating. A warning label against electric shock shall be permanently affixed to the outer door. The pump panel shall be constructed to facilitate it being mounted inside the electrical cabinet.
4. A back panel with electroplated bright zinc and clear chromatic finish shall be provided.
5. "Run" lights and "Hand-Off-Auto" switches shall be provided. "Run" lights and "Hand-Off-Auto" switches shall be mounted on an electroplated bright zinc chromatic finish steel brackets. "Run" lights and "Hand-Off-Auto" switches shall be properly labeled as to function. "Hand-Off-Auto" switches shall be the rocker type with an electrical life of 50,000 operations. "Run" lights shall match the "Hand-Off-Auto" switches in appearance and be of push to test type and have an electrical life of 5,000 hours. "Run" lights shall be red.
6. Terminal blocks with box type lugs shall be supplied to terminate all wiring for control floats, pump over temperature, high water and seal failure sensors for the pumps. The pump leads shall be terminated at the overload relay or at box type terminal blocks. Both the pump power connectors and sensor cables will be bated into the receptacle on the bottom of the trough which connects to the control panel.
7. A circuit breaker shall be used to protect from line faults and to disconnect the pump from the incoming power. Circuit breaker shall be thermal magnetic and sized to meet NEC requirements for motor controls. The motor starter shall give an alarm signal upon motor overload failure.
8. The magnetic starters shall include a contactor with a minimum mechanical life of 3,000,000 operations and a minimum contact life of 1,000,000 operations. The magnetic starter shall include an overload relay which is ambient temperature compensated and bimetallic. The overload

relay shall have test and reset buttons. The overload relay shall be capable of being set in either manual or automatic reset mode. In the manual mode, reset shall be accomplished only by the operator. At 6 times full load amps the overload relay shall trip within 10 seconds or Class 10 rated overload relays shall be required.

9. Control voltage shall be 120 VAC and may be accomplished by the means of a transformer or available line voltage. A control fuse and "On/Off" switch shall protect and isolate the control voltage from the line.
10. Wire ties shall be used to maintain panel wiring in neat bundles for maintenance and to prevent interference with operating devices. All wiring shall be color coded to facilitate maintenance and repair of the control panel. Where a color is repeated, number coding shall be added. A schematic shall be permanently attached to the inside surface of the front door.
11. All ground connections shall be made with ring tongue terminals and star washers to assure proper ground.
12. The PLC shall be provided for control logic.
13. The control panel shall be equipped to monitor the incoming power and shut down the pump motors when required to protect the motor(s) from damage caused by phase reversal, phase loss, voltage imbalance, and low voltage for three phase pumps. A time delay shall be provided to minimize nuisance trips. The motor(s) shall automatically restart when power conditions return to normal.
14. The panel shall be equipped with the following additional features:
  - a. U.L. 913 labeled with intrinsically safe circuit extensions for the floats, heat sensor and seal sensor circuitry.
  - b. External general alarm light
  - c. Elapsed time meter for each pump.
  - d. "Phase Failure" , "High Level", "Pump 1 overtemp", "Pump 1 seal fail", "Pump 1 overload", "Pump 2 overtemp", "Pump 2 seal fail", "Pump 2 overload", "Pump 2 run", "Control Power On", push to test lights.
  - e. Anti-condensate heater with thermostat.
  - f. Lightning suppresser.

- g. UPS with built-in surge suppressor for control circuit
- h. 110 volt convenience outlet for remote SCADA panel power.
- i. Pump alternator with lead pump selector switch.
- j. Time delay relay for high level float (0-10 min) alarms to prevent nuisance alarms
- k. 24 volt DC power supply for Micrologix PLC and pressure level transducer.
- l. Digital inputs to the Micrologix PLC SCADA system for the Following:
  - 1. Normal Power On
  - 2. UPS Failure
  - 3. Pump 1 Auto
  - 4. Pump 1 Run
  - 5. Pump 1 Overload
  - 6. Pump 1 Seal Fail
  - 7. Pump 1 Overtemperature
  - 8. Pump 2 Auto
  - 9. Pump 2 Run
  - 10. Pump 2 Overload
  - 11. Pump 2 Seal Fail
  - 12. Pump 2 Overtemperature
  - 13. Pumps Off Float
  - 14. Lag Pump Start Float
  - 15. Lead Pump Start Float
  - 16. High Level Float
  - 17. Generator Run "Future"
  - 18. Generator Fail "Future"
  - 19. Transfer Switch Fail "Future"
  - 20. Phase Failure
- m. Analog inputs (4-20 mA) to the Micrologix PLC SCADA system for wet well level and station flow "magnetic flow meter".

17. PLC Based Float Backup Operation Of The System

- a. In case of pressure transducer failure, on wet well level rise, the float switch "Lead Pump On" level shall start the lead pump, then the "Lag Pump On" level shall next energize and start the lag pump. Both the lead and lag pump shall operate together until the "Pumps

Off” level turns off both pumps. If the water level rises to the “High Level” elevation, the alarm and light will be activated. If one pump should fail for any reason, the second pump shall operate on the override control.

## 2.3 FINISHES

### A. GENERAL

1. Each pump shall be painted after assembly, and testing, with a water reducible air dry enamel. The paint shall be applied in one coat covering all exterior surfaces. The pumps shall be air dried after testing and before painting.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install equipment in accordance with Manufacturer’s recommendations and installation drawings.

### 3.2 START-UP AND FIELD TESTING

- A. The Manufacturer shall provide the services of qualified factory trained technician(s) who shall inspect the placement and wiring of the station(s), perform field tests as specified herein, and instruct the Owner’s personnel in the operation and maintenance of the equipment before the station is accepted by the Owner. All equipment and materials necessary to perform testing shall be the responsibility of the installer.
- B. Upon completion of the installation, the authorized factory technicians will perform the following test on the station:
  1. Make certain the discharge shut-off valve is fully open. This valve must not be closed when the pumps are operating.
  2. Turn ON the alarm power circuit.
  3. Fill the wet well with water to a depth sufficient to verify the high level alarm is operating. Shut OFF water.
  4. Turn ON pump power circuit. Initiate pump operation to verify automatic “ON/OFF” controls are operative. Pump should immediately turn ON.
- C. Upon completion of the start-up and testing, the Manufacturer shall submit to the Owner the start-up authorization form describing the results of the tests



performed for the pump station. Final acceptance of the pump station will not occur until the performance tests are deemed satisfactory by the Owner

### 3.3 SPARE PARTS

- A. The following spare parts shall be included with each pump station:
1. A complete replacement pump seal assembly kit shall be furnished with each pump. The spare items shall be provided in a separate box labeled "Spare Parts" and shall include complete installation instructions.
  2. A spare set of volute gaskets shall be provided for each pump.
  3. A spare set of seal housing gaskets shall be provided for each pump.
  4. A spare set of pump wear rings shall be provided for each pump.
  5. One spare set of fuses for each fuse used shall be provided inside the control panel for delivery including but not limited to:
    - a. Main Disconnect
    - b. Control Panel Circuit
  6. One spare float switch and cable of each type.
- B. Spare parts shall be shipped with the pumping equipment and stored by the Contractor until turned over to the Owner during certified pump station start-up. Spare parts utilized during start-up and prior to acceptance shall be replaced by the Contractor at no additional cost to the Owner.

END OF SECTION

## SECTION 13324

### FLOW METERING EQUIPMENT

#### PART 1 – GENERAL

##### 1.1 WORK INCLUDED

- A. The Contractor shall provide the labor, tools, equipment, and materials necessary to install flow measurement equipment in accordance with the Contract Drawings and as specified herein.
- B. The types of equipment specified in this section include the following:
  - 1. Magnetic flow meter and transmitter.
  - 2. Parshall flume.
  - 3. Ultrasonic open channel flow monitor.
  - 4. Ultrasonic full pipe flow meter.
  - 5. Air and gas flow meter.
  - 6. Area-Velocity flow meter
  - 7. Ultrasonic pipe cartridge flow meter.

##### 1.2 RELATED WORK

- A. Division 16 – Electrical
- B. Drawings

##### 1.3 QUALITY ASSURANCE

###### A. GENERAL

- 1. The Contractors shall be responsible for ensuring that all equipment installed is properly connected to other related equipment for proper functioning of the Plant.

###### B. MANUFACTURER'S QUALIFICATIONS

- 1. The Manufacturer of work of this section shall have 5 years minimum proven experience in such work and shall have satisfactorily completed 3 jobs of similar size and type within the last 5 years.

2. Substitutions for all work of this section from Manufacturers not complying with the specified experience period shall include the following:
  - a. Special guarantees and warranties
    - 1) Period: 5 years.
    - 2) Manufacturer's special guarantees and warranties.
    - 3) Contractor's and Installer's special guarantees and warranties.
  - b. Bond or cash deposit equal to 100% of the equipment cost guaranteeing compliance of the above specified special guarantees and warranties.

#### 1.4 MEASUREMENT AND PAYMENT

- A. Payment for this work will include all equipment, materials and labor necessary to perform the work under this specification as shown on the Drawings and specified herein and included in the Contract. The payment for this work shall be included in the lump sum price for Faircrest Lift Station, Complete.

#### 1.4 REFERENCES

- A. Perform all work associated with flow metering equipment in compliance with applicable requirements of governing agencies having jurisdiction and in accordance with these plans and as specified herein.
  1. National Electrical Manufacturers Association (NEMA) Compliance.
  2. National Electrical Code (NEC) Compliance.
  3. Underwriters' Laboratories, Inc. (UL) Compliance and Labeling. Comply with provisions of UL safety standards pertaining to flow measurement equipment. Provide products and components which have been UL listed and labeled.

#### 1.5 SUBMITTALS

##### A. SHOP DRAWINGS AND ENGINEERING DATA

1. Submit complete shop drawings and engineering data to the Engineer in accordance with the requirements of the Supplemental Specifications
2. Submit complete operation and maintenance data on the flow metering equipment in accordance with the Supplemental Specifications.

## 1.6 STORAGE AND PROTECTION

- A. Store and protect the flow metering equipment and accessories in accordance with the requirements of the Manufacturer's recommendations.

## 1.7 GUARANTEE

- A. Provide a guarantee against defective equipment and workmanship.

## PART 2 – PRODUCTS

### 2.1 MANUFACTURED UNITS

#### A. MAGNETIC FLOW METERS

##### 1. Features

- a. Pulsed dc electromagnetic induction meter with absolute zero stability.
- b. Flow Tube
  - 1) Enclosure
    - a) NEMA 4X and NEMA 6P capable of withstanding accidental submergence in 30 feet of water for up to 48 hours, for meter vault locations.
    - b) Designed to meet Class I, Division 1, National Electrical Code requirements for flow tubes (See Flow Measurement Schedules).
  - 2) End Connections: 150 pound flanged ends.
  - 3) Conduit Connections: ½ or ¾-inch NPT with watertight seals on cable entrance.
  - 4) Fluid Property Effects: Accuracy unaffected by changes in fluid velocity, density, pressure, temperature, or conductivity (above minimum conductivity limit).
  - 5) The meter shall incorporate high impedance amplifiers, (minimum of  $10^{12}$  Ohms) eliminating the need for electrode cleaning.
- c. Signal Converter
  - 1) Construction: Solid state.

- 2) Interchangeability: Capable of being interchanged with any magnetic flow meter or signal converter of the type specified herein without affecting accuracy or requiring circuit modifications or recalibration.
- 3) Low flow cutoff.
- 4) Mounting: Remote mounting to wall or pipe stand or direct mount to flow tube (See Schedule).
- 5) Enclosure: See Flow Measurement Schedules.
- 6) Local Indication: Integrally mounted LCD with two (2) lines of 16 alpha-numeric characters with backlighting.
- 7) Digital indicators: Illuminated, ¼-inch high digits, 1 percent resolution, permanent tag including full scale reading and units. If integral units cannot meet this specification, then adjacent units are to be provided. Limit digital display to one (1) decimal.
- 8) Local indication shall display rate of flow and total flow.
- 9) Programming of the transmitter shall be through a limited password access from either a handheld device or locally using touch programming.
- 10) It shall be possible to check the settings, read totalized data and all error and alarm messages from the installed meter through a traceable field device.

d. Meter Calibration Verification Requirements

The meter shall have an integral method of system calibration verification. This system shall be able to verify in a quantifiable manner the meter's current condition versus the meter's condition when originally manufactured. This calibration verification of the meters shall be performed without any physical access to the pipe or meter primary element needed. The calibration verification shall meet or exceed the following specifications:

- 1) The original fingerprint values shall be stored on a disc given to the end user. The verification process shall consist of at least (52) meter conditions pertaining to the primary coils, primary electrodes, interconnecting cable, and signal converter.

- 2) The coil verification shall include faults of continuity impedance, resistance to ground, inductance, and magnetic field strength.
- 3) The electrode verification shall include faults of continuity impedance, impedance, and insulation.
- 4) The cable verification shall include faults of coil, electrode, driven shield, shield, and ground connections, cable cut, cable damaged, and water in cable.
- 5) The signal converter verification shall include faults of current supply to the coils, zero offset, span forward and reverse, offset on electrodes, current output, frequency output forward and reverse, driven shield to ground, overall shield to ground, and signal ground connection to ground.
- 6) The calibration verification shall include the following checks: water ingress into the primary elements, faulty electrodes, dirty electrodes, electrode leakage, corroded electrodes, high process noise, liner failure, conductivity coatings on the liner, insulating coatings on the liner, and primary element damage.
- 7) All tests shall be performed by means of comparison between the absolute values and change in values from the new condition.
- 8) The verification standard shall be +/- 1% of wet calibration for meters produced using the calibration verification service, or +/- 2% for standard meters.
- 9) The verification system software shall be compatible for use with Windows 3.11 or Windows 95/98. This software shall be capable of generating a report based upon the result of the previously mentioned tests. The software shall be capable of creating and storing an audit trail of the meter's condition and meter history.
- 10) The calibration verification and metering system shall meet or exceed the standards established by the National Testing laboratories.

## 2. Sizes and Ratings

- a. Accuracy:  $\pm 0.5\%$  (0.7 – 34 fps) (with option to 0.2% for critical applications at no extra cost.
- b. Repeatability: 0.1% of reading.

- c. Rangeability: 100:1 turndown.
- d. Drift: Complete zero stability.
- e. Ambient Temperature Range: -40 to 150 degrees Fahrenheit (°F).
- f. Process Fluid Temperature: +150°F maximum.
- g. Conductivity: Minimum 5 microSiemens/cm.
- h. Selectable Damping: 0.01-99 seconds configurable.
- i. Low Flow Cutoff: Infinitely configurable.
- j. Lay Length: All meters must comply with the latest ISO/ASME lay lengths.
- k. Signal Outputs: Isolated 4-20 into 0 to 700 to 750 Ohms, proportional to flow rate, plus a scaled 24VDC pulse or open collector operating at frequencies up to 10Khz. Analog outputs shall have an adjustable response time from 0.01 to 100 seconds. Flow direction, empty pipe detection, alarm and status contact outputs.
- l. Power Requirements: 110/120 vac, 50/60 Hz.
- m. Size and flow range as specified in the schedule at the end of this section.

### 3. Materials

- a. Body and Tube
  - 1) Flow tubes, all sizes, shall be 300 series stainless steel with epoxy coated cast aluminum or epoxy coated carbon steel housing. Flanged ends shall be carbon steel.
  - 2) Liner: As specified in schedule at end of this section.
  - 3) Electrodes: Tantalum, Hastelloy C, or 316L/316 stainless steel as specified in Flow Measurement Schedule at end of this section.
  - 4) Grounding: Hastelloy C or 316 Stainless Steel orifice type to match electrodes or internal electrode grounding.
  - 5) Exterior Finish: Sensor housing shall be corrosion resistant epoxy.

- b. Signal Converter Enclosure: Cast aluminum with gasketed covers.

4. Accessories

- a. Lifting lug on the top of each meter flange, where applicable.
- b. Shielded cable assemblies for connection between flow meter and signal converter. See the Contract Drawings for cable length requirement.
- c. Grounding electrodes.
- d. Self-cleaning probes and rings.
- e. Grounding straps as recommended by the supplier.
- f. Integral case heaters and thermostat for signal converters in outdoor locations as required.
- g. Stainless steel tag.

5. Manufacturer

- a. Subject to compliance with the requirements of this specification, provide magnetic flow meters manufactured by one of the following:
  - 1) Endress and Hauser PROline/PROMAG series.
  - 2) ABB Instrumentation. MAG-X Series, Model 10Dx3111.

B. PARSHALL FLUME

1. Features

- a. Self-supporting one (1) piece design.
- b. Interior dimensions conforming to U.S. Department of Interior, Bureau of Reclamation, Water Measurement Manual.
- c. Adjustable 304 stainless steel mounting bracket for ultrasonic sensor.
- d. A depth gauge indicating in both inches and tenths of feet molded into flume liner, located to allow conversion of depth to flow rate.



2. Accessories

- a. Flow element and transmitter as specified in this section and listed in the schedule at the end of this section.
- b. Necessary hardware for mounting flow element probe at proper measuring point.
- c. The Manufacturer shall submit a certified head versus rate of flow curve for the flow range specified in the schedule at the end of this section.
- d. The Manufacturer shall confirm that the installation is appropriate to ensure the specified accuracy.

3. Materials

- a. Flume: Molded fiberglass reinforced polyester.
- b. Hardware: Stainless steel.

4. Sizes and Ratings

- a. Accuracy  $\pm 2$  percent of the flow between minimum and maximum flow limits.
- b. Sizes and flow ranges shall be as specified in the schedule at the end of this section.

5. Manufacturer

- a. Subject to compliance with the requirements of this specification, provide Parshall flume manufactured by one (1) of the following:
  - 1) Warminster Fiberglass. (Fischer & Porter)
  - 2) Plasti-Fab, Inc.
  - 3) Corrosion Control Equipment Company.

C. ULTRA-SONIC OPEN CHANNEL FLOW MONITOR

1. Features

- a. Transducer
  - 1) 1-inch NPT mounting conduit connection.
  - 2) Totally encapsulated in ETFE, CPVC or polypropylene to NEMA 6P rating (Submersible).

- 3) FM approved for Class 1, Division 1, classified hazardous locations/areas.
  - 4) Built-in temperature sensors for speed of sound compensation.
- b. Transmitter (microprocessor based)
- 1) Non-intrusive programmer can be used for all setup and adjustment functions via an infra-red link.
  - 2) Can automatically switch to battery operation on loss of powers.
  - 3) Alpha-numeric display or LCD display with optional backlit features.
  - 4) Power consumption less than 15VA.
  - 5) Distance from sensor to transmitter up to 1,000 feet.
  - 6) Built-in level to flow calculation for standard primary devices. Programmable head versus flow curve (up to 16 points) using algorithms necessary to guarantee total system accuracy. False echo reduction algorithms shall be incorporated.

## 2. Materials

- a. Transducer: CPVC body and polyurethane face or Tefzel for added protection.
- b. Transmitter: Polycarbonate enclosure, NEMA 4 (IP65).
- c. Temperature Sensor: PVC body totally encapsulated.

## 3. Sizes and Ratings

- a. Input Power: 120 VAC @ 16 VA, or 18-36 VDC
- b. Range: As required (See Schedule).
- c. Blocking: Adjustable to 10 feet.
- d. Outputs:
  - 1) Three (3) SPDT Relays contacts rated 4A @ 250 VAC.
  - 2) 4-20 mA DC into 1,000 ohms maximum.
  - 3) Output current limit 24mADC

- e. Data Logging (integral or remote):
  - 1) 1 minute to 24 hour adjustable intervals
  - 2) Format: Site ID number, date and time of each record, flow rate, daily flow total, maximum and minimum flow rates and temperature with times of occurrence.
  - 3) Format: ASCII or data base manager (spreadsheet compatible), converted by utilities software provided.
- f. Communications
  - 1) User interface via detachable IR keypad, or alternatively six tactile keypad with full programming and setup features.
  - 2) RS 232 serial port.
  - 3) Optional RS 485 interface, with plug in options for HART.
  - 4) Bi-polar  $\pm 20$  mA current loop.
- g. Operating Temperature
  - 1) Transducer: (-40 to 200°F)
  - 2) Transmitter: (14 to 122°F)
  - 3) Temperature Sensor: (-40 to 158°F)
- h. Temperature Compensation
  - 1) Resolution: 0.1°C
  - 2) Linearity:  $\pm 0.2$ °C
- i. Resolution
  - 1) Liquid Head: 0.03" (1mm) or 0.1% of measuring span, whichever is greater.
  - 2) Current Output: 5 microamps/12 bit D/A
- j. Accuracy:  $\pm 1$  mm/m, calculated errorless than 0.02%
- k. Total system accuracy shall be 0.25% of span or better

#### 4. Manufacturer

- a. Subject to compliance with the requirements of this specification, provide flow monitor manufactured by the following:

- 1) Milltronics Model OCM III
- 2) Endress and Hauser Prosonic range

#### D. ULTRASONIC FULL PIPE FLOW METER

##### 1. Features

- a. Non-invasive, clamp-on design, transit time of flight operation.
- b. Field programmable without need to open the enclosure.
- c. Wall mounted, NEMA 4X solid state transmitter, 0.5" conduit entries.
- d. Local digital flow rate display and totalizer, resettable.
- e. Standard analog, relay and pulse outputs.

##### 2. Accessories

- a. Factory calibration.
- b. Stainless steel identification tag.
- c. Transducer mounting straps and rigid premeasured/calibrated installation mounting bar(s).
- d. Transmitter heater with thermostat for operating temperature range of -22°F to 160°F where required.
- e. Vendor supplied cable between the sensor elements terminal enclosure and transmitter, for distances as shown on the Drawings.
- f. Flanged stainless steel schedule 10 spool piece, minimum 4'-0" length, for mounting of flow meter sensors.

##### 3. Materials

- a. Transducer: Sensor enclosures, mounting bars, and straps shall be C300 Series stainless steel with epoxy encapsulation and chemically resistant PVC face.

##### 4. Sizes and Ratings

- a. Accuracy:  $\pm 2\%$  of reading (dry calibration).
- b. Repeatability:  $\pm 0.2\%$  of reading.
- c. Signal Output: 2 HART current outputs of 4-20 mA<sub>dc</sub>, 700 ohms maximum, or one HART output plus one frequency output to 10Khz and with two relay outputs (fully user configurable for alarms, limits, etc.).
- d. Flow Element Range: Freely adjustable 0-3 ft/sec up to 0-50 ft/sec.
- e. Power Input: 80-260 V, 50/60 hz, VAC or 16-60 VDC for wide power variation suppression.

- f. FM approved Class 1 Division 2 groups a-d (Class 1, Division 1 available as option).
  - g. Operating Temperatures:
    - 1) Sensor Element: -40° to 200°F.
    - 2) Electrical Housing: -22° to 160°F
  - h. Calibration: Factory calibrated on fully traceable flow stand at specified flow range and process conditions as listed in schedule at the end of this section.
  - i. Sizes and flow range as specified in the schedule at the end of this section.
5. Manufacturer (ISO 9000 series quality approved)
- a. Subject to compliance with the requirements of this specification, provide ultrasonic full pipe flow meters manufactured by:
    - 1) Polysonics, Model DCT6088.
    - 2) Endress and Hauser Prosonic series

## E. AIR AND GAS FLOW METER

- 1. Features
  - a. Insertion type thermal dispersion flow meter.
  - b. Remote digital flow rate display and totalizer.
  - c. Process pipe mounting with pipe saddle; ¾-inch or per Manufacturer's recommendation. NPT process connection.
  - d. Wall mounted NEMA 7 solid state transmitter. Class 1, Division 1 enclosure, FM approved is required for the digester gas and utility gas meters.
  - e. Aluminum or galvanized steel support mounted NEMA 4X solid state transmitter for exterior locations at air header piping along Aeration Basin.
- 2. Accessories
  - a. Factory calibration.
  - b. Stainless steel identification tag.

- c. Service saddle.
  - d. One (1) handheld configurator supplied.
  - e. Vendor supplied cable between the element terminal enclosure and transmitter, for distances shown on Drawings.
  - f. Straightening Vanes: Provide straightening vanes (air flow straightener) as shown on Drawings or as specified herein. Straightening vanes shall be flange connection to match ASA 125 pound drilling; fabricated from minimum Schedule 5 stainless steel pipe, ASTM 304 stainless steel; flange to flange laying length of approximately three pipe diameters; fabricated to straighten the flow pattern based on the piping and valve layout shown on the Drawings; and, operate with a headloss of no greater than 0.30 inches water column for peak flow condition.
3. Materials
- a. Process parts and components in air flow shall be stainless steel.
  - b. Stainless steel body, cadmium plated bolts, and neoprene gaskets.
4. Sizes and Ratings
- a. Base Accuracy:  $\pm 3\%$  of reading.
  - b. Repeatability:  $\pm 0.50\%$  of reading.
  - c. Site Accuracy: Maximum  $\pm 8\%$  of reading based on site conditions plus 0.50% of full scale.
  - d. Signal Output: 4-20mA, 600 ohm load.
  - e. Operating Pressure: 9 psig at 225°F.
  - f. Power Input: 120 Vac,  $\pm 10$  Vac. 16 Watts.
  - g. Operating Temperatures:
    - 1) Sensor Element: 0° - 250 °F.
    - 2) Electrical Housing: 0° - 150 °F.
  - h. Calibration. Factory calibrated at specified flow range and process range as listed in schedule.
  - i. Turndown Ratio: Range 10:1 to 100:1.

- j. Insertion Length: Probe, insertion to extend past centerline of pipe. Confirm pipe diameter, saddle and associated hardware to determine required length.

5. Manufacturer

- a. Subject to compliance with the requirements of this specification, provide mass flow meters manufactured by the following:
  - 1) Fluid Components, Inc., Model ST98.
  - 2) Energy Strategies Corporation, Snorkel.
  - 3) Or equal.

F. AREA-VELOCITY FLOW METER

1. General Flow Meter Description:

- a. Flow meter shall be a velocity profiling type utilizing ultrasonic Doppler velocity and ultrasonic level measurement techniques. The flow meter shall utilize a combination velocity and level sensor to measure both the flow velocity profile and the depth. The sensor shall operate in stream temperatures ranging from 23° F to 95° F and shall be temperature compensated. The probe shall be supplied with cable and junction box as necessary.
- b. The flow meter shall use ultrasonic pulse-Doppler technology with range gating to produce a velocity profile for velocity measurement. The velocity profile shall have a vertical resolution of 2 to 6-inches, user selectable. The system's ultrasonic sensor shall have four (4) individual ultrasonic velocity measuring beams with nominal beam-widths of one (1) degree. Each beam shall be capable of measuring an independent velocity profile. The flow meter shall be capable of measuring velocity in depths of flow ranging from 9-inches to 20-feet nominal, in concentrations of 50-1000 ppm (50-100 mg/l) and measure velocity in depths of flow ranging from 9-inches to 9-feet nominal, in water as clean as 1 ppm (1 mg/l) total suspended solids (TSS). The meter shall be capable of reading negative flow and shall have a velocity measurement range of +/-30 fps. Velocity accuracy shall be +/-1.0% of reading.
- c. The flow meter shall utilize an ultrasonic level sensor for primary level measurement. The level range shall be 0.4 to 20-feet with an accuracy of 0.5% of reading +/-0.20-inches.
- d. The flow meter shall utilize a pressure sensor for a secondary level measurement. The level range shall be 1 psig to 10 psig with an

accuracy of  $\pm 0.1\%$  of reading. The secondary level measurement shall monitor levels during pipe surcharge conditions.

- e. The flow meter shall use the four (4) velocity profiles and either the measured primary or secondary level to calculate the flow rate value. This velocity profiling method shall provide a flow rate measurement accuracy of  $\pm 2.0\%$  of the reading or better over the entire range of measurement.
- f. No in-situ calibration for velocity or level shall be required for commissioning the flow meter. Periodic calibration of velocity or level measurement shall not be required to maintain the specified flow rate accuracy stated above.

2. Flow Meter Construction:

- a. The flow meter shall operate on externally supplied 120 VAC, 60 Hz for main power. All electrical components shall be housed in a nonmetallic enclosure rated NEMA 4X. The enclosure shall have a sealed front cover to protect the internal electronics. Overall flow meter dimensions including the power supply shall not exceed 18-in. H x 16-in. W x 8-in. D.
- b. The flow meter shall contain a battery backup power supply to provide 48 hours of flow meter and data logging operation.

3. Programming:

- a. For flow rate measurement applications, the flow meter shall be capable of computing flows in channels with circular, elliptical, rectangular and trapezoidal cross sections.
- b. The field selectable units of measurement shall be as follows:
  - 1) Level: Inches, feet, centimeters and meters.
  - 2) Velocity: Feet per second, centimeters per second and meters per second.
  - 3) Flow Rate: Gallons per minute, million gallons per day, cubic feet per second, cubic centimeters per second and cubic meters per second.

4. Program/Memory Storage:

- a. Flow meter programmed parameters shall be stored in a non-volatile memory to prevent loss in case of power interruption. An internal battery shall be provided for backup power to the internal clock and memory.



- b. The flow meter shall have on-board data logging capability and be able to store at least 200,000 data points; equivalent to 140 days of data at 1-minute intervals. The data stored shall include level, average velocity, flow rate and temperature. Each data point shall include the date and time associated with the data.
- c. Flow meter shall accept a 4–20mA analog signal input from external level sensing instruments. The flow meter shall store data from this level sensor in addition to flow and level data from the flow meter sensor.
- d. The flow meter shall have an RS232 serial interface port for data retrieval with data transfer at 57,600 baud to any IBM compatible PC operating the manufacturer's data transfer software.
- e. The flow meter shall have the capability of communication with a remote computer via modem connection.
- f. The manufacturer's data transfer software shall be provided with the flow meter. The software shall at a minimum operate on the Microsoft Windows '95 platform and be able to output data files that can be imported into Microsoft Excel or Access. The output data format shall be comma separated variable (.csv) ASCII strings. The software shall be provided on IBM/PC compatible 3.5" diskettes. A 10-ft. interface cable for connecting the flow meter to a PC shall also be provided.

5. Manufacturer

- a. Subject to compliance with the requirements of this specification, provide Area-Velocity flow meter manufactured by the following:
  - 1) MGD Technologies, Inc., ADFM Velocity Profiler Model Pro20.
  - 2) Or equal.

G. ULTRASONIC PIPE CARTRIDGE FLOW METER

1. Features

- a. Stainless steel cartridge containing stainless steel trapezoidal flume/ ultrasonic level sensor/ transit time velocity sensor combination for a 24" diameter pipe as shown on the Drawings.
- b. Factory programmed for the specific application.
- c. Wall mounted, NEMA 4X solid state transmitter
- d. Local digital flow rate display and totalizer, resettable.
- e. Standard analog, relay and pulse outputs.
- f. Full graphic display.

- g. (5) relays and (3) 4-20 mA outputs with data logging.
- h. Factory alignment and calibration.
- i. Turndown ratio= 60:1

## 2. Accessories

- a. Vendor supplied cable between the sensor elements terminal enclosure and transmitter, for distances as shown on the Drawings.
- b. Dry contact closure produced from the flow meter for the existing SIGMA 900 all weather sampler.
- c. Sampler connector and flow pacing half cable for the existing SIGMA 900 all weather sampler.
- d. Honeywell model DR45AT-1000-00-01-0A-000000-0 Truline Chart Recorder with single input, 12" circular chart with totalization, flow and total display, and thermal chart paper with totalization print feature.

## 3. Materials

- a. Transducer: Sensor enclosures, mounting bars, and straps shall be C300 Series stainless steel with epoxy encapsulation and chemically resistant PVC face.
- b. Level Sensor: Teflon sensor housing submersible NEMA 4X
- c. Cartridge/ Flume: type 304 stainless steel

## 4. Sizes and Ratings

- a. Accuracy: Low range-  $\pm 3\%$ - 5%.  
High range=  $\pm 1\%$ - 2%.
- b. Repeatability:  $\pm 0.25\%$  of reading.
- c. Data Acquisition: 3 current outputs of 4-20 mA<sub>dc</sub>, 800 ohms maximum(flow, level, velocity), and five relay outputs (fully user configurable for alarms, limits, etc.), serial outputs RS/232/485 with Modbus protocol, data logging with eight distinct channels
- d. Level Sensor Accuracy:  $\pm 0.02$  or 0.05% of target distance.
- e. Power Input: 80-240 V, 50/60 hz, VAC or 12-28 VDC for wide power variation suppression.
- f. FM approved Class 1 Division 2 groups a-d and Class 1, Division 1.

- g. Operating Temperatures:
    - 1) Level and Velocity Sensor Elements: -40° to 158°F.
    - 2) Electrical Housing: -22° to 160°F
  - h. Calibration: Factory calibrated on fully traceable flow stand at specified flow range and process conditions as listed in schedule at the end of this section.
  - i. Sizes and flow range as specified in the schedule at the end of this section.
5. Manufacturer (ISO 9000 series quality approved)
- a. Subject to compliance with the requirements of this specification, provide ultrasonic pipe cartridge flow meters manufactured by:
    - 1) Eastech Flow Controls, Model 721024PTXJ.
    - 2) Or equal.

## PART 3 – EXECUTION

### 3.1 INSTALLATION

#### A. GENERAL

- 1. Coordinate the installation of inline process flow elements with the installation of process piping equipment.
- 2. Install straight lengths of pipe on either side of flow meter as recommended by the Manufacturer unless otherwise noted on the Contract Drawings. Coordinate actual installation location with Contractor installing piping before piping layouts are submitted.
- 3. Mount instruments so that they may be readily approached and easily serviced.
- 4. Install transmitter with local indicators in a position that the operator can observe the indicator from the operating area.

#### B. ULTRASONIC PIPE CARTRIDGE FLOW METER

- 1. Field adjust flume for level bottom, and plumb sides.
- 2. Install hardware to mount cartridge at proper measuring point.

### 3.2 FIELD QUALITY CONTROL

#### A. CALIBRATION

1. The Contractor shall furnish labor, materials, tools, and equipment required to calibrate the flow meters. Calibration shall be performed under conditions of constant flow. All calibrations shall be fully traceable to national and reference standards. Refer to specific product requirements for additional calibration requirements.

#### B. INSPECTION AND TRAINING

1. Upon completion of this portion of the work, the Contractor shall provide for services of a qualified representative of the Manufacturer to inspect and approve installation. Training for operation of the flow meter, chart recorder and sampler shall be provided by a qualified representative of the Manufacturer. A total of two (2) eight hour days shall be provided for calibration, inspection, and training.

### 3.3 ADJUSTING

#### A. CALIBRATION

1. Perform calibration adjustments of each flow device as needed for a complete operational system.

### 3.4 CLEANING

#### A. FLOW MEASUREMENT

1. Each flow device shall be kept clean and free of dust during the storage, startup, demonstration, and warranty period.

### 3.5 DEMONSTRATION

#### A. GENERAL

1. Before required tests may be performed, the Contractor, along with a qualified representative of the instrument supplier, shall thoroughly demonstrate to the Engineer and to the Owner's personnel the operation and maintenance of all items provided under this section.

## B. FEATURES

1. Reliable and accurate operation of each meter and all specified accessories shall be demonstrated. This shall include accuracy, stability and repeatability as specified over a 10 to 1 flow range.

## C. CONTINUITY

1. Once a meter has demonstrated the specified features and accuracy, it shall demonstrate continuity of performance throughout the warranty period. The meter shall be exposed to conditions that provide the full range of variations of flow. Each day during a three (3) successive day demonstration period, an hourly validation of accuracy and all accessories shall be made by the Engineer. Nighttime validation shall occur as arranged by the Owner and Engineer. Any performance outside specified performance or any failure of any accessory shall cause the complete 3-day performance demonstration to begin again.

## 13324 FLOW MEASUREMENT SCHEDULES

### A. MAGNETIC FLOWMETERS AND TRANSMITTERS

Tag No.	Meter Size	Flow Range (gpm)	Max. Press. (psi)	Converter Mounting	Power Supply	Liner Material	Encl. Class Flow Tube	Signal Converter	Flange Class	Electrode Material	Process Condition
M1	4"	0-500	200	Remote	120 VAC	Polyurethane	NEMA 4	NEMA 4	ANSI 150	Stainless Steel 316L/316	Lift Station Valve Vault

### B. PARSHALL FLUMES

Tag No.	Throat Width	Flow Range (mgd)	Max. Flow (mgd)	Max Head (ft.)	Process Conditions

### C. ULTRASONIC OPEN CHANNEL FLOW METER

Tag No.	Primary Element Type	Size	Enclosure Class	Power Supply	Process Conditions

### D. ULTRASONIC FULL PIPE FLOW METER

Tag No.	Meter Size	Flow Range (mgd)	Enclosure Class	Power Supply	Process Conditions

### E. AIR AND GAS FLOW METERS AND TRANSMITTERS

Tag No.	Pipe Size (in.)	Flow Range (scfm)	Enclosure Class	Power Supply	Process Conditions

F. AREA-VELOCITY FLOW METER

Tag No.	Meter Size	Flow Range (gpm)	Enclosure Class	Power Supply	Process Conditions

G. ULTRASONIC PIPE CARTRIDGE FLOW METER

Tag No.	Meter Size	Flow Range (mgd)	Enclosure Class	Power Supply	Process Conditions

END OF SECTION

## SECTION 15010

### MECHANICAL GENERAL PROVISIONS

#### PART 1 – GENERAL

##### 1.1 WORK INCLUDED

- A. The intent is to obtain a complete installation to which end the Contractor shall furnish all material, equipment, labor, etc. specified and any other accessory items which may not be specified, but which normally are furnished or can be reasonably implied from the specifications and plans. The Contractor shall furnish all freight, drayage, rigging, etc. required for his work.

- 1.2 In this section, the word “Contractor” or “This Contractor” means the Contractor who is engaged to execute that portion of the work under which the word is shown.

- 1.3 The word “Provide” means to furnish, install, and connect.

##### 1.4 CODES, LAWS AND ORDINANCES

- A. Contractor shall comply with all laws, codes and ordinances, etc, having jurisdiction over the work involved, except where the requirements called for in Drawings and Specifications are in excess of those called for in said laws, codes, etc.

- B. Perform work in accordance with the standards listed below, except where Federal, State, or Local Codes are more stringent, in which case follow same:

- |    |   |        |
|----|---|--------|
| 1. | American Society of Testing Materials                   | ASTM   |
| 2. | National Fire Protection Association                    | NFPA   |
| 3. | Sheet Metal & Air Conditioning Contractor’s Association | SMACNA |
| 4. | Standard Building Code                                  | SBCCI  |
| 5. | Standard Mechanical Code                                | SBCCI  |
| 6. | Standard Plumbing Code                                  | SBCCI  |
| 7. | Standard Gas Code                                       | SBCCI  |
| 8. | Underwriters Laboratories                               | UL     |



- |     |  |      |
|-----|--|------|
| 9.  | National Sanitation Foundation<br>Testing Laboratory | NSF  |
| 10. | American National Standards Institute                | ANSI |

- C. Any changes necessary in order that the work comply with all such codes, laws, ordinances, etc., shall be made by the Contractor, with the approval of the Engineer, and without additional cost to the Owner.
- D. The Contractor shall obtain permits, inspection certificates, etc., required and give them to the Owner upon request before final payment.

## 1.5 PLANS AND SPECIFICATIONS

- A. While Drawings are to scale, they are diagrammatic. Equipment, piping, outlets, etc. are not exactly positioned, therefore the Contractor shall refer to architectural Drawings for actual building dimensions and work by other trades. Do not scale Drawings having ¼" or smaller scale.
- B. The right is reserved to move any outlet, equipment, and related ducts, controls, piping, etc., as much as five (5) feet at no increase in cost provided the Contractor is notified of the change before work on the detail in question is started.
- C. It shall be the responsibility of this Contractor that the equipment he installs fits the space available, leaving reasonable space for maintenance and servicing of equipment. If, after the installation of any equipment, piping, etc., it is determined that the space requirements have not been met, the Contractor shall rearrange the work at no extra cost to the Owner.
- D. Existing Conditions. The Contractor is to visit site PRIOR TO BID to become completely familiar with existing systems, conditions and location of work affected by the plans and specifications. Failure to observe existing conditions shall not relieve the Contractor from providing a complete and properly operating system or from providing offsets, fittings, accessories, etc. which may be required for new and existing systems.

## PART 2 – PRODUCTS

### 2.1 MATERIALS AND EQUIPMENT

- A. All materials and equipment shall be new and the best grade and shall conform to all standards and requirements governing the work. Equipment and materials damaged during the installation shall be replaced immediately at no extra cost to the Owner.

- B. Manufacturer's names, catalog numbers, etc. used herein are to denote design, workmanship, and quality desired. Materials and equipment of other Manufacturers, when conforming to the specifications, and when proved to be equal to the material specified, will be approved. This paragraph shall be considered as applying throughout.

## 2.2 SHOP DRAWINGS

- A. The Contractor shall submit, for approval by the Engineer, six (6) sets of brochures describing each item required. Description shall include rated capacities, dimensions, and characteristics. This information shall be submitted before procurement. Mark sheets with model numbers and options being proposed, identified with same designation as used on plans.
- B. ALL BROCHURES AND DRAWINGS SHALL BE SUBMITTED AT ONE TIME: Items not approved shall be resubmitted with the necessary corrections made and shall be resubmitted until final approval is obtained.
- C. On request from the Engineer, the Contractor shall submit samples of material and equipment.
- D. Equipment substitutions which affect structural, architectural, electrical or other trades will be the sole responsibility of the Contractor. Any additional work required by other trades for proper installation shall become the responsibility of the Contractor whose work was substituted. Shop drawing approval shall not relieve the Contractor from compliance.

## PART 3 – EXECUTION

- 3.1 All work shall be carried out in a neat and orderly manner by experience mechanics, and under constant supervision of a competent mechanic, trained and licensed in this field, who shall represent this Contractor at all times in connection with the work.
- 3.2 When materials or work is rejected by the Engineer, the Contractor shall remove all rejected work and/or material at no extra cost to the Owner.
- 3.3 When this work damages other material, equipment, etc. this Contractor shall make all needed repairs which shall be equal to that damaged, in quality, strength, and appearance.

- 3.4 This Contractor shall, in every way, cooperate with the other contractors in the job. Where several trades are involved in any space, area, or pipe chase, all shall cooperate and install their own work to utilize the space between them as their individual trades require. In general, the ductwork shall be given preference except where grading of a pipe becomes impossible. Attention is called to space required by lighting fixtures.

END OF SECTION

## SECTION 15050

### BASIC MATERIALS AND METHODS

#### PART 1 - GENERAL

1.1 REFERENCE: Requirements stated in General and Special Provisions apply to all work in this Section. Alternates, Addenda and Division I are a part of this Specification. Contractors and Sub-contractors shall examine same as well as other Divisions of the Specifications which affect work under this Division.

#### 1.2 WORK INCLUDES

1. Pipe and Fittings
2. Valves
3. Floor, Ceiling and Wall Plates
4. Sleeves
5. Inserts, Hangers and Supports
6. Roof Flashings
7. Vibration Control
8. General Piping
9. Excavation and Backfill

#### 1.3 RELATED WORK SPECIFIED ELSEWHERE

- A. Division 15: Plumbing
- B. Division 15: Heating and Ventilating

1.4 SUBMITTALS: Submit data for all products proposed for this project.

#### PART 2 - PRODUCTS

#### 2.1 PIPE AND FITTINGS

- A. Underground:
  1. Sanitary Drains to 5'0" from Building: Schedule 40 PVC with drainage pattern fittings and solvent welded joints.
  2. Domestic Water Underground: Schedule 80 PVC pressure pipe fittings

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with solvent welded joints.

B. Above Ground:

1. Soil, Waste and Vent Piping: Schedule 40 PVC with drainage pattern fittings and solvent welded joints.
2. Domestic Water: Schedule 40 PVC pressure pipe fittings with solvent welded joints.
3. Gas: ASTM-A53 Schedule 40 black steel pipe with screwed malleable iron fittings.

2.2 VALVES

- A. Valves shall be of the same manufacture where possible as manufactured by Nibco, Appolo or approved equal and rated to withstand minimum 125 lbs. steam working pressure.
- B. Valves in water piping 2" and smaller: Ball valves with bronze body and screwed ends.
- C. Other valves or valve requirements shall be as described hereinafter in the Sections covering the Specification of the various systems.

2.3 FLOOR, CEILING AND WALL PLATES: Fit all pipe passing through walls, floors or ceilings in finished rooms with PVC escutcheons.

2.4 SLEEVES

- A. Where pipes pass through masonry or concrete partitions, or rated fire partitions other than masonry, set machine cut steel pipe sleeves 1" larger than outside diameter of pipe, with ends of sleeves flush with partition faces.
- B. Where pipes pass through floors, set Schedule 40 PVC pipe sleeves 1" larger than outside diameter of pipe. Top of sleeve to be 4" above finished floor in machine rooms and wet floor locations.
- C. Set sleeves true to line, grade; position and plumb or level and so maintain throughout construction period.
- D. Where concrete or masonry floors and walls are core drilled for pipe passage steel sleeves are not required.
- E. Seal opening between pipe and sleeve or opening as required to maintain the integrity of the fire rating of all walls and floors.

2.5 INSERTS, HANGERS AND SUPPORTS

- A. Provide all inserts, hangers, anchors, guides and supports to properly support and retain piping, ductwork and conduits; to control expansion, contraction,

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anchorage, drainage and prevent sway and vibration. Piping shall be so supported as not to place a strain on valves or equipment.

- B. Support individual piping from hangers as manufactured by Anvil, PHD Manufacturing, National Pipe Hanger Corporation or approved equal.
  - 1. PVC Pipe - Anvil Figure 65 carbon steel clevis coated with Scotchcote 134 epoxy coating on hanger rods and clevis hanger.

C. Hanger Spacing (steel pipe):

<u>PIPE SIZE</u>	<u>MAXIMUM SPACING</u>
Up to 1"	6'
1-1/4"	8'
1-1/2", 2"	10'
2-1/2", 3"	12'
4"	14'

Provide additional hanger support within two feet of each elbow and at valves, strainers and other equipment in pipe lines.

- D. PVC water pipe shall be supported at intervals of not over four feet. Additional supports shall be provided where necessary to maintain proper alignment.
- E. Plastic soil pipe hung from building construction shall be supported at intervals of not over four feet next to hub. Additional supports shall be provided where necessary to maintain proper alignment and grade.
- F. Do not suspend a pipe from another pipe or ductwork. Do not support ceiling framing or lighting from piping or ductwork.

2.6 VIBRATION CONTROL

- A. Vibration or noise created in any part of the building by the operation of any equipment furnished and/or installed under this contract will be prohibited and this Contractor shall take all precautions by isolating the various items of equipment from the building structure.
- B. Flexible connections shall be used between ductwork and air handling equipment and the ductwork attached rigidly to the structure.
- C. Isolators shall be manufactured by Mason Industries, Consolidated Kinetics or Amber Booth.

## PART 3 – EXECUTION

### 3.1 GENERAL PIPING

- A. Provide shut-off valves at all branch connections to main, at each piece of apparatus and in mains to sectionalize the systems and elsewhere as indicated on plans.
- B. Install valves with stems at or above horizontal position.
- C. Provide hose end drain valves at all low points, trapped sections and on equipment side of all branch valves to permit draining of all parts of liquid piping systems. Install valves at high points of equipment and piping to allow venting.
- D. Pipe equipment drip bases to nearest drain.
- E. Make piping connections to equipment indicated.
- F. Plug open ends of pipe or equipment at all times during installation to keep dirt and foreign material out of system.
- G. Arrange and install all pipes, valves, cleanouts, access openings and equipment so as to be accessible for service. Locate equipment to maintain clearances for tube, coil pulling, periodic servicing.
- H. Make reductions in piping lines with reducing coupling.
- I. Where underfloor PVC drainage pipes connect to floor drains, support the first section of pipe with hangers, from the floor slab.

### 3.2 JOINTS

- A. All pipe must be reamed and cleaned before assembly. Apply Teflon tape to male end of threaded joints.

### 3.3 EXPANSION

- A. Install all piping throughout the project with adequate allowance for expansion to prevent damage to the building, equipment and piping.

### 3.4 EXCAVATION AND BACKFILL

- A. Provide all excavation and backfilling necessary for installation of work.

- B. Dig trenches to exact grade and depth with only sufficient dirt removed at holes to provide working space. Bell holes shall be dug to insure pipe resting for its entire length upon bottom of trench. Refill trenches dug below required depth to proper depth with sand. Dig trenches not more than 18" wider than external diameter of pipe and sides practically perpendicular. Shore or sheet pile trenches if necessary to prevent caving. Do not endanger work of other contractors or existing structures. Contractor will be held solely responsible for damage.
- C. In event that rock is encountered during excavation, notify Engineer at once. In event that shale is encountered or any condition such that it is not possible to provide a flat even grade depth to properly support sewer.
- D. After installation and testing of piping has been completed and approved for backfill, refill all excavation inside of building and under paved areas outside of building with grits or bank run sand or the previously excavated material if this excavated material is determined by the Engineer to be suitable for reuse. Backfill shall be made and tamped in six-inch layers.
- E. Remove, dispose of any material not used for backfill as outlined in Division 2.
- F. Provide, operate pumping equipment as necessary to keep trenches, other excavations, free of water. No piping shall be installed in trenches until trenches have been pumped and bottom dried-out sufficiently to receive piping.

END OF SECTION



**SECTION 15051**  
**PROCESS PIPING TESTING**

**PART 1 - GENERAL**

**1.1 SCOPE**

- A. The Work covered by this section includes furnishing all labor, equipment, and materials required to pressure test process piping as specified.
- B. Contractor shall give the Owner and Engineer 48 hours advance notice before pressure testing process piping.
- C. Pressure testing shall be conducted in the presence of the Engineer.

**1.2 QUALITY ASSURANCE**

**A. TEST GAUGES**

- 1. Accuracy:  $\pm 1/2\%$  of full scale over entire scale range.
- 2. Graduations:

<u>Test Pressure (psi)</u>	<u>Figure Interval</u>	<u>Minor Graduation</u>
15	1	0.1
25	5	0.2
100	10	1
150	20	1

**PART 2 – PRODUCTS**

**2.1 TEST EQUIPMENT**

- A. Contractor shall provide all testing apparatus including pumps, hoses, gauges, valves, fittings and appurtenances as required.

## PART 3 – EXECUTION

### 3.1 FIELD PREPARATION

#### A. FLUSHING AND CLEANING

1. Air Piping: Clean pipe completely by blowing air through the piping.
2. Process Piping Excluding Air Piping: Flush pipe and valves completely with water. Valves shall be partially opened and closed several times during flushing and under expected pipe pressure. Adequate flow velocities shall be used to flush debris out of valves and piping.

### 3.2 PRESSURE TESTING

#### A. AIR PIPING

1. Pump air into test section of pipe from an external source to a test pressure of 15 psi.
2. Stabilize pressure in the piping.
3. Disconnect air supply from piping.
4. Pressure in piping shall remain within 1 psi of the test pressure for 2 hours.
5. Locate and repair all leaks in piping being tested.
6. Retest piping sections that fail pressure test.
7. Repair all leaks in piping regardless of pressure test results.

#### B. PROCESS PIPING EXCLUDING AIR PIPING

1. Pump water into test section of pipe to a test pressure of 100 psi for pump discharge piping and 20 psi for all other process piping.
2. Expel all air from pipe test section.
3. Maintain test pressure for 18 hours without fluctuating by more than  $\pm 5\%$ .
4. Locate and repair all leaks in piping being tested.
5. Re-pressurize test piping section again and maintain test pressure for 2 hours.

6. Measure amount of water used to maintain test pressure.
7. Calculate leakage using the formula below:

$$\frac{L = SD P^{1/2}}{133,200}$$

- L = Allowable leakage in gallons per hour.
- S = Length of pipe in feet.
- D = Nominal diameter of pipe in inches.
- P = Average test pressure during test in pounds per square inch gauge.

8. Pipe sections that fail the leakage test shall have leaks located and repaired.
9. Retest pipe sections that failed the leakage test.
10. All visible leaks shall be repaired.

END OF SECTION

## SECTION 15062

### DUCTILE IRON PIPE AND FITTINGS

#### PART 1 - GENERAL

##### 1.1 SCOPE

- A. The work covered by this section includes furnishing all labor, equipment, and materials required to furnish, install, and test ductile iron piping, including all fittings, wall pipe and sleeves, couplings, toppings, anchor blocks, and accessories, as specified herein and/or shown on the Drawings.

##### 1.2 QUALITY ASSURANCE

- A. Submit to the Engineer written evidence that the pipe furnished under this Specification is in conformance with the material and mechanical requirements specified herein. Certified copies of independent laboratory test results or mill test results from the pipe supplier may be considered evidence of compliance provided such tests are performed in accordance with the appropriate ASTM or AWWA testing standards by experienced, competent personnel. In case of doubt as to the accuracy or adequacy of mill tests, the Engineer may require that the Contractor furnish test reports from an independent testing laboratory on samples of pipe materials.
- B. Clearly mark each ductile iron pipe length and fitting with the pressure rating, metal thickness class, heat mark, net weight (excluding lining or coating), and name of the manufacturer. In addition, each item of piping shall be marked with an identifying mark corresponding to the appropriate mark on the shop drawings for that particular item of piping.

##### 1.3 SHOP DRAWINGS AND ENGINEERING DATA

- A. Submit complete shop drawings and engineering data on all piping and accessories to the Engineer in accordance with the requirements of the Supplemental Specifications
- B. Shop drawings shall indicate piping layout in plan and elevations as may be required and shall be completely dimensioned. The Drawings shall include a complete schedule of all pipe, fittings, specials, hangers, and supports. Special castings shall be clearly detailed showing all pertinent dimensions.
- C. Furnish the Engineer with lists, in duplicate, of all pieces of pipe and fittings in each shipment received. These lists shall give the serial or mark number, weight, class, size, and description of each item received.

#### 1.4 STORAGE AND PROTECTION

- A. Equipment and products stored outdoors shall be supported above the ground on suitable wooden blocks or braces arranged to prevent excessive deflection or bending between supports. Items such as pipe, structural steel, and sheet construction products shall be stored with one end elevated to facilitate drainage.

#### 1.5 SHOP PAINTING

- A. All ductile iron pipe and fittings shall be cleaned and provided with a bituminous coating and cement lining applied at the factory, unless otherwise specified herein.
- B. All ductile iron pipe and fittings used for wastewater service shall be cleaned, provided with a cement lining, and painted in accordance with the Specifications.

#### 1.6 GUARANTEE

- A. Provide a guarantee against defective materials and workmanship.

#### 1.7 MEASUREMENT AND PAYMENT

- A. Payment for this work will include all equipment, materials and labor necessary to perform the work under this specification as shown on the Drawings and specified herein and included in the Contract. The payment for this work shall be included in the lump sum price for Faircrest Lift Station, Complete.

### PART 2 - PRODUCTS

#### 2.1 GENERAL

- A. No broken, cracked, deformed, misshapened, imperfectly coated, or otherwise damaged or defective pipe or fittings shall be used. All such material shall be removed from the site of the work.
- B. Minimum pipe wall thickness and pressure class of pipe shall be as follows, unless otherwise shown on the Drawings or directed by the Engineer:

<u>Pipe Size</u>	<u>Pressure Class (psi)</u>	<u>Metal Wall Thickness in Inches</u>
3-Inch Ductile Iron	350	0.25
4-Inch Ductile Iron	350	0.25
6-Inch Ductile Iron	350	0.25
8-Inch Ductile Iron	350	0.25
10-Inch Ductile Iron	350	0.26

12-Inch Ductile Iron	350	0.28
14-Inch Ductile Iron	350	0.31
16-Inch Ductile Iron	350	0.34
18-Inch Ductile Iron	300	0.34
20-Inch Ductile Iron	300	0.36
24-Inch Ductile Iron	250	0.37
30-Inch Ductile Iron	250	0.42
36-Inch Ductile Iron	250	0.47
42-Inch Ductile Iron	250	0.52
48-Inch Ductile Iron	250	0.58
54-Inch Ductile Iron	250	0.65
60-Inch Ductile Iron	250	0.68
64-Inch Ductile Iron	250	0.72

- C. All ductile iron pipe with flanged joints, mechanical joints, or mechanical groove coupling joints shall be thickness Class 53 minimum, unless pressure testing and service conditions require pipe of a higher thickness class.

## 2.2 DUCTILE IRON PIPE

- A. Ductile iron pipe shall be designed in accordance with ANSI/AWWA C150/A21.50, "Thickness Design of Ductile Iron Pipe," using 60,000-psi tensile strength, 42,000-psi yield strength, and 10 percent elongation. Additionally, ring bending stress is limited to 48,000 psi to provide a 2.0 safety factor based upon ultimate bending stress.
- B. Ductile iron pipe shall be manufactured in accordance with ANSI/AWWA C151/A21.51, "Ductile Iron Pipe Centrifugally Cast in Metal Molds or Sand-Lined Molds for Water or Other Liquids," and shall be made of ductile iron having a minimum tensile strength of 60,000 psi, a minimum yield strength of 42,000 psi, and 10 percent minimum elongation.

## 2.3 DUCTILE IRON FITTINGS

- A. All fittings shall conform in every respect to ANSI/AWWA C110/A21.10, "3 Inch through 48 Inch for Water and Other Liquids" or ANSI/AWWA C153/A21.53, "3 Inch through 16 Inch for Water and Other Liquids."
- B. All fittings shall be for pressure rating of 250 psi, unless otherwise shown on the Drawings, directed, or specified.
- C. Flanged fittings, in general, shall be ANSI pattern using long radius elbows except where space limitations prohibit the use of same. Design of all fittings, whether long or short pattern, shall be as indicated or dimensioned on the Drawings. Special fittings, wall pipes, and sleeves shall conform to the dimensions and details shown on the Drawings.

## 2.4 JOINTS FOR DUCTILE IRON PIPE AND FITTINGS

### A. General

1. Joints for ductile iron pipe and fittings shall be mechanical joints, flanged joints, push-on joints, or bell and spigot joints, as shown on the Drawings or specified herein.
2. All ductile iron pipe laid underground shall be joined using mechanical joints or push-on type joints, unless otherwise shown on the Drawings, specified, or directed.

### B. Mechanical Joints

1. Mechanical joints shall consist of a bolt joint of the stuffing box type as detailed in ANSI A21.10 and described in ANSI A21.11.
2. Mechanical joints shall be thoroughly bolted in accordance with the manufacturer's recommendations with Tee Head Bolts and bolts of high strength, low-alloy steel having a minimum yield point strength of 40,000 psi and an ultimate tensile strength of 70,000 psi.
3. Gaskets, bolts, and nuts shall conform to ANSI A21.11. Gaskets shall be of neoprene or rubber of such quality that they will not be damaged by the liquid or gases with which they will come into contact.
4. Glands shall be of high strength ductile iron.

### C. Flanged Joints

1. Flanged joints shall conform to ANSI B16.1, Class 125, in accordance with Table 10.23 of ANSI A21.10.
2. Flanged joints shall be bolted with through stud or tap bolts of required size as directed. Bolts and nuts shall conform in dimensions to the American Standard heavy series. Nuts shall be hexagonal, cold pressed. Bolts and nuts shall be cadmium plated, cold pressed, steel machine bolts, conforming to ASTM A 307, Grade B. Cadmium plating shall be by an approved process and shall be between 0.003 and 0.0005 inch thick. After each joint has been made, all bolts, heads, and nuts shall be coated with two coats of coal tar epoxy (total of 16 mil thickness D.F.T.), or approved equal coating.
3. Gaskets shall be full face type, 1/16 inch thick, conforming to the requirements of AWWA C111.

4. Flanged ductile iron pipe approximately 12 inches or less in length shall have flanges cast solidly to the pipe barrel. Flanges on ductile iron pipe longer than 12 inches may be of the screw type. Pipe threads shall be of such length that with flanges screwed home, the end of the pipe shall project beyond the face line of the flange. Flange and pipe shall then be machined to give a flush finish to the pipe and the flange and surface shall be normal to the axis of the pipe. Ductile iron flanges shall be of such design that the flange neck completely covers the threaded portion of the pipe to protect same against corrosion. All pipe with screw type flanges shall be assembled, faced, and drilled at the point of manufacture, unless otherwise approved by the Engineer.
5. Where tap or stud bolts are required, flanges shall be drilled and tapped accordingly.

D. Push-On Joints

1. Push-on joints shall conform to ANSI A21.11. Details of the joint design shall be in accordance with the manufacturer's standard practice.
2. Gaskets shall be in accordance with ANSI A21.11 and shall be of such quality that they will not be damaged by the liquid or gases with which they will come into contact.

E. Mechanical Grooved Coupling System:

1. General. All grooved components shall be of one manufacturer and may be used as an option in lieu of flanged joints shown on the contract drawings.
2. Couplings shall meet the requirements of ASTM A-536. Pipe ends to be cut rigid radius grooves conforming to ANSI/AWWA C-606.
3. Rigid and Flexible Couplings. Shall be sized and based on the pressures and support system for the piping system. All grooved joints shall be rigid, unless otherwise approved by the Engineer. Rigid and flexible couplings shall be Victaulic Style, or as approved.
4. Flange Adapters. Connections compatible with ANSI Class 125/150 flanged components. Cast of ductile iron, conforming to ASTM A-536, Grade 65-45-12. Flange adapters shall be Vic-Flange Adapter Style 341, or as approved.
5. Gaskets. Grade M Butyl compound, conforming to ASTM D-2000, temperature operating range -20°F to 200°F. Compatible with water and wastewater service.



6. Fittings. Grooved mechanical joint fittings may be used as an option to welded or flanged fittings. All fittings shall have a cement mortar lining unless specified or indicated on the Drawings otherwise.

## 2.5 PIPE COATING AND LINING

### A. Exterior Pipe Coatings

1. Buried Ductile Iron Pipe: The exterior of ductile iron pipe, special, and fittings shall be coated with a 1 mil asphaltic coating in accordance with AWWA C151, Section 51-9. When specified, loose polyethylene encasement shall be supplied in accordance with AWWA C105.
  2. Above Grade Interior/Non-immersion (Mild Exposure) Primer:
    - a. TENEMEC 37H-77, or equal.
    - b. Shop coat thickness: 2.0-4.0 mils dry film thickness.
  3. Exterior, or Immersion (Aggressive Exposure) Primer:
    - a. TNEMEC N69-1211, or equal.
    - b. Shop coat thickness: 3.0-8.0 mils dry film thickness.
  4. Exterior Finish: See Section 09900, Painting.
- B. All ductile iron pipe used for water shall have cement mortar lining of standard thickness in accordance with ANSI A21.4. Cement mortar lining for ductile iron fittings shall be double the standard thickness under ANSI A21.4.
- C. All ductile iron pipe used for wastewater shall have cement mortar lining of standard thickness in accordance with ANSI A21.4.
- D. No lining shall be provided for ductile iron pipe and fittings used for air.
- E. Where a special lining is indicated on the Drawings for resistance to corrosive wastewaters, pipe and fittings shall be furnished with a minimum of 40 mils DFT lining of chemically inert, abrasion-resistant ceramic epoxy. The lining shall be an amine cured novalac epoxy containing ceramic quartz pigment complying with ASTM E-96 having a permeability rating of 0.00. The lining shall be unaffected by hydrogen sulfide, detergents, grease, oil, inorganic acids, alkalis, and most organic materials found in municipal wastewaters and shall be suitable for service at operating temperatures of up to 180 F. The lining shall have a Hazen-Williams "C" coefficient of approximately 150 and a Manning "n" coefficient of approximately 0.010. Ceramic Epoxy-lined ductile iron pipe shall be U.S. Pipe "Protecto 401," American Cast Iron Pipe "Protecto 401," or equal.

## 2.6 PIPE COUPLINGS

- A. Pipe couplings shall be installed where shown on the Drawings, required for installation, or directed by the Engineer.
- B. Pipe couplings shall conform to the requirements of Section 15090, Pipe Couplings and Expansion Joints.

## 2.7 WALL PIPE AND WALL SLEEVES

- A. Furnish and install ductile iron wall pipe or wall sleeves where ductile iron piping connects with or passes through concrete walls or floors and in locations where small piping and electric wiring and conduits connect with or pass through concrete walls or floors.
- B. Where wall pipes or sleeves are to be installed flush with the wall or slab, the flange or bell shall be tapped for studs. Where the flange or bell will project beyond the wall, the projection shall be sufficient to allow for installation of connecting bolts.

## 2.8 BEDDING

- A. Bedding for pipe shall be provided as herein specified or shown on the Drawings to fit the depth of trench, type and sizes of pipe, width of trench, and bearing value of subgrade.
- B. Bedding shall consist of crushed rock or gravel, granular materials, meeting the requirements of ODOT Item 703, size No. 67 aggregate except no slag permitted.
- C. Concrete thrust blocks shall be Class A concrete.

## 2.9 SPARE PARTS

- A. Furnish 4 spare gaskets for each size and type of joint requiring the use of a gasket. Furnish 8 bolts and nuts of each size and type used for ductile iron pipe joints.

## PART 3 - EXECUTION

### 3.1 LAYING

- A. Proper and suitable tools and appliances for safe and convenient handling and laying of pipe and fittings shall be used. Great care shall be taken to prevent the pipe coating from being damaged, particularly cement linings on the inside of the pipes and fittings. Any damage shall be remedied as directed by the Engineer.

- B. Carefully examine all pipe and fittings for defects just before laying and no pipe or fitting shall be laid which is defective. If any defective pipe or fitting is discovered after having been laid, it shall be removed and replaced in a satisfactory manner with a sound pipe or fitting by the Contractor at his own expense.
- C. Thoroughly clean all pipes and fittings before they are laid and keep clean until they are used in the completed work. Open ends of pipe shall be kept plugged with a bulkhead during construction.
- D. Pipe laid in trenches shall be laid true to line and grade on a firm and even bearing for its full length at depths and grades as shown on the Drawings. Adequate precautions shall be taken to prevent flotation of pipelines prior to backfilling. Installation of ductile iron pipe in underground pressure piping systems shall conform to the requirements of AWWA C600. Excavation of trenches and backfilling around pipes shall conform to the requirements of the Section 02200, Earthwork.
- E. All ductile iron piping laid underground shall have a minimum of 36 inches of cover above the top of the pipe unless otherwise shown on the Drawings.
- F. All elbows, tees, branches, crosses, and reducers in pressure piping systems shall be adequately restrained against thrust. Underground pressure piping shall be restrained by thrust restrained joints (EBAA Meg-a-Lug Series 11005D, or approved equal). Install restraints in accordance with manufacturer's recommendations. Install number of restraints recommended by manufacturer for size of pipe, type of fitting, and type of soil. In lieu of restrained joints, Contractor may use thrust blocks of size shown on the Drawings.
- G. All ductile iron pipes entering buildings or basins shall be adequately supported between the structure and undisturbed earth as shown on the Drawings to prevent breakage resulting from settlement of backfill around the structure.
- H. Wall pipe and wall sleeves shall be accurately located and securely fastened in place before concrete is poured. All wall pipe and wall sleeves shall have wall collars properly located to be in the center of the wall where the respective pipes are to be installed.
- I. Wall pipe and wall sleeves shall be installed when the wall or slab is constructed. Blocking out or breaking of the wall for later insertion shall not be permitted.
- J. Cutting or weakening of structural members to facilitate pipe installation shall not be permitted. All piping shall be installed in place without springing or forcing.
- K. Sufficient couplings and flanged joints shall be provided to facilitate equipment installation and removal.

- L. Exposed ductile iron piping shall be supported as shown on the Drawings.

### 3.2 CUTTING

- A. Whenever pipe requires cutting to fit the lines, the work shall be done in such manner as to leave a smooth end at right angles to the axis of the pipe. When a piece of pipe is cut to fit into the line, no payment will be made for the portion cut off and not used.
- B. Whenever existing pipe requires cutting to install new fittings, the work shall be done in such manner as to leave a smooth end at right angles to the axis of the pipe and special care shall be exercised to guard against breaking or splitting the existing piping.
- C. All cutting of ductile iron pipe shall be done with a cutting saw. All burrs shall be removed from the inside and outside edges of all cut pipe.

### 3.3 JOINTING

#### A. Mechanical Joints

1. The successful operation of the mechanical joint specified requires that the spigot be centrally located in the bell and that adequate anchorage be provided where abrupt changes in direction and dead ends occur.
2. The surfaces with which the rubber gasket comes in contact shall be brushed thoroughly with a wire brush just prior to assembly to remove all loose rust or foreign material which may be present and to provide clean surfaces which shall be brushed with a liberal amount of soapy water or other approved lubricant just prior to slipping the gasket over the spigot end and into the bell. Lubricant shall be brushed over the gasket prior to installation to remove loose dirt and lubricate the gasket as it is forced into its retaining space.
3. Joint bolts shall be tightened by the use of approved wrenches and to a tension recommended by the pipe manufacturer. When tightening bolts, it is essential that the gland be brought up toward the pipe flange evenly, maintaining approximately the same distance between the gland and the face of the flange at all points around the socket. This may be done by partially tightening the bottom bolt first, then the top bolt, next the bolts at either side, and last, the remaining bolts. This cycle shall be repeated until all bolts are within the range of acceptable torques. If effective sealing is not attained at the maximum torque indicated above, the joint shall be disassembled and reassembled after thorough cleaning. Overstressing of bolts to compensate for poor installation shall not be permitted.

4. After installation, bolts and nuts in buried or submerged piping shall be given 2 heavy coats of a bituminous paint.

#### B. Flanged Joints

1. All flanges shall be true and perpendicular to the axis of the pipe. Flanges shall be cleaned of all burrs, deformations, or other imperfections before joining. Flanged joints shall be installed so as to ensure uniform gasket compression. All bolting shall be pulled up to the specified torque by crossover sequence. Where screwed flanges are used, the finished pipe edge shall not extend beyond the face of the flange, and the flange neck shall completely cover the threaded portion of the pipe.
2. Connections to equipment shall be made in such a way that no strain is placed on the equipment flanges. Connecting flanges must be in proper position and alignment and no external force may be used to bring them together properly.
3. After installation, bolts and nuts in buried or submerged piping shall be given 2 heavy coats of a bituminous paint.

#### C. Push-On Joints

1. The inside of the bell and the outside of the pipe from the plain end to the guide stripe must be wiped clean immediately before assembling the pipe joint. Then the rubber gasket shall be inserted into a groove or shaped recess in the bell. Both the bell and spigot ends to be joined shall be wiped again to ensure they are thoroughly clean. A liberal coating of special lubricant furnished by the pipe manufacturer shall be applied to the outside of the pipe from the plain end to the yellow guide stripe and to the inside of the gasket. The plain end shall be centered in the bell and the spigot pushed home. Wherever possible the pipe shall be socketed by hand; however, jacking may be required to push the spigot in place on the larger sizes of pipe. The completed joint shall be permanently sealed and watertight.
2. Whenever the pipe is cut in the field, the cut end shall be conditioned so it can be used in making up a joint by filing or grinding the cut end to remove burrs or sharp edges that might damage the gasket.

#### D. Permissible Deflection of Joints

1. Deflection of ductile iron pipe at joints for long radius curves or for avoiding obstacles shall be permitted only upon approval of the Engineer.

2. Where deflection of joints is permitted, such deflection shall be made in accordance with and shall not exceed limits provided in Section 9b.5 and Section 9c.4, as applicable, of AWWA C600.

E. Joints of Dissimilar Metals. When a flanged joint consists of a ductile iron flange mated to a steel or alloy flange, the steel flanges shall be flat-faced and furnished with full-faced gaskets, insulating bushings, and stainless steel bolts.

### 3.4 SERVICE CONNECTIONS

A. Small service lines and branches shall connect to larger ductile iron mains using ductile iron tapped tees and crosses, in general and unless otherwise shown.

B. Tapped tees and crosses shall have minimum 2-inch NPT branch connections and shall be furnished with mechanical joint ends.

### 3.5 CUT-INS TO EXISTING PIPING

A. Cut-ins to existing ductile iron piping for installation of new mechanical joint fittings and valves shall be made using ductile iron cutting-in sleeves, in general and unless otherwise shown.

B. Cutting-in sleeves shall have a pressure rating not less than that of the existing pipeline and shall be furnished with a mechanical joint end on one end and a plain end on the other.

### 3.6 DRILLING AND TAPPING

A. Wherever required, ductile iron pipe and fittings shall be drilled and tapped to receive drainage or any other piping. All holes shall be drilled accurately at right angles to the axis of any pipe or fitting. Where plugs are drilled, holes shall be at right angles to the face of the plug.

B. Where the size of the pipe to be connected is such as to require bosses for connection and when the pipe wall thickness is too thin to permit the effective length of pipe threads to be utilized as necessary for the size pipe being connected by threads, furnish such pipe with cast-on bosses suitable for drilling, tapping, and connecting such pipe. Alternately, where shown or specified, a tapped saddle clamp may be used in lieu of a cast-on boss. Saddle clamp shall be of the heavy-duty type with O-ring gaskets and 2 heavy U-bolt clamps.

C. All tapping shall be carefully and neatly done by skilled workmen with suitable tools.

D. Where connections are made between new and old piping, the connections shall be made in a thorough and workmanlike manner using proper fittings and specials to suit actual conditions.

- E. Cut-ins to existing and operating pipelines shall be done at times agreeable to the Owner upon approval of the Engineer.
- F. Existing pipelines that may be cut or damaged during the performance of work under this item shall be repaired, reconnected, and returned to service in equal or better condition in which they were found and in accordance with the requirements of this Specification.
- G. No separate payment will be made for drilling, tapping, making connections, cut-ins, repairs to damaged existing pipelines, and reconnections in existing pipelines.

### 3.7 BEDDING INSTALLATION

#### A. Granular Material

- 1. Ductile iron pipe shall be installed with crushed rock or gravel granular materials meeting the requirements of ODOT Item 703, size No. 67 aggregate, except no slag permitted, providing uniform longitudinal support under the pipe. Bedding material shall be worked under the sides of the pipe to provide satisfactory haunching. Bedding shall be placed to a minimum depth of 12 inches over the top of the pipe. All pipe bedding material shall be selected and placed carefully. Bedding shall be compacted to a minimum of 90 percent Standard Proctor.

#### B. Thrust Blocking

- 1. All elbows, tees, branches, crosses, and reducers in pressure piping system shall be adequately restrained against thrust. Underground pressure piping shall be restrained by thrust restrained joints. Install restraints in accordance with manufacturer's recommendations. Install number of restraints recommended by manufacturer for size of pipe, type of fitting, and type of soil. Provide concrete thrust blocks at all fittings for pressure piping systems.

### 3.8 FIELD TESTING

- A. After all piping has been placed and backfilled between the joints, each run of newly laid pipe, or any valved section thereof, shall be tested by the Contractor in the presence of the Engineer, and tests shall be continued until all leaks have been made tight to the satisfaction of the Engineer.
- B. All piping shall be subject to a hydrostatic gauge pressure equal to 150 percent of the maximum operating pressure of the pipe section under test or 150 psig, whichever is greater, based on the elevation of the lowest point of the section of pipe under test and corrected to the elevation of the test gauge. The above pressures shall be maintained for a minimum of two consecutive hours. No

leakage will be allowed. Leakage may be determined by loss of pressure or other methods approved by the Engineer.

- C. Take all precautions necessary to protect any equipment that might be damaged by the pressures used in the tests. Delicate equipment shall be valved off, removed, or otherwise protected.
- D. Securely anchor and restrain all piping against movement prior to application of test pressures. Prior to the pressure test, pipe laid in trenches shall be partially backfilled to adequately secure the pipe during the test. All joints, fittings, and valves will be left open where possible. All exposed pipe, fittings, valves, and joints shall be carefully examined during the pressure test.
- E. Expel all air from the pipe before applying the specified test pressure. If hydrants, blow-offs, or air release valves are not available at the high places, make the necessary taps at points of highest elevation before the test is made and insert plugs after the test has been completed.
- F. After satisfactory completion of the pressure test, a leakage test shall be performed on each section of pipe in accordance with Section 4.1 of AWWA C600 at a hydrostatic pressure equal to the maximum operating pressure of the pipe section under test, based on the elevation of the lowest point of the line or lowest point of the section under test and corrected to the elevation of the gauge.
- G. Any leakage developing during the test shall be corrected at the Contractor's expense by tightening, replacing packing or gaskets, or replacing defective portions of the piping system. Caulking will not be permitted. If the defective portion cannot be located, the Contractor, at his expense, shall remove and reconstruct as much of the original work as necessary to obtain a facility tested without leakage.
- H. Carefully clean, blow out, and drain the line of all water to prevent freezing, after all tests on any section have been completed to the satisfaction of the Engineer. Demonstrate to the satisfaction of the Engineer that any and all lines are free from obstructions and foreign material.
- I. The Contractor shall bear the complete cost of the tests, including set-up, labor, temporary piping, blocking, gauges, bulkheads, water, air, soap solutions, and any other materials required to conduct the tests.

### 3.9 DISINFECTION

- A. Potable water lines shall be disinfected in accordance with the requirements of Section 15041, Disinfection of Potable Water Lines and Water Storage Tanks, following installation and testing.

END OF SECTION



## SECTION 15090

### PIPE COUPLINGS AND EXPANSION JOINTS

#### PART 1 - GENERAL

##### 1.1 SCOPE

- A. The work covered by this section includes furnishing all labor, equipment, and materials required to furnish and install pipe couplings and expansion joints, including grooved couplings, flanged adaptors, expansion couplings, and rubber expansion joints, as shown on the Drawings, specified herein, and/or required for proper installation of piping and equipment.

##### 1.2 SHOP DRAWINGS AND ENGINEERING DATA

- A. Complete shop drawings and engineering data shall be submitted to the Engineer in accordance with the requirements of the Supplemental Specifications

##### 1.3 STORAGE AND PROTECTION

- A. Equipment and products stored outdoors shall be supported above the ground on suitable wooden blocks or braces arranged to prevent excessive deflection or bending between supports. Items such as pipe, structural steel, and sheet construction products shall be stored with one end elevated to facilitate drainage.

##### 1.4 SHOP PAINTING

- A. Clean, shop prime, and shop paint all pipe couplings as specified herein.

##### 1.5 GUARANTEE

- A. Provide a guarantee against defective materials and workmanship.

##### 1.6 MEASUREMENT AND PAYMENT

- A. Payment for this work will include all equipment, materials and labor necessary to perform the work under this specification as shown on the Drawings and specified herein and included in the Contract. The payment for this work shall be included in the lump sum price for Faircrest Lift Station, Complete.

## PART 2 - PRODUCTS

### 2.1 EXPANSION COUPLINGS

- A. Unless otherwise shown or specified, expansion couplings shall be of a gasketed, short sleeve type, with a diameter to fit the pipe properly. Expansion couplings shall have a working pressure of not less than 150 psig.
- B. Each short sleeve coupling for joining ductile iron or steel pipe shall consist of one cylindrical steel middle ring without pipe stop, two steel follower rings, two rubber-compound, wedge section gaskets, and a sufficient number of track head, electroplated steel bolts to compress the gaskets properly. Steel couplings shall be Dresser Style 38, Rockwell Style 411, or equal.
- C. Where expansion couplings are required for joining ductile iron pipe to steel pipe of the same nominal size, steel transition couplings, Dresser Style 62, Rockwell Style 413, or equal, shall be used.
- D. Rubber gaskets shall be composed of a resilient synthetic rubber compound suitable for use in wastewater containing oil and grease.

### 2.2 GROOVED COUPLINGS

- A. Grooved couplings for ductile iron pipe shall consist of two or more ductile iron housing clamps, a single rubber-compound gasket and electroplated oval-neck track bolts with heavy hex nuts. Housing shall be ribbed for strength and self-centering. Rubber gasket shall be composed of a resilient synthetic rubber compound suitable for use in wastewater containing oil and grease.
- B. Grooved couplings shall provide for a pipe end separation of not less than 3/32-inch and a deflection of not less than 0.45'.
- C. Grooved couplings shall engage two circumferential grooves cut at the ends of the pipe sections to be joined. The grooves shall provide a positive mechanical grip that locks the pipe ends together such that they cannot blow apart under pressure, vibration, or sag. Grooves shall be cut with a radius at the inside corners of the grooves.
- D. Grooved couplings for joining ductile iron pipe shall be Vitaulic Style 31, Gustin-Bacon Gruvajoint No. 500, or equal.

## 2.3 FLANGED ADAPTORS

- A. Flanged adaptors shall be used for joining plain end ductile iron pipe to flanged valves, pumps, and fittings. Flanged adaptors shall be suitable for working pressures to 150 psig.
- B. Flanged adaptors in sizes 12-inch and smaller shall consist of an ASTM A 126, Class B cast iron flanged body drilled to mate with a 125-pound cast iron flange per ANSI B16.1, a cast iron follower ring, a rubber-compound, wedge section gasket, and a sufficient number of track head, electroplated steel bolts to compress the gasket properly.
- C. Flanged adaptors in sizes 14-inch and larger shall consist of a high strength steel flanged body drilled to mate with a 125-pound cast iron flange per ANSI B16.1, a high strength steel follower ring, a rubber-compound, wedge section gasket, and a sufficient number of electroplated steel bolts to compress the gasket properly.
- D. Rubber gasket shall be composed of a resilient synthetic rubber compound suitable for use in wastewater containing oil and grease.

## 2.4 FLANGED RUBBER EXPANSION JOINTS

- A. Flanged rubber expansion joints shall be standard spool-type single or multiple arch expansion joints constructed of abrasion-resistant rubber reinforced with high tensile strength synthetic fabric and steel rings.
- B. Ends of the expansion joint shall be integral with the body and shall be full faced and drilled per ANSI B16.1 for 125-pound flanges. Beveled and split, galvanized steel retaining rings shall be provided to prevent damage to flanges and to distribute bolting stresses during assembly.
- C. Tube, body, and flanges shall be constructed using Buna-N for wastewater, natural rubber for clean water, and Buna-N or neoprene for air. For working temperatures in excess of 180 F or for chemical service, tube, body, and flanges shall be constructed of Viton. The exterior of the expansion joint shall be coated with Hypalon to resist weathering.
- D. When used to convey slurries, raw water, or untreated wastewater in horizontal piping, arches shall be filled with a special soft rubber compound integrally cured in the arches.
- E. In unrestrained piping systems or pipe systems subject to excessive longitudinal deflection, joints shall be furnished with two plated steel control rods fitted with nuts to limit compression and extension and prevent damage to the joint.

- F. Rubber expansion joints shall be "Redflex," as manufactured by Red Valve Company, "Invincible Expansion Joint," as manufactured by Mercer Rubber Company, or equal, subject to the requirements of this section.

2.5 SLIP-ON RUBBER EXPANSION JOINTS

- A. Slip-on rubber expansion joints for low pressure applications (less than 15 psig) up through 6-inch diameter in size shall be sleeve-type, single-arch expansion joints constructed of abrasion resistant rubber reinforced with high tensile strength synthetic fabric.
- B. Ends of the joint shall be designed to slip over pipe ends and shall be secured in place with adjustable stainless steel clamps. Two (2) clamps shall be provided on each end of the joint.
- C. Joint shall be constructed of Buna-N for wastewater and Buna-N or neoprene for air at working temperatures up to 180 F.

2.6 SHOP COATINGS

- A. Couplings and adaptors shall have finish as follows:

<u>Material</u>	<u>Location</u>	<u>Primer</u>	<u>Finish</u>
Ductile Iron	Buried, Submerged, or Exposed	Epoxy Primer Interior	Epoxy
Ductile Iron	Buried, Submerged, or Exposed	Epoxy Primer (Exterior)	Epoxy
Steel	Buried, Submerged, or Exposed	Epoxy Primer Interior	Epoxy Finish
Steel	Buried, Submerged, or Exposed	Epoxy Primer (Exterior)	Coal Tar Epoxy

- B. Coatings used for couplings and adaptors in potable water shall be approved for use with potable water.

2.7 SPARE PARTS

- A. Furnish 2 spare gasket sets and 2 spare track head bolt sets for each size and type of coupling.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Pipe couplings and expansion joints shall be installed where shown on the Drawings, required, or directed by the Engineer. Couplings and joints shall be installed in strict conformance with the manufacturer's instructions.
- B. Pipe ends shall be cleaned, brushed, or filed to produce a mating surface for the gasket that is free from dirt, rust, chuck marks, mill scores, dents, burrs or other foreign substances that would impede proper gasket seating.
- C. Grooves for grooved couplings shall be accurately located and cut with a suitable grooving tool.
- D. A lubricant recommended by the coupling manufacturer shall be used in seating all gaskets.
- E. On expansion couplings and flanged adaptors, bolts shall be tightened diametrically opposite each other and in progression so that the inner rims project an equal distance over the flares of the middle ring at all points. Bolts shall be tightened sufficiently to ensure a watertight joint but shall not be tightened beyond the point of stretching.
- F. On grooved couplings, bolts shall be tightened alternately and uniformly so the housing clamps come together evenly and the gasket is not pinched. Bolts shall be tightened until the housing clamps meet.
- G. Couplings shall be field painted, following installation and testing, in accordance with the requirements listed previously in this section. Rubber expansion joints shall not be painted.

END OF SECTION

## SECTION 15095

### PIPE SUPPORTS AND HANGERS

#### PART 1 - GENERAL

##### 1.1 SCOPE

- A. This section covers all pipe supports, hangers, and brackets necessary to install piping furnished under these Contract Documents. The Contractor shall furnish and install all foundations, anchor bolts, pipe supports, shims, hangers, clamps, and hardware required for a complete installation as shown on the Drawings and/or specified herein.

##### 1.2 SHOP DRAWINGS AND ENGINEERING DATA

- A. Complete shop drawings and engineering data shall be submitted to the Engineer in accordance with the requirements of the Supplemental Specifications.

##### 1.3 STORAGE AND PROTECTION

- A. Pipe supports and accessories shall be stored and protected in accordance with the Manufacturer's recommendation.

##### 1.4 SHOP PAINTING

- A. Fabricated pipe supports and accessories not specified to be galvanized or cadmium plated shall be cleaned, shop primed, and/or shop painted as specified and/or shown on the Drawings.

##### 1.5 GUARANTEE

- A. Provide a guarantee against defective equipment and workmanship.

##### 1.6 MEASUREMENT AND PAYMENT

- A. Payment for this work will include all equipment, materials and labor necessary to perform the work under this specification as shown on the Drawings and specified herein and included in the Contract. The payment for this work shall be included in the lump sum price for Faircrest Lift Station, Complete.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

All supports and hangers shall meet the following material requirements:

- A. All structural steel shall conform to ASTM A 36.
- B. All pipe support columns shall conform to ASTM A 53, Grade B, and shall be minimum Schedule 40.
- C. All embedded anchor bolt materials shall conform to ASTM A 193, Grade B8; ASTM A 276, Type 304; or IFI-104, Grade 304. Nuts shall be heavy hex nuts conforming to ASTM A 194, Grade 8 or IFI-104, Grade 304. Minimum anchor bolt size for pipe supports shall be 5/8-inch diameter.
- D. All rod and bolting materials in contact with cold piping (less than -20 F) shall conform to ASTM A 320, Grade B8. Nuts shall be heavy hex nuts conforming to ASTM A 194, Grade 8 or 8T.
- E. All rod and bolting materials shall conform to ASTM A 307, Grade B, and shall be cadmium plated. Nuts shall be heavy hex nuts conforming to ASTM A 307. Cadmium plating shall conform to ASTM A 165, Type NS.
- F. All carbon steel or malleable iron straps, hangers, clamps, U-bolts, and other hardware in contact with the pipe shall be cadmium plated or hot-dip galvanized.
- G. Expansion type anchor bolts shall be of stainless steel construction and shall comply with Federal Specification FF-S-325.
- H. Long runs of pipe subject to expansion shall be hung by means of adjustable swivel pipe roll hangers, Grinnell, Figure 174; Fee and Mason, Figure 2729; or equal.
- I. Short runs of uninsulated pipe subject to expansion in sizes up to and including 3-1/2 inches as well as all pipe of those sizes not subject to expansion shall be hung by means of adjustable swivel, split pipe ring, Grinnell, Figure 104; Fee and Mason, Figure 199; or equal.
- J. Insulated piping and tubing, short lengths of 4-inch and larger pipe subject to expansion, and pipe 4 inches and larger not subject to expansion shall be hung by means of adjustable steel clevis hangers, Grinnell, Figure 260; Fee and Mason, Figure 239; or equal.
- K. Pipe 2 inches and less in diameter and not subject to expansion may, when paralleling walls, be supported by single hook clamp hangers, Grinnell, Figure 168; Fee and Mason, Figure 327B, or equal.

- L. Flat strap hangers will not be permitted. Hangers relying on mastics or adhesives shall not be used.
- M. Pipe supported from underneath and subject to expansion shall have adjustable pipe roll stand supports, Grinnell, Figure 274; Fee and Mason, Figure 161; or equal. The pipe roll stand shall be supported by concrete piers, structural steel, or steel brackets as required.
- N. Pipe supported from underneath and not subject to expansion shall have cast-in-place concrete supports as shown on the Drawings or adjustable pipe saddle supports on properly sized pipe stanchions and ample properly grouted floor flanges. Provide pipe supports with bolted connections for flanges, grouted bases, stainless steel anchor bolts, and cast-in-place concrete supports as shown on Drawings. Saddle supports shall be Grinnell, Figure 264; Fee and Mason, Figure 291; or equal.
- O. Hangers suspended from structural steel shall be supported on U.F.S. beam clamp, Grinnell, Figure 228L or 2921; Fee and Mason, Figure 252L or 253L; or equal with links as required.
- P. Hangers from concrete work shall be secured by universal, galvanized metal inserts, Grinnell, Figure 282; Fee and Mason, Figure 2570; or equal, placed in the concrete at the time of pouring. Wooden plugs or other improvised means shall not be used for any form of hanger fastening.
- Q. Steel or concrete pipe supports for all piping between undisturbed earth and face of structures shall be in accordance with the details shown on the Drawings.
- R. All interior and exterior concrete piers shall be Class A concrete meeting the requirements of these Specifications. Provide epoxy anchors for connections to existing concrete at cast-in-place concrete supports.
- S. Rods for supporting suction bells or foot valves of pump intakes shall be stainless steel of the size shown on the Drawings. The rods shall be furnished complete with stainless steel turnbuckles and eyes or other approved means for connection to the suction bell and stainless steel eye bolt anchored in the concrete. Supports for other pump suction pipelines shall be as shown on the Drawings.
- T. Uninsulated copper tubing shall be hung by means of copper-plated, split-ring hangers with copper-plated sockets, Grinnell Figure CT-109, Fee and Mason Figure 360, or equal.
- U. Stainless Steel Pipe Cradle. Sliding bearing pads shall be sized for piping weights, and support expansion or contraction requirements. Sliding bearing pads for air service shall have supports and backing slide plates fabricated from



ASTM A283 Type 304L stainless steel. Higher grades of stainless steel may be allowed dependent on the weldability of the pipe materials. Each support pad shall include a hold down guide for the slide plates at locations where shown on Drawings, or as otherwise necessary for pipe supports. All fasteners shall be Type 304 stainless steel. Sliding strips shall be from TFE material. Stainless steel pipe cradle shall be by Piping Technologies and Products, Incorporation, or as approved.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Contact between ferrous supports and non-ferrous piping materials shall not be permitted. Supports and clamps shall be rubber coated or copper plated as necessary to prevent this condition.
- B. Adequate supports shall be provided so that there is no movement or visible sagging between supports.
- C. Hangers shall permit a minimum of 1-1/2-inch vertical adjustment after installation.
- D. Hanger rods shall be galvanized carbon steel conforming to the following sizes:

<u>Minimum Pipe Size (Inches)</u>	<u>Rod Diameter (Inch)</u>
1/2 and under	1/4
3/4 - 2	3/8
2-1/2 - 3-1/2	1/2
4	5/8
6	3/4
8 - 12	7/8

- E. Carbon steel, alloy steel, stainless steel, and hard-drawn copper pipe shall be supported on maximum intervals as follows:

<u>(Inches)</u>	<u>Maximum Interval for Steel, (Feet)</u>		<u>Maximum Interval for Copper (Feet)</u>
	<u>Liquid</u>	<u>Gas</u>	
1/2	5	6	4
3/4	6	7	5
1	7	9	6
1-1/2	9	11	8
2	10	13	8
2-1/2	11	14	9
3	12	15	10
4	13	17	11
6	17	21	--
8	19	24	--
10	22	27	--
12	23	29	--
14	25	32	--
16	27	35	--
18	28	37	--
20	30	39	--
24	32	42	--

- F. Annealed copper tubing, polyethylene tubing, and PVC piping shall be supported on maximum intervals as follows:

<u>Tube Size (Inches)</u>	<u>Maximum Interval (Feet)</u>
3/8 and smaller	2
1/2 - 5/8	3
3/4 - 1-1/8	4
1-1/4 - 2	5
2-1/2 - 3-1/2	6
4	7
6	8

- G. Exposed piping and tubing carrying liquid shall be sloped as necessary to permit complete draining, where indicated or directed by the Engineer. Pipe deflection between supports shall be considered when determining the slope required to permit complete drainage. All underground piping shall be sloped uniformly for complete drainage.

- H. Cast iron or ductile iron piping shall be supported as recommended by the manufacturer, and at all valves and fittings larger than 4 inches in size. At least

one support shall be provided per pipe section or at every other joint, whichever is closer. Supports shall be located next to hubs or bells.

- I. Open ends of pipe columns used for support shall be completely covered with a 1/4-inch-thick plate or angle leg welded in place.
- J. All threaded connections installed loose, such as hanger rods and U-bolts, shall have a double nut installation.
- K. Vertical piping shall be supported as shown or required to prevent buckling or swaying utilizing special brackets. Unless otherwise shown, vertical piping shall be supported at the bottom and at each floor. Vertical copper tubing 1 inch and smaller in size shall be supported at 5-foot intervals.
- L. Provide a support within 18 inches of each elbow and within 24 inches of each equipment connection.
- M. Pipes passing through non-load bearing walls and partitions shall not bear on building construction. Pipes shall not be supported from roof decking, bar joists, or ceiling suspension systems unless approved by the Engineer.
- N. Insulation on hot piping (carrying fluids above 70°F) shall be protected at supports and hangers with a 12-inch-long galvanized steel protection saddle with welded center support. Protection saddle shall be Grinnell Figure 160 or 161, Fee and Mason Figure 171 or 1710, or equal.
- O. Insulation on cold piping (carrying fluids at 70°F or below) shall be protected at supports and hangers by galvanized steel insulation shields with a 180-degree contour. Insulation shields shall be Grinnell Figure 167, Fee and Mason Figure 81, or equal.
- P. On insulation finished with an aluminum jacket, a 1/32-inch-thick sheet of neoprene shall be provided between the jacket and the shield.
- Q. Hangers shall be selected to fit around insulation.
- R. Following installation, all pipe supports shall be field primed and painted with the painting system specified and/or shown on the Drawings.
- S. Piping shall not be fastened to a support in such a manner that would prevent axial movement due to thermal expansion and contraction, unless otherwise shown.
- T. No pipe supports shall be anchored to or supported from floor grating.

- U. Unless otherwise noted, piping dimensions shown on the Drawings are for reference only and shall be verified in the field by the Contractor. The Contractor shall size supports and hangers using actual field dimensions.
- V. Prepare concrete surfaces for pipe supports. Roughen existing surfaces and apply a bonding agent where cast-in-place pier or column rests on existing concrete.
- W. Provide epoxy anchors for attachments to existing concrete. Verify existing concrete is sound and prepared in accordance with anchor manufacturer's requirements. Exposed anchors shall be stainless steel with stainless steel bolts and washers.
- X. Provide grout and cast-in-place concrete in accordance with these Specifications.

END OF SECTION

## SECTION 16010

### ELECTRICAL GENERAL PROVISIONS

#### PART 1 – GENERAL

##### 1.1 WORK INCLUDED

- A. Provide all labor, equipment, material, etc. required to complete installation specified herein, and/or shown or scheduled on the Drawings.
- B. This section supplements all sections of this Division and shall apply to all phases or work hereinafter specified, shown on the Drawings or required to provide a complete installation of electrical systems.
- C. The specifications and drawings for electrical work are complementary and are for the complete interpretation of the work.
- D. Unless noted or modified by specific notation to the contrary, the modification and/or description of any electrical item in the documents carries with it the instruction to furnish, install and connect same. It shall be understood that the intent governs the work, regardless of whether or not this instruction is explicitly stated.
- E. No exclusion from, or limitation in the Drawings or Specifications, for the electrical work shall be reason for omitting the appurtenances or accessories necessary to complete any required system or item of equipment.

##### 1.2 SPECIAL CONDITIONS, ELECTRICAL

- A. By the act of submitting a bid, this Contractor agrees that all of the “Contract Documents” in each of the Divisions of the complete specifications resulting therefrom are included in his proposal.
- B. In Division 16, the word “Contractor” means the Electrical Contractor. The word “provide” means furnish, install and connect.
- C. Do not scale drawings having ¼-inch or smaller scale. Because of small scale, it is not possible to indicate all offsets, fittings and accessories; provide such as required for complete installation.
- D. The right is reserved to move any element as much as 5 feet at no increase in cost, provided Contractor is notified before work in question is started.
- E. All conductors, regardless of service, shall be installed in raceways, unless specifically noted otherwise.

- F. The Contract Drawings are shown in part diagrammatic, intended to convey the scope of work, indicating the general arrangement of equipment, conduit and outlets. Follow the drawings in laying out the work and verify places for the installation of the materials and equipment. Wherever a question exists as to the exact intended location of the outlets or equipment, obtain instructions from the Engineer before proceeding with the work.

### 1.3 REFERENCES

- A. The intent is that the complete installation shall comply with applicable laws and ordinances, utility company regulations, and applicable requirements of the following:
  - 1. NFPA: National Fire Protection Association
  - 2. UL: Underwriters Laboratories
  - 3. NEC: National Electrical Code
  - 4. NEMA: National Electrical Manufacturers Association
  - 5. OSHA: Occupational Safety & Health Act
  - 6. Standard Building Code
- B. Where the contract documents exceed minimum requirements, the contract documents take precedence.
- C. Comply with all requirements for permits, licenses, fees, and codes. Permits, licenses, fees, inspections, and arrangements required for the work under this contract shall be obtained by this contractor, at his expense, and made available at the completion of the work, unless otherwise specified.

### 1.4 COORDINATION OF WORK

- A. Plan all work so that it proceeds with a minimum of interference with other trades. Inform all parties concerned of openings required for equipment or conduit in the building construction for electrical work and provide all special frames, sleeves, inserts, supports, anchor bolts, etc as required. Coordinate the electrical work with the mechanical installation.
- B. Work lines and established heights shall be in strict accordance with Drawings and Specifications and insofar as these Drawings and Specifications extend. Verify all dimensions shown and establish all

elevations and detailed dimensions shown and establish all elevations and detailed dimensions not shown.

- C. Lay out and coordinate all work well enough in advance to avoid conflicts or interference's with other work in progress so that in case of interference, the electrical layout may be altered to suit the conditions, prior to the installation of any work and without additional cost to the Owner.
- D. Coordinate all outlets, fixtures, etc with floor, wall and ceiling patterns.

## 1.5 EXECUTION OF THE WORK

- A. Install equipment and materials in a neat and workmanlike manner and align, level and adjust for satisfactory operation. Install equipment so that all parts are easily accessible for inspection, operation, maintenance and repair.

## 1.6 SUBMITTALS

### A. SHOP DRAWINGS AND ENGINEERING DATA

- 1. Submit complete shop drawings and engineering data to the Engineer in accordance with the requirements of the Supplemental Specifications.

## 1.7 STORAGE AND PROTECTION

- A. Store and protect materials and equipment in accordance with the Manufacturer's Recommendations.

## 1.8 GUARANTEE

- A. Provide a guarantee against defective products and workmanship.

## 1.9 MEASUREMENT AND PAYMENT

- A. No separate measurement or payment will be allowed for this work. Payment for this work shall be included in the lump sum price of Faircrest Lift Station Electrical, Complete.

## PART 2 – PRODUCTS

### 2.1 REFERENCE TO DRAWINGS

- A. Reference shall be made to drawing schedules and details for: manufacturer, model, catalog number, size, capacity, performance, installation, etc. of equipment and material. Equipment of manufacturers other than those named, will be acceptable provided, in the opinion of the Engineer, it is of equal substance, function, performance and appearance.

## 2.2 CHOICE OF MATERIALS AND EQUIPMENT

- A. All submittals for substitutions shall be done as outlined in Division 1, Specification Sections.
- B. In submitting substitutions, Bidders should note the following minimum considerations:
  - 1. Capabilities shown are absolute minimal and must be equaled.
  - 2. Physical size limitations for space allotted.
  - 3. Structural properties.
  - 4. Noise level.
  - 5. Interchangeability.
  - 6. Compatibility with other materials, assemblies.
  - 7. Similar items shall be same manufacture and style, etc. except where specifically exempted.
- C. All materials and equipment, for which a UL Standard, or NEMA Standard is established, shall be so approved and labeled or stamped.

## 2.2 ELECTRICAL EQUIPMENT

- A. NEMA Standards shall be taken as minimum requirements for electrical equipment.
- B. Equipment shall operate properly under a 10% plus or minus voltage variation.

## PART 3 – EXECUTION (Not Applicable)

END OF SECTION



## SECTION 16111

### CONDUIT

#### PART 1 – GENERAL

##### 1.1 WORK INCLUDED

- A. Rigid metal conduit and fittings.
- B. Liquidtight flexible metal conduit and fittings.
- C. Non-metallic conduit and fittings.

##### 1.2 RELATED WORK

- A. Division 16 – Electrical.
- B. Drawings.
- C. Section 03300 - Cast-In-Place Concrete: Protective envelope for underground conduit installations.

##### 1.3 QUALITY ASSURANCE

- A. The Contractor shall be responsible for ensuring that all equipment installed is properly connected to other related equipment for proper functioning of the Plant.

##### 1.4 REFERENCES

- A. ANSI C80.1 – Rigid Steel Conduit, 304 Stainless Steel and Zinc-Coated Steel.
- B. ANSI/NEMA FB 1 – Fittings and Supports for Conduit and Cable Assemblies.
- C. ANSI/NEMA TC 2; Schedule 40 PVC.
- D. ANSI/NEMA TC 3; Plastic fittings and conduit bodies.

## 1.5 SUBMITTALS

### A. SHOP DRAWINGS AND ENGINEERING DATA

1. Submit complete shop drawings and engineering data to the Owner's Representative in accordance with the requirements of the Supplemental Specifications.

## 1.6 STORAGE AND PROTECTION

- A. Store and protect materials and equipment in accordance with the Manufacturer's recommendations.

## 1.7 GUARANTEE

- A. Provide a guarantee against defective products and workmanship.

## 1.8 MEASUREMENT AND PAYMENT

- A. No separate measurement or payment will be allowed for this work. Payment for this work shall be included in the lump sum price of Faircrest Lift Station Electrical, Complete.

## PART 2 – PRODUCTS

### 2.1 RIGID METAL CONDUIT AND FITTINGS

- A. 304 Stainless Steel Rigid Steel Conduit: ANSI C80.1.
- B. Galvanized Steel Rigid Steel Conduit: ANSI C80.1.
- C. PVC Externally Coated Conduit: NEMA RN 1; rigid steel conduit with external 20 mil PVC coating and internal galvanized surface.
- D. Fittings and Conduit Bodies: ANSI/NEMA FB 1; threaded type, material to match conduit material.

### 2.2 LIQUIDTIGHT FLEXIBLE CONDUIT AND FITTINGS

- A. Conduit: Flexible metal conduit with PVC jacket.
- B. Fittings and Conduit Bodies: ANSI/NEMA FB 1.

### 2.3 PLASTIC CONDUIT AND FITTINGS

- A. Conduit: NEMA TC 2; Schedule 40 PVC.

- B. Fittings and Conduit Bodies: NEMA TC 3.

## 2.4 CONDUIT SUPPORTS

- A. Conduit Clamps, Straps, and Supports: Steel or malleable iron.

## PART 3 – EXECUTION

### 3.1 CONDUIT SIZING, ARRANGEMENT, AND SUPPORT

- A. Size conduit for conductor type installed or for Type THW conductors, whichever is larger. Minimum size for above-ground circuits is  $\frac{3}{4}$ -inch; minimum size for underground circuits is 1 inch.
- B. Arrange conduit to maintain headroom and present a neat appearance.
- C. Route exposed conduit and conduit above accessible ceilings parallel and perpendicular to walls and adjacent piping.
- D. Maintain minimum 6-inch clearance between conduit and piping. Maintain 12-inch clearance between conduit and heat sources such as flues, steam pipes, and heating appliances.
- E. Arrange conduit supports to prevent distortion of alignment by wire pulling operations. Fasten conduit using galvanized straps, lay-in adjustable hangers, clevis hangers, or bolted split stamped galvanized hangers.
- F. Group conduit in parallel runs where practical and use conduit rack constructed of steel channel with conduit straps or clamps. Provide space for 25 percent additional conduit.
- G. Do not fasten conduit with wire or perforated pipe straps. Remove all wire used for temporary conduit support during construction, before conductors are pulled.
- H. Support conduit at a maximum of 7 feet on center.

### 3.2 CONDUIT INSTALLATION

- A. Cut conduit square using a saw or pipecutter; deburr cut ends.
- B. Bring conduit to the shoulder of fittings and couplings and fasten securely.
- C. Use conduit hubs or sealing locknuts for fastening conduit to cast boxes, and for fastening conduit to sheet metal boxes in damp or wet locations.

- D. Install no more than the equivalent of four 90-degree bends between boxes.
- E. Use conduit bodies to make sharp changes in direction, as around beams.
- F. Use hydraulic one-shot conduit bender or factory elbows for bends in conduit larger than 2-inch size.
- G. Avoid moisture traps where possible; where unavoidable, provide junction box with drain fitting at conduit low point.
- H. Use suitable conduit caps to protect installed conduit against entrance of dirt and moisture.
- I. Provide No.12 AWG insulated conductor or suitable pull string in empty conduit, except sleeves and nipples.
- J. Install expansion-deflection joints where conduit crosses building expansion or seismic joints.
- K. Where conduit penetrates fire-rated walls and floors, provide pipe sleeve two sizes larger than conduit; pack void around conduit with oakum and fill ends of sleeve with fire-resistive compound.
- L. Route conduits through roof openings for piping and ductwork where possible; otherwise, route through roof jack with pitch pocket.
- M. Maximum Size Conduit in Slabs Above Grade:  $\frac{3}{4}$ -inch. Do not route conduits to cross each other in slabs above grade. Conduits crossing each other may not be larger than  $\frac{3}{4}$ -inch.
- N. Use PVC-coated rigid steel factory elbows for bends in plastic conduit runs longer than 100 feet, or in plastic conduit runs which have more than two bends regardless of length.
- O. Wipe plastic conduit clean and dry before joining. Apply full even coat of cement to entire area that will be inserted into fitting. Let joint cure for 20 minutes minimum.

### 3.3 UNDERGROUND DUCTBANK INSTALLATION

- A. Install top of duct bank minimum 30 inches below finished grade.
- B. Install conduit with minimum grade of 4 inches per 100 feet.
- C. Terminate conduit in end bell at manhole entries.

- D. Stagger conduit joints in concrete encasement 6 inches minimum vertically.
- E. Use suitable separators and chairs installed not greater than 4 feet on centers. Band conduit together with suitable banding devices. Securely anchor conduit to prevent movement during concrete placement.
- F. Provide minimum 3-inch concrete cover at bottom, top, and sides of duct bank.
- G. Provide two No. 4 steel reinforcing bars in top of bank under paved areas.

### 3.4 CONDUIT INSTALLATION SCHEDULE

- A. Underground or Exposed Installations less than Ten Feet From Pump Station Wet Wells, Valve Vaults, Open Channels or Open Tanks: 304 Stainless Steel.
- B. Underground Installations More than Five Feet From Foundation Wall: Rigid steel conduit encased in concrete envelope; Schedule 40 plastic conduit encased in concrete envelope; or as specified in the drawings.
- C. Installations In or Under Concrete Slab, or Underground Within Five Feet of Foundation Wall: Rigid steel conduit; Schedule 40 plastic conduit encased in concrete envelope; or as specified in the drawings. Underground entry into building shall be rigid steel conduit.
- D. In Slab Above Grade: Rigid steel conduit or Schedule 40 plastic conduit.
- E. Exposed Outdoor Locations: 304 Stainless Steel or PVC coated and galvanized rigid steel conduit, refer to item 3.4.A above for proximity to exposed waste water facilities.
- F. Wet Interior Locations: 304 Stainless Steel or PVC coated and galvanized rigid steel conduit.
- G. Concealed Dry Interior Locations: Galvanized rigid steel conduit or intermediate metal conduit.
- H. Concealed in Masonry Walls: Galvanized rigid steel conduit or intermediate metal conduit or electrical metallic tubing.
- I. Exposed Dry Interior Locations: Galvanized rigid steel conduit.

END OF SECTION

## SECTION 16123

### BUILDING WIRE AND CABLE

#### PART 1 – GENERAL

##### 1.1 WORK INCLUDED

- A. Building wire and cable.
- B. Wiring connectors.

##### 1.2 RELATED WORK

- A. Division 16 – Electrical.
- B. Drawings.

##### 1.3 SYSTEM DESCRIPTION

- A. Where wire and cable routing is not shown, and destination only is indicated, determine exact routing and lengths required.

##### 1.4 QUALITY ASSURANCE

###### A. GENERAL

- 1. The Contractor shall be responsible for ensuring that all equipment installed is properly connected to other related equipment for proper functioning of the Plant.

###### B. MANUFACTURER'S QUALIFICATIONS

- 1. The Manufacturer of work of this section shall have five (5) years minimum proven experience in such work and shall have satisfactorily completed three (3) jobs of similar size and type within the last five (5) years.

##### 1.5 SUBMITTALS

###### A. SHOP DRAWINGS AND ENGINEERING DATA

- 1. Submit complete shop drawings and engineering data to the Engineer in accordance with the requirements of the Supplemental Specifications.

##### 1.6 STORAGE AND PROTECTION

- A. Store and protect materials and equipment in accordance with the requirements of the General Specifications.

## 1.7 GUARANTEE

- A. Provide a guarantee against defective products and workmanship in accordance with the requirements of the General Specifications.

## 1.8 MEASUREMENT AND PAYMENT

- A. No separate measurement or payment will be allowed for this work. Payment for this work shall be included in the lump sum price of Faircrest Lift Station Electrical, Complete.

## PART 2 – PRODUCTS

### 2.1 MANUFACTURERS

- A. The equipment shall be provided by the following manufacturers:
  - 1. Okonite Company.
  - 2. Service Wire Company.
  - 3. Beldon Cable.
  - 4. BICC Cable.
  - 5. Southwire Company.
  - 6. Or approved equal.

### 2.2 SYSTEM COMPONENTS

#### A. BUILDING WIRE AND CABLE

- 1. Description: Single conductor insulated wire.
- 2. Conductor: Stranded copper.
- 3. Insulation Voltage Rating: 600 volts.
- 4. Insulation: ANSI/NFPA 70; Type XHHW or THWN insulation for feeders and branch circuits larger than 6 AWG; Type THHN/THWN insulation for feeders and branch circuits 6 AWG and smaller.

#### B. WIRING CONNECTORS

- 1. Wire Sizes 10 AWG and Smaller:

- a. Splices and Taps: 3M Scotchlok type Y & R insulated spring connectors.
- b. Terminals: Thomas & Betts Stakon Series RA, RB, and RC insulated terminals. Use locking fork type for connection to terminal blocks and ring type for motor terminations.

## PART 3 – EXECUTION

### 3.1 EXAMINATION

- A. Verify that mechanical work likely to damage wire and cable has been completed.
- B. Verify that field measurements are as shown on Drawings.

### 3.2 PREPARATION

- A. Completely and thoroughly swab raceway before installing wire.
- B. Determine required separation between cable and other work.
- C. Determine cable routing to avoid interference with other work.

### 3.3 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Use stranded conductors for feeders and branch circuits 12 AWG and smaller to wiring devices.
- C. Use stranded conductors for control circuits.
- D. Use conductor not smaller than 12 AWG for power and lighting circuits.
- E. Use conductor not smaller than 14 AWG for control circuits and for discrete type instrumentation wiring.
- F. Use 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 100 feet.
- G. Pull all conductors into raceway at same time.
- H. Use suitable wire pulling lubricant for building wire 4 AWG and larger.
- I. Provide a properly-sized equipment grounding conductor in all raceways.
- J. Neatly train and lace wiring inside boxes, equipment, and panelboards.



- K. Clean conductor surfaces before installing lugs and connectors.
- L. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
- M. After making splice or tap, tape uninsulated conductors and connector with electrical tape (3M 33+) to 150 percent of insulation rating of conductor.

#### 3.4 INTERFACE WITH OTHER PRODUCTS

- A. Identify each conductor with its circuit number or other designation indicated on Drawings.

#### 3.5 FIELD QUALITY CONTROL

- A. Inspect wire and cable for physical damage and proper connection.

END OF SECTION

## SECTION 16130

### BOXES

#### PART 1 – GENERAL

##### 1.1 WORK INCLUDED

- A. Pull and junction boxes.

##### 1.2 RELATED WORK

- A. Division 16 – Electrical.
- B. Drawings.

##### 1.3 QUALITY ASSURANCE

###### A. GENERAL

- 1. The Contractor shall be responsible for ensuring that all equipment installed is properly connected to other related equipment for proper functioning of the Plant.

##### 1.4 REFERENCES

- A. NEMA 250 – Enclosures for Electrical Equipment (1000 Volts Maximum).

##### 1.5 SUBMITTALS

###### A. SHOP DRAWINGS AND ENGINEERING DATA

- 1. Submit complete shop drawings and engineering data to the Engineer in accordance with the requirements of the Supplemental Specifications.

##### 1.6 STORAGE AND PROTECTION

- A. Store and protect materials and equipment in accordance with the Manufacturer's recommendations.

##### 1.7 GUARANTEE

- A. Provide a guarantee against defective products and workmanship.

## 1.8 MEASUREMENT AND PAYMENT

- A. No separate measurement or payment will be allowed for this work. Payment for this work shall be included in the lump sum price of Faircrest Lift Station Electrical, Complete.

## PART 2 – PRODUCTS

### 2.1 PULL AND JUNCTION BOXES

- A. Sheet Metal Boxes: ANSI/NEMA OS 1; galvanized steel.
- B. Cast Metal Boxes for Outdoor and Wet Location Installations: NEMA 250; Type 4 and Type 6, flat-flanged, surface-mounted junction box, UL listed as raintight. Galvanized cast iron box and cover with ground flange, neoprene gasket, and stainless steel cover screws.

## PART 3 – EXECUTION

### 3.1 COORDINATION OF BOX LOCATIONS

- A. Provide electrical boxes as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections, and code compliance.
- B. Electrical box locations shown on Contract Drawings are approximate unless dimensioned.
- C. Locate and install boxes to allow access. Where installation is inaccessible, provide access door.
- D. Locate and install to maintain headroom and to present a neat appearance.

### 3.2 PULL AND JUNCTION BOX INSTALLATION

- A. Locate pull boxes and junction boxes and junction boxes above accessible ceilings or in unfinished areas.
- B. Support pull and junction boxes independent of conduit.

END OF SECTION

**SECTION 16140**  
**WIRING DEVICES**

**PART 1 – GENERAL**

**1.1 WORK INCLUDED**

- A. AC switches.
- B. Receptacles.
- C. Wallplates.

**1.2 RELATED WORK**

- A. Division 16 – Electrical.
- B. Drawings.

**1.3 QUALITY ASSURANCE**

**A. GENERAL**

- 1. The Contractor shall be responsible for ensuring that all equipment installed is properly connected to other related equipment for proper functioning of the Plant.

**1.4 REFERENCES**

- A. NECA: Standard of Installation.

**1.5 SUBMITTALS**

**A. SHOP DRAWINGS AND ENGINEERING DATA**

- 1. Submit complete shop drawings and engineering data to the Engineer in accordance with the requirements of the Supplemental Specifications.

**1.6 STORAGE AND PROTECTION**

- A. Store and protect materials and equipment in accordance with the Manufacturer's recommendations.

**1.7 GUARANTEE**

- A. Provide a guarantee against defective products and workmanship.

## 1.8 MEASUREMENT AND PAYMENT

- A. No separate measurement or payment will be allowed for this work. Payment for this work shall be included in the lump sum price of Faircrest Lift Station Electrical, Complete.

## PART 2 – PRODUCTS

### 2.1 AC SWITCHES

#### A. MANUFACTURERS

- 1. Single-Pole Switch:
  - a. Hubbell Cat. No. 1221.
  - b. Arrow Hart Cat. No. 1991.
  - c. Bryant Cat. No. 4901.
  - d. Or approved equal.
- 2. Three-Way Switch:
  - a. Hubbell Cat. No. 1223.
  - b. Arrow Hart Cat. No. 1993.
  - c. Bryant Cat. No. 4903.
  - d. Or approved equal.
- 3. Four-Way Switch:
  - a. Hubbell Cat. No. 1224.
  - b. Arrow Hart Cat. No. 1994.
  - c. Bryant Cat. No. 4904.
  - d. Or approved equal.

#### B. DESCRIPTION

- 1. NEMA WD 1, heavy-duty, AC only general-use snap switch with toggle handle with compression terminals for backwiring.

#### C. COLOR

- 1. Unfinished Areas: Gray.
- 2. Finished Areas: Selected from manufacturer's standard colors.

#### D. RATINGS

1. Voltage: 120-277 volts, AC.
2. Current: 20 amperes.

## 2.2 AC SWITCHES FOR CLASSIFIED AREAS

### A. MANUFACTURERS

1. Appleton.
2. Crouse Hinds.
3. Or approved equal.

### B. TYPE

1. Corrosion-resistant, explosion proof tumbler switches rated for Class I, Division I, Group D areas. Use Type EDS (factory sealed) or type EFS (in conjunction with external sealing fittings).

### C. MOUNTING

1. Surface mount.

### D. RATING

1. NEMA 7.

### E. MATERIAL

1. Malleable cast iron body and cover with front-operated handle. Include stainless steel cover screws.

## 2.3 RECEPTACLES

### A. MANUFACTURERS

1. Duplex Receptacle:
  - a. Hubbell Cat. No. 5362.
  - b. Arrow Hart Cat. No. 5362.
  - c. Bryant Cat. No. 5362.
  - d. Or approved equal.
2. Duplex Corrosion Resistant Receptacle:

- a. Hubbell Cat. No. 53CM62.
- b. Arrow Hart Cat. No. 5362CR.
- c. Bryant Cat. No. 5362CR.
- d. Or approved equal.

3. Ground Fault Circuit Interrupter Receptacle:

- a. Hubbell Cat. No. GF5362.
- b. Arrow Hart Cat. No. GF5362.
- c. Bryant Cat. No. GFR53FT.
- d. Or approved equal.

B. DESCRIPTION

- 1. NEMA WD 1, heavy-duty general use receptacle with compression terminals for backwiring.

C. COLOR

- 1. Unfinished Areas: Gray.
- 2. Finished Areas: Selected from manufacturer's standards.

2.4 WALLPLATES

A. UNFINISHED AREAS

- 1. 302/304 beveled stainless steel.

B. FINISHED AREAS

- 1. Nylon in color selected from manufacturer's standards.

C. WEATHERPROOF WALL SWITCH COVERPLATES

- 1. Clear silicone rubber bubble plate.

D. WEATHERPROOF CONVENIENCE RECEPTACLE COVERPLATES

- 1. Gasketed cast aluminum with hinged gasketed device cover.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify that outlet boxes are installed at proper heights.
- B. Verify that wall openings are neatly cut and will be completely covered by wallplates.
- C. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

### 3.2 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean debris from outlet boxes.

### 3.3 INSTALLATION

- A. Install devices plumb and level.
- B. Install switches with OFF position down.
- C. Install receptacles with grounding pole on top.
- D. Use feed-through installation to protect downstream receptacles where multiple GFI receptacles share the same branch circuit in the same room. Label downstream receptacles as GFI protected.
- E. Connect wiring devices grounding terminal to branch circuit equipment grounding conductor.
- F. Install decorative plates on switch, receptacle, and blank outlets in finished areas.
- G. Connect wiring devices by wrapping conductor around screw terminal.
- H. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.
- I. Coordinate locations of outlet boxes provided under Section 16130 to obtain mounting heights specified and indicated on Drawings.
- J. Install wall switch 48 inches above finished floor.
- K. Install convenience receptacle 18 inches above finished floor in finished areas.
- L. Install convenience receptacle 48 inches above finished floor in unfinished areas.
- M. Install convenience receptacle 6 inches above backsplash of counter.



### 3.4 FIELD QUALITY CONTROL

- A. Inspect each wiring device for defects.
- B. Operate each wall switch with circuit energized and verify proper operation.
- C. Verify that each receptacle device is energized.
- D. Test each receptacle device for proper polarity.
- E. Test each GFCI receptacle device for proper operation.

### 3.5 ADJUSTING

- A. Adjust devices and wallplates to be flush and level.

### 3.6 SPARE PARTS

- A. Furnish two of each style, size, and finish wallplate.

### 3.7 CLEANING

- A. Clean exposed surfaces to remove splatters and restore finish.

END OF SECTION

**SECTION 16170**  
**GROUNDING AND BONDING**

**PART 1 – GENERAL**

**1.1 WORK INCLUDED**

- A. Equipment grounding conductors.
- B. Exothermic connections.
- C. Grounding electrode conductor.
- D. Grounding electrodes.

**1.2 RELATED WORK**

- A. Division 16 – Electrical.
- B. Drawings.

**1.3 QUALITY ASSURANCE**

**A. GENERAL**

- 1. The Contractor shall be responsible for ensuring that all equipment installed is properly connected to other related equipment for proper functioning of the Plant.

**B. MANUFACTURER'S QUALIFICATIONS**

- 1. The Manufacturer of work of this section shall have five (5) years minimum proven experience in such work and shall have satisfactorily completed three (3) jobs of similar size and type within the last five (5) years.

**1.4 SUBMITTALS**

**A. SHOP DRAWINGS AND ENGINEERING DATA**

- 1. Submit complete shop drawings and engineering data to the Owner's Representative in accordance with the requirements of the Supplemental Specifications.

## 1.5 STORAGE AND PROTECTION

- A. Store and protect materials and equipment in accordance with the Manufacturer's recommendations.

## 1.6 GUARANTEE

- A. Provide a guarantee against defective products and workmanship in accordance with the requirements of the General Specifications.

## 1.7 MEASUREMENT AND PAYMENT

- A. No separate measurement or payment will be allowed for this work. Payment for this work shall be included in the lump sum price of Faircrest Lift Station Electrical, Complete.

## PART 2 – PRODUCTS

### 2.1 EQUIPMENT GROUNDING CONDUCTORS

- A. Provide conductors in accordance with Section 16123.

### 2.2 EXOTHERMIC CONNECTIONS

- A. The equipment shall be provided by the following manufacturers:
  1. Cadweld.
  2. Burndy.
  3. Or approved equal.

### 2.3 GROUNDING ELECTRODE CONDUCTOR

- A. Material: Stranded copper.

### 2.4 GROUNDING ELECTRODES

- A. Material:  $\frac{3}{4}$ " by 10' copper clad steel ground rods.

## PART 3 – EXECUTION

### 3.1 INSTALLATION

- A. Provide bonding to meet regulatory requirements.

- B. Equipment Grounding Conductor: Provide separate, insulated green conductor within each raceway. Terminate each end on suitable lug, bus, or bushing.
- C. Drive grounding electrode until top is 6 inches below finished grade.
- D. Install a grounding electrode conductor in conduit to the nearest grounding electrode in compliance with NEC 250. Bond conductor to grounding electrode with exothermic weld connection at least 24 inches below grade.

END OF SECTION

**SECTION 16180**  
**EQUIPMENT WIRING SYSTEM**

**PART 1 – GENERAL**

**1.1 WORK INCLUDED**

- A. Electrical connections to equipment specified under other Sections.
- B. Provide power and control wiring including conduit, wire, relays, switches, and other devices necessary to properly operate equipment as specified, as shown on Drawings, and as required for Owner's use.
- C. Work includes connection and interwiring of equipment and devices, unless connection and interwiring is specified as included under another Section.

**1.2 RELATED WORK**

- A. Division 16 – Electrical.
- B. Drawings.

**1.3 COORDINATION**

- A. Obtain and review shop drawings, product data, and manufacturer's instructions for equipment furnished under other sections.
- B. Refer to electrical and mechanical drawings for quantities and locations of the respective equipment, including field mounted devices to be hooked up to the respective equipment.
- C. Determine connection locations and requirements.
- D. Sequence rough-in of electrical connections to coordinate with installation schedule for equipment.
- E. Sequence electrical connections to coordinate with start-up schedule for equipment.

#### 1.4 QUALITY ASSURANCE

- A. The Contractor shall be responsible for ensuring that all equipment installed is properly connected to other related equipment for proper functioning of the Plant.

#### 1.5 SUBMITTALS

##### A. SHOP DRAWINGS AND ENGINEERING DATA

- 1. Submit complete shop drawings and engineering data to the Engineer in accordance with the requirements of the Supplemental Specifications.

#### 1.6 STORAGE AND PROTECTION

- A. Store and protect materials and equipment in accordance with the requirements of the General Specifications.

#### 1.7 GUARANTEE

- A. Provide a guarantee against defective products and workmanship.

#### 1.8 MEASUREMENT AND PAYMENT

- A. No separate measurement or payment will be allowed for this work. Payment for this work shall be included in the lump sum price of Faircrest Lift Station Electrical, Complete.

### PART 2 – PRODUCTS

#### 2.1 CORDS AND CAPS

- A. Attachment Plug Construction: Conform to NEMA WD 1.
- B. Configuration: NEMA WD 6; match receptacle configuration at outlet provided for equipment.
- C. Cord Construction: ANSI/NFPA 70, Type SO or SJO multi-conductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.
- D. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.

## PART 3 – EXECUTION

### 3.1 EXAMINATION

- A. Comply with equipment and device manufacturer's instructions for connections and interwiring, and size, type, and quantity of conductors.
- B. Verify that manufacturer's requirements meet regulatory requirements and requirements for proper installation and operation of equipment.
- C. Verify that equipment is ready for electrical connection, wiring, and energization.

### 3.2 ELECTRICAL CONNECTIONS

- A. Make electrical connections in accordance with equipment manufacturer's instructions.
- B. Make conduit connections to equipment using flexible liquid-tight flexible conduit with watertight connectors in damp or wet locations.
- C. Make wiring connections using wire and cable with insulation suitable for temperatures encountered in heat producing equipment.
- D. Provide suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- E. Install enclosed disconnect switches, controllers, control stations, and control devices as indicated.
- F. Modify equipment control wiring with terminal block jumpers as indicated.
- G. Provide interconnecting conduit and wiring between devices and equipment where indicated.
- H. Make sure connections are proper, secure, and tight.
- I. Secure and properly support wire bundles.

END OF SECTION

**SECTION 16190**  
**SUPPORTING DEVICES**

**PART 1 – GENERAL**

**1.1 WORK INCLUDED**

- A. Anchors and fasteners.
- B. Channel framing supports.

**1.2 RELATED WORK**

- A. Division 16 – Electrical.
- B. Drawings.

**1.3 SYSTEM DESCRIPTION**

- A. Materials and Finishes: Provide corrosion resistant materials suitable for the application.
- B. Provide materials, sizes, and types of anchors, fasteners, and supports to carry the load of equipment and conduit. Consider weight of wire in conduit when selecting products.

**1.4 QUALITY ASSURANCE**

**A. GENERAL**

- 1. The Contractor shall be responsible for ensuring that all equipment installed is properly connected to other related equipment for proper functioning of the Plant.

**B. MANUFACTURER'S QUALIFICATION**

- 1. The Manufacturer of work of this section shall have five (5) years minimum proven experience in such work and shall have satisfactorily completed three (3) jobs of similar size and type within the last five (5) years.

**1.5 SUBMITTALS**

**A. SHOP DRAWINGS AND ENGINEERING DATA**



1. Submit complete shop drawings and engineering data to the Engineer in accordance with the requirements of the Supplemental Specifications.

#### 1.6 STORAGE AND PROTECTION

- A. Store and protect materials and equipment in accordance with the Manufacturer's recommendations.

#### 1.7 GUARANTEE

- A. Provide a guarantee against defective products and workmanship.

#### 1.8 MEASUREMENT AND PAYMENT

- A. No separate measurement or payment will be allowed for this work. Payment for this work shall be included in the lump sum price of Faircrest Lift Station Electrical, Complete.

### PART 2 – PRODUCTS

#### 2.1 MANUFACTURERS

- A. The equipment shall be provided by the following manufacturers:
  1. Thomas and Betts/Kindorf.
  2. Entrum Industries/Strut Tech.
  3. Unistrut Corporation.
  4. Or approved equal.

#### 2.2 ANCHORS AND FASTENERS

- A. Use methods most appropriate for and compatible with substrate. Do not use methods which will cause structural damage.
  1. Concrete Structural Elements:
    - a. Precast insert system.
    - b. Expansion anchors.
    - c. Self-drilling anchors.
    - d. Epoxied anchors.
  2. Steel Structural Elements:
    - a. Beam clamps.

- b. Welded fasteners.
- 3. Hollow Masonry, Plaster, and Gypsum Board Partitions:
  - a. Toggle bolts.
  - b. Hollow wall fasteners.
- 4. Solid Masonry:
  - a. Expansion anchors.
  - b. Preset insets.
- 5. Sheet Metal:
  - a. Sheet metal screws.
- 6. Wood elements:
  - a. Wood screws or lag bolts.
- 7. Fiberglass Elements:
  - a. Stainless steel bolts.

## 2.3 CHANNEL FRAMING SUPPORTS

- A. Use channel framing for equipment support.
  - 1. Minimum Size: 1-5/8 inch channel.
  - 2. Hardware: Stainless steel.
  - 3. Indoor, Dry Locations: Use galvanized steel channel framing.
  - 4. Indoor, Damp and Corrosive Locations: Use fiberglass channel framing where suitable for weight of supported equipment. Otherwise, use stainless steel channel framing.

## PART 3 – EXECUTION

### 3.1 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.

- B. Provide anchors, fasteners, and supports in accordance with NECA "Standard of Installation".
- C. Rigidly support fixtures and equipment from the building structure.
- D. Do not fasten supports to pipes, ducts, mechanical equipment, and conduit.
- E. Do not use spring steel clips and clamps.
- F. Do not use powder-actuated anchors.
- G. Obtain permission from ENGINEER before drilling or cutting structural members.
- H. Fabricate supports from channel framing. Use hexagon head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.
- I. Install surface mounted cabinets and panelboards with minimum of four anchors.
- J. In wet and damp locations, channel framing supports to stand cabinets and panelboards 1 inch off of surface.
- K. Touch-up field cut ends of galvanized steel supports with galvanizing repair paint.
- L. Seal all cut fiberglass channel ends and exposed FRP threads with fiberglass sealant.

### 3.2 FABRICATION

- A. Brackets and other miscellaneous hardware shall be fabricated from galvanized steel.
- B. Bolts and threaded hardware shall be fabricated from stainless steel.

END OF SECTION

## SECTION 16195

### ELECTRICAL IDENTIFICATION

#### PART 1 – GENERAL

##### 1.1 WORK INCLUDED

- A. Nameplates.
- B. Labels.
- C. Wire markers.
- D. Component markers.
- E. Underground Warning Tape.

##### 1.2 QUALITY ASSURANCE

###### A. GENERAL

- 1. The Contractor shall be responsible for ensuring that all equipment installed is properly connected to other related equipment for proper functioning of the Plant.

###### B. MANUFACTURER'S QUALIFICATIONS

- 1. The Manufacturer of work of this section shall have five (5) years minimum proven experience in such work and shall have satisfactorily completed three (3) jobs of similar size and type within the last five (5) years.

##### 1.3 SUBMITTALS

###### A. SHOP DRAWINGS AND ENGINEERING DATA

- 1. Submit complete shop drawings and engineering data to the Engineer in accordance with the requirements of the Supplemental Specifications.

##### 1.4 STORAGE AND PROTECTION

- A. Store and protect materials and equipment in accordance with the Manufacturer's recommendations.

##### 1.5 GUARANTEE

- A. Provide a guarantee against defective products and workmanship.

## 1.6 MEASUREMENT AND PAYMENT

- A. No separate measurement or payment will be allowed for this work. Payment for this work shall be included in the lump sum price of Faircrest Lift Station Electrical, Complete.

## PART 2 – PRODUCTS

### 2.1 NAMEPLATES

#### A. DESCRIPTION

- 1. Engraved three-layer laminated plastic, black letters on white background unless otherwise indicated.

#### B. LOCATIONS

- 1. Each electrical distribution and control equipment enclosure, telemetry panel, motor control center.

#### C. LETTER SIZE

- 1. Use 1/8-inch letters for identifying individual equipment and loads unless otherwise indicated.
- 2. Use ¼-inch letters for identifying grouped equipment and loads unless otherwise indicated.

### 2.2 LABELS

- A. Embossed adhesive tape, with 3/16-inch black letters on white background unless otherwise indicated.

### 2.3 WIRE MARKERS

#### A. DESCRIPTION

- 1. Brady ID Pro wire markers.

#### B. LOCATIONS

- 1. Every splice, terminal, and connection.

#### C. CONNECTION LEGENDS

- 1. Provide terminal, wire, and component identification for all electrical control panel wiring diagrams and control circuit schematics as part of the record drawings to relate the code identification of each wire, junction, and

termination with respect to corresponding devices, panels, terminals, and connections installed under this Contract.

## 2.4 COMPONENT MARKERS

### A. DESCRIPTION

1. Permanently affixed tape or engraved nameplate uniquely identifying each control device within an enclosure with a number or code corresponding to the circuit diagram.

### B. LOCATE

1. On or adjacent to each control device and visible from panel front.

## 2.5 UNDERGROUND WARNING TAPE

### A. MANUFACTURER

1. Empire Level.
2. Presco.
3. Or approved equal.

### B. DESCRIPTION

1. 6-inch wide electric warning tape with integral metallic component for detection.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Degrease and clean surfaces to receive nameplates and labels.

### 3.2 APPLICATION

- A. Install nameplates and labels parallel to equipment lines.
- B. Secure nameplate to equipment front using stainless steel screws.
- C. Secure nameplate to inside surface of door on panelboard that is recessed in finished locations.

- D. Identify feeders, branch circuits, and service entrance conductors by phase and system voltage using colored electrical tape:
    - 1. Phase A, 480 Volt System: Brown.
    - 2. Phase B, 480 Volt System: Orange.
    - 3. Phase C, 480 Volt System: Yellow.
  - E. Provide wire tags on all panelboard feeders and branch circuits to correspond with the circuit breaker identification number assigned to protect the feeder to branch circuit.
  - F. Install underground warning tape 12 inches below finished grade.
- 3.3 FIELD QUALITY CONTROL
- A. Verify that every identification marker corresponds with the respective terminal or connection code identification.
  - B. Except for common connections, do not duplicate numbers, symbols, colors, or prints in the building.

END OF SECTION

**SECTION 16441**  
**ENCLOSED SWITCHES**

**PART 1- GENERAL**

**1.1 WORK INCLUDED**

- A. Enclosed switches.
- B. Fuses.

**1.2 RELATED WORK**

- A. Division 16 – Electrical.
- B. Drawings.

**1.3 QUALITY ASSURANCE**

**A. GENERAL**

- 1. The Contractor shall be responsible for ensuring that all equipment installed is properly connected to other related equipment for proper functioning of the Project.

**1.4 REFERENCES**

- A. NEMA KS-1: Enclosed and Miscellaneous Distribution Equipment Switches.
- B. ANSI/UL 198C: High-Intensity Capacity Fuses; Current Limiting Types.

**1.5 SUBMITTALS**

**A. SHOP DRAWINGS AND ENGINEERING DATA**

- 1. Submit complete shop drawings and engineering data to the Engineer in accordance with the requirements of the Supplemental Specifications.

**1.6 STORAGE AND PROTECTION**

- A. Store and protect materials and equipment in accordance with the manufacturer's recommendations.

**1.7 GUARANTEE**

- A. Provide a guarantee against defective products and workmanship.

**1.8 MEASUREMENT AND PAYMENT**

JS

16441-1

E12022-2  
12/13



- A. No separate measurement or payment will be allowed for this work. Payment for this work shall be included in the lump sum price of Faircrest Lift Station Electrical, Complete.

## PART 2 - PRODUCTS

### 2.1 ENCLOSED SWITCHES

- A. Manufacturers:

1. Square D Company.
2. Cutler-Hammer.
3. General Electric.
4. Siemens.
5. Or approved equal.

- B. Fusible Switch Assemblies: Type HD load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position. Fuse clips: Designed to accommodate Class J fuses.

- C. Non-Fusible Switch Assemblies: Type HD load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position. Include electrical interlock (N.C.), snap switch type.

- D. Rating: As indicated on schedule.

- E. Identify equipment in accordance with Section 16195.

- F. Enclosure: As indicated on schedule.

### 2.2 FUSES

- A. Description: Dual element, current limiting, time delay, one-time fuse, 600 volt, Class J.

- B. Interrupting Rating: 200,000 A rms.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

A. Install switches where indicated.

B. Install switches 5 feet from operating handle to floor or finished grade unless otherwise noted.

### 3.2 SPARE PARTS

A. Provide three of each size and type fuse installed.

### 3.3 ENCLOSED SWITCH SCHEDULE

ES-	EQUIPMENT	TYPE	AMP RATING	VOLTAGE RATING	POLES	NEMA ENCL.
1	Meter Disconnect	NF	200	480	4	4X
2	Main Disconnect	Fusible	200/200	480	4	4X
3	Manual Transfer Switch	Double Throw	200	480	4	1
4	Transformer Disconnect	Fusible	30	480	2	1

END OF SECTION

## SECTION 16461

### DRY TYPE TRANSFORMERS

#### PART 1 - GENERAL

##### 1.1 WORK INCLUDED

- A. This section covers all equipment, materials, accessories, and labor required to assemble, install, test, and place into satisfactory service the dry type transformers as specified herein and shown on the Drawings.

##### 1.2 RELATED WORK

- A. Division 16 – Electrical.
- B. Drawings.

##### 1.3 SYSTEM DESCRIPTION

- A. Dry Type Transformers.

##### 1.4 QUALITY ASSURANCE

###### A. GENERAL

- 1. The Contractor shall be responsible for ensuring that all equipment installed is properly connected to other related equipment for proper functioning of the Plant.

###### B. MANUFACTURER'S QUALIFICATIONS

- 1. The Manufacturer of work of this section shall have five (5) years minimum proven experience in such work and shall have satisfactorily completed three (3) jobs of similar size and type within the last five (5) years.

##### 1.5 REFERENCES

- A. NEMA AB 1 - Molded Case Circuit Breakers.
- B. NEMA ST 20 - Dry-Type Transformers for General Applications.

## 1.6 SUBMITTALS

### A. SHOP DRAWINGS AND ENGINEERING DATA

1. Submit complete shop drawings and engineering data to the Engineer in accordance with the requirements of the Supplemental Specifications.
2. Submit complete operation and maintenance data accordance with the requirements the Supplemental Specifications

## 1.7 STORAGE AND PROTECTION

- A. Store and protect materials and equipment in accordance with the Manufacturer's recommendations.

## 1.8 GUARANTEE

- A. Provide a guarantee against defective products and workmanship.

## 1.9 MEASURE AND PAYMENT

- A. No separate measurement or payment will be allowed for this work. Payment for this work shall be included in the lump sum price of Faircrest Lift Station Electrical, Complete.

## PART 2 – PRODUCTS

### 2.1 DRY TYPE TRANSFORMERS

#### A. MANUFACTURERS

1. The design has been based on equipment provided by the following manufacturers:
  - a. Square D.
  - b. Cutler Hammer.
  - c. Or approved equal.
- B. Factory-assembled, NEMA ST20, air cooled, dry type transformers, ratings as indicated on schedule.

- C. Insulation System and Average Winding Temperature Rise:
  - 1. 1 to 15 kVA: Temperature Class 185 degrees C with winding rise of 115 degrees C.
  - 2. 16 to 500 kVA: Temperature Class 220 degrees C with winding rise of 150 degrees C.
- D. Case temperature: Maximum 35 degree C rise above ambient at warmest point.
- E. Winding Taps:
  - 1. Transformers Less Than 15 kVA: Two 5 percent below rated voltage, full capacity taps on primary winding.
  - 2. Transformers 15 kVA and Larger: NEMA ST 20. Minimum of four 2-1/2 percent full capacity primary taps.
- F. Sound Levels: As determined by NEMA or ANSI standards.
- G. Enclosure: As indicated in schedule.
- H. Ventilation Openings: Designed to prevent accidental access to live parts in accordance with UL, NEMA, and NEC standards.
- I. Mounting: As indicated in schedule.
- J. Vibration isolating pads.
- K. Coil Conductors: Continuous windings impregnated with non-hygroscopic, thermo-setting varnish and with terminations brazed or welded.
- L. Ground core and coil assembly to enclosure by means of a visible flexible copper grounding conductor sized in accordance with NEMA, IEEE, and ANSI standards.
- M. Nameplate: Include transformer connection data and overload capacity based on rated allowable temperature rise.
- N. Terminal Compartment: Located at the bottom of the transformer.
- O. Listed by Underwriter's Laboratories for the specified temperature rise.

## 2.2 SYSTEM COMPONENTS

### A. FINISHES

1. GENERAL

- a. Provide Manufacturer's standard shop applied coating suitable for the service indicated.

PART 3 – EXECUTION

3.1 INSTALLATION

A. GENERAL

- 1. Install equipment in accordance with Manufacturer's recommendations.
- 2. Install in accordance with manufacturer's instructions.
- 3. Provide properly sized concrete housekeeping pad.
- 4. Set transformer plumb and level.
- 5. Use flexible conduit, 2 feet minimum length, for connections to transformer case; see Section 16111. Make conduit connection to side panel of enclosure.
- 6. Mount transformers on vibration isolating pads suitable for isolating the transformer from the building structure.
- 7. Provide grounding and bonding; see Section 16170.
- 8. Mount with a minimum 3-inch clearance for air circulation.
- 9. Identify each dry type transformer; see Section 16195.

B. TOUCH-UP COATING

- 1. Touch up all damaged coating surfaces with compatible coating of identical color in such manner that there shall be no evidence of damage.

3.2 TRANSFORMER SCHEDULES

DTT-	KVA RATING	PRIMARY VOLTAGE	SECONDARY VOLATAGE	PHASE	WIRE	ENCLOSURE	MTG.
1	10	480	120/240	1	3	Ventilated	Wall

END OF SECTION

## **SECTION 16470**

### **PANELBOARDS**

#### **PART 1 – GENERAL**

##### **1.1 WORK INCLUDED**

- A. Branch Circuit Panelboards.
- B. Distribution Panelboards.

##### **1.2 RELATED WORK**

- A. Division 16 – Electrical.
- B. Drawings.

##### **1.3 QUALITY ASSURANCE**

- A. The Contractors shall be responsible for ensuring that all equipment is properly connected to other related equipment for proper functioning of the Plant.
- B. Indicate voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker and fusible switch arrangement and sizes.

##### **1.4 SUBMITTALS**

###### **A. SHOP DRAWINGS AND ENGINEERING DATA**

- 1. Submit complete shop drawings and engineering data to the Engineer in accordance with the requirements of the Supplemental Specifications.

##### **1.5 STORAGE AND PROTECTION**

- A. Store and protect materials and equipment in accordance with the manufacturer's recommendations.

##### **1.6 GUARANTEE**

- A. Provide a guarantee against defective products and workmanship.

##### **1.7 MEASUREMENT AND PAYMENT**

- A. No separate measurement or payment will be allowed for this work. Payment for this work shall be included in the lump sum price of Faircrest Lift Station Electrical, Complete.

## PART 2 – PRODUCTS

### 2.1 MANUFACTURERS

- A. Square D Company.
- B. Cutler-Hammer.
- C. Or approved equal.

### 2.2 BRANCH CIRCUIT PANELBOARDS

- A. Lighting and Appliance Branch Circuit Panelboards: NEMA PB 1, circuit breaker type.
- B. Panelboard Bus: Copper ratings as indicated. Provide copper ground bus in each panelboard.
- C. Minimum Integrated Short Circuit Rating: 14,000 amperes rms symmetrical for 480 volt panelboards.
- D. Molded Case Circuit Breakers: NEMA AB 1, bolt-on type thermal magnetic trip circuit breakers, with common trip handle for all poles. Provide circuit breakers UL listed as Type SWD for lighting circuits. Provide UL Class A ground fault interrupter circuit breakers where scheduled. Do not use tandem circuit breakers.
- E. Enclosure: NEMA PB 1, Type 1.
- F. Cabinet Box: 6 inches deep; 20 inches wide for 240 volt and less panelboards.
- G. Cabinet Front: Surface type with concealed trim clamps, concealed hinge, and flush lock, all keyed alike. Finish in manufacturer's standards gray enamel.

### 2.3 DISTRIBUTION PANELBOARDS

- A. Power Distribution Panelboards: NEMA PB 1, circuit breaker type or fusible switch type.
- B. Panelboard Bus: Copper ratings as indicated. Provide copper ground bus in each panelboard.
- C. Minimum Integrated Short Circuit Rating: 10,000A rms symmetrical for 240-V panelboards, 14,000A rms symmetrical for 480-V panelboards, or as shown.
- D. Molded Case Circuit Breakers: NEMA AB 1, bolt-on type thermal magnetic trip circuit breakers, with common trip handle for all poles. Provide UL Class A



ground fault interrupter circuit breakers where scheduled. Provide UL listed Type HACR circuit breakers for air conditioning equipment branch circuits.

- E. Enclosure: NEMA PB 1, Type 1.
- F. Cabinet Front: Surface type with concealed trim clamps, concealed hinge, and flush lock, all keyed alike. Finish in manufacturer's standards gray enamel.
- G. Fusible Switch Assemblies: NEMA KS 1, UL 512; quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle.
- H. Fuse Clips: UL 512. Designed to accommodate Class R fuses.

## 2.4 FUSES

- A. Fuses 600 A and Less: Dual element, current limiting, time delay, one time fuse, 250, 600 V, UL Class RK 1, RK 5, J.
- B. Fuses 601 A and Larger: Dual element current limiting, time delay, one time fuse, 600 V, UL Class L.
- C. Interrupting Rating: 200,000 A rms.

## PART 3 – EXECUTION

### 3.1 INSTALLATION

- A. Install panelboards in accordance with NEMA PB 1.1.
- B. Install panelboards plumb. Install recessed panelboards flush with wall finishes. Provide supports as required for secure installation. Follow Section 16190.
- C. Height: 6 feet to top of panelboard.
- D. Provide filler plates for unused spaces in panelboards.
- E. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuitry changes required to balance phase loads.
- F. Provide engraved plastic nameplates; see Section 16195. Attach plates with corrosion-resistant screws.

### 3.2 FIELD QUALITY CONTROL

- A. Perform the following visual and mechanical inspections and related work:

1. Inspect for defects and physical damage, labeling, and nameplate compliance with requirements of up-to-date drawings and panelboard schedules.
  2. Exercise and perform operational tests of all mechanical components and other operable devices in accordance with manufacturer's instruction manual.
  3. Check panelboard mounting, area clearances, and alignment and fit of components.
  4. Check tightness of bolted electrical connections.
  5. Measure steady state load currents at each panelboard feeder; rearrange circuits in the panelboard to balance the phase loads to within 20 percent of each other. Maintain proper phasing for multi-wire branch circuits.
- B. Perform the following electrical tests:
1. Ground resistance test on system and equipment ground connections.
- C. Correct deficiencies identified by tests and observations and provide retesting of panelboards. Verify by the system tests that the total assembly meets specified requirements.
- 3.3 SPARE PARTS
- A. Panelboard Keys: Two of each.
- 3.4 PANELBOARD SCHEDULE:

PB-1			SERVICE			MAINS		
Type	Branch		Voltage	Pha ses	W ir e	Amp Rating	Location	Type
Mtg.	Surface		120/240	1	3	50	Top	Circuit Breaker
BRANCH CIRCUIT						No. of Outlets	LOAD DESCRIPTION	
No.	Pole	Bkr.	Phase A	Phase B				
1	1	20 A	X		3		Valve Vault and Wet Well Lights	
3	1	20 A		X	1		Security Light	
5	1	20 A	X		1		SCADA Panel	
7	1	20 A		X	1		Spare	
9			X				N/A	
11				X			N/A	
13			X				N/A	
15				X			N/A	
17			X				N/A	
19				X			N/A	
21			X				N/A	
23				X			N/A	
25			X				N/A	
27				X			N/A	
29			X				N/A	
31				X			N/A	
33			X				N/A	
35				X			N/A	
37			X				N/A	
39				X			N/A	
41			X				N/A	
2	1	20 A	X		1		Wet Well Level Transmitter	
4	1	20 A		X	1		Station Flow Meter	
6	1	20 A	X		1		Chemical Feed Receptacle	
8	1	20 A		X	1		Electrical Enclosure Receptacle	
10	1	20 A	X		1		Spare	
12				X			N/A	
14			X				N/A	
16				X			N/A	
18			X				N/A	
20				X			N/A	
22			X				N/A	
24				X			N/A	
26			X				N/A	
28				X			N/A	
30			X				N/A	
32				X			N/A	
34			X				N/A	
36				X			N/A	
38			X				N/A	
40				X			N/A	
42			X				N/A	

END OF SECTION

**SECTION 16510**  
**LIGHTING FIXTURES**

**PART 1 – GENERAL**

**1.1 WORK INCLUDED**

- A. Interior luminaries and accessories.
- B. Lamps.
- C. Ballasts.

**1.2 RELATED WORK**

- A. Division 16 – Electrical.
- B. Drawings.

**1.3 QUALITY ASSURANCE**

**A. GENERAL**

- 1. The Contractor shall be responsible for ensuring that all equipment installed is properly connected to other related equipment for proper functioning of the Plant.

**B. MANUFACTURER'S QUALIFICATIONS**

- 1. The Manufacturer of work of this section shall have five (5) years minimum proven experience in such work and shall have satisfactorily completed three (3) jobs of similar size and type within the last five (5) years.

**1.4 REFERENCES**

- A. ANSI C82.1 – Specification for Fluorescent Lamp Ballasts.
- B. ANSI C82.4 – Specifications for High-Intensity-Discharge Lamp Ballasts (Multiple Supply Type).
- C. FS W-F-414 – Fixture, Lighting (Fluorescent, Alternating-Current, Pendant Mounting).
- D. NEMA LE 2 – H-I-D Lighting System Noise Criterion (LS-NC) Ratings.

## 1.5 SUBMITTALS

### A. SHOP DRAWINGS AND ENGINEERING DATA

1. Submit complete shop drawings and engineering data to the Engineer in accordance with the requirements of the Supplemental Specifications.

## 1.6 STORAGE AND PROTECTION

- A. Store and protect materials and equipment in accordance with the manufacturer's recommendations.

## 1.7 GUARANTEE

- A. Provide a guarantee against defective products and workmanship in accordance with the requirements of the General Specifications.

## 1.8 MEASUREMENT AND PAYMENT

- A. No separate measurement or payment will be allowed for this work. Payment for this work shall be included in the lump sum price of Faircrest Lift Station Electrical, Complete.

## PART 2 – PRODUCTS

### 2.1 LUMINAIRES AND ACCESSORIES

- A. See Luminaire Schedule.

### 2.2 LAMPS

- A. The lamps shall be provided by the following manufacturers:
  1. General Electric.
  2. Philips.
  3. Or approved equal.

### 2.3 BALLASTS

- A. The ballast shall be provided by the following manufactures:
  1. Advance.
  2. Valmont.

3. Or approved equal.

#### B. FLUORESCENT BALLASTS

1. Fluorescent Ballasts: ANSI C82.1; high power factor type.
2. Nominal F32T8 Lamp Ballasts: High frequency electronic type.

#### C. HID BALLASTS

1. HID Ballast: ANSI C82.4; suitable for 122 degrees F (50 degrees C) ambient.
2. LS-NC Rating: NEMA LE 2; equal to or less than ratings listed in Table C-

### PART 3 – EXECUTION

#### 3.1 INSTALLATION

- A. Install lamps in luminaries and lampholders.
- B. Support surface-mounted luminaries directly from building structure fasten to T using bolts, screws, rivets, or approved ceiling framing member clips. Install fluorescent luminaries larger than 2 x 4 foot size independent of ceiling framing.
- C. Install recessed luminaries to permit removal from below. Install grid clips.

#### 3.2 RELAMPING

- A. Relamp luminaries which have failed lamps at completion of Work.

#### 3.3 ADJUSTING AND CLEANING

- A. Align luminaries and clean lenses and diffusers at completion of Work. Clean paint splatters, dirt, and debris from installed luminaries.
- B. Touchup luminaire and pole finish at completion of work.

#### 3.4 SPARE PARTS

- A. Ballasts: Provide one of each type.
- B. Lamps: Provide one for one replacement up to 10 Spare Lamps of each type furnished.
- C. Lenses: Provide one of each size and type.

3.5 LUMINAIRE SCHEDULE

- A. See drawings.

END OF SECTION

**SECTION 16902**  
**ELECTRIC CONTROLS AND RELAYS**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Pushbutton and selector switches.
- B. Indicating lights.
- C. Magnetic control relays.
- D. Control power transformers.

**1.2 RELATED WORK**

- A. Division 16 – Electrical.
- B. Drawings.

**1.3 QUALITLY ASSURANCE**

**A. GENERAL**

- 1. The Contractor shall be responsible for ensuring that all equipment installed is properly connected to other related equipment for proper functioning of the Plant.

**B. MANUFACTURER'S QUALIFICATIONS**

- 1. The Manufacturer of work of this section shall have five (5) years minimum proven experience in such work and shall have satisfactorily completed three (3) jobs of similar size and type within the last five (5) years.

**1.4 REFERENCES**

- A. NEMA ICS: Industrial Control Systems.



## 1.5 SUBMITTALS

### A. SHOP DRAWINGS AND ENGINEERING DATA

1. Submit complete shop drawings and engineering data to the Engineer in accordance with the requirements of the Supplemental Specifications.

## 1.6 STORAGE AND PROTECTION

- A. Store and protect materials and equipment in accordance with the Manufacturer's recommendations.

## 1.7 GUARANTEE

- A. Provide a guarantee against defective products and workmanship.

## 1.8 MEASUREMENT AND PAYMENT

- A. No separate measurement or payment will be allowed for this work. Payment for this work shall be included in the lump sum price of Faircrest Lift Station Electrical, Complete

## PART 2 - PRODUCTS

### 2.1 PUSHBUTTONS AND SELECTOR SWITCHES

#### A. MANUFACTURER

1. Square D Company.
2. Allen-Bradley.
3. Cutler-Hammer.
4. Siemens.
5. Or approved equal.

#### B. DESCRIPTION

1. Heavy-duty, oil-tight, NEMA style, NEMA Type 4/4X corrosion-resistant, 30.5 mm mounting hole. Refer to Drawings for operator type, color, and contact configuration.

C. CONTACTS

1. NEMA ICS 2, form as indicated.

D. CONTACT RATINGS

1. NEMA ICS 2 at 120 VAC, 10A continuous rating.

2.2 INDICATING LIGHTS

A. MANUFACTURER

1. Square D Company.
2. Allen-Bradley.
3. Cutler-Hammer.
4. Siemens.
5. Or approved equal.

B. DESCRIPTION

1. Heavy-duty, oil-tight, NEMA style, NEMA Type 4/4X corrosion-resistant, 30.5 mm mounting hole, push-to-test, full voltage.

C. LAMP LIFE

1. 10,000 hours, minimum.

2.3 MAGNETIC CONTROL RELAYS

A. MANUFACTURERS

1. Potter & Brumfield, Series KVP.
2. Square D Company, Type K.
3. Allen-Bradley, Type HB.
4. Or approved equal.

B. DESCRIPTION

1. NEMA ICS 2, Class A300.

C. CONTACTS

1. NEMA ICS 2, 3PDT, spade terminals.

D. CONTACT RATINGS

1. NEMA ICS 2, 10A continuous rating at 120 VAC.

E. COIL VOLTAGE

1. 120 volts, 60 Hertz, AC.

F. Include neon pilot light, manual operator, and square base.

2.4 CONTROL POWER TRANSFORMER

A. MANUFACTURERS

1. Square D Company.
2. Cutler-Hammer.
3. Allen-Bradley.
4. Siemens.
5. Or approved equal.

B. DESCRIPTION

1. NEMA ST 1, machine tool transformer with isolated secondary winding and fusing on all underground lets.

C. POWER RATING

1. As indicated, otherwise 50 VA minimum.

D. VOLTAGE RATING

1. 480 volts primary; 120 volts secondary or as required.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install individual relays and time delay relays in enclosures.
- C. Install cabinets; in accordance with Section 16131.
- D. Make electrical wiring interconnections as indicated.

### 3.2 CONTROL STATION SCHEDULE

CS-	CONTROLLED EQUIPMENT	CONTROLLER TYPE	NEMA ENCL.
1	Make Up Air Unit MAU-1	Run/Stop	12

END OF SECTION

# APPENDICES

# **APPENDIX A**

## **Subsurface Investigation Information**

## **APPENDIX “A”**

### **Subsurface Investigation Information**

#### Disclaimer

The subsurface investigation and soil boring logs were prepared for the Owner for use in design in June, 2013. They are included as an appendix for informational purposes only. The Subsurface Investigation and soil boring logs are not a part of the Contract Documents and are not to be relied upon as a complete representation of all possible soil conditions which may be encountered. Use of the information is totally at the risk of the Contractor. Additional soils information, if needed by any Contractor, shall be obtained by the Contractor at no cost to the Owner. The Contractor shall make no claim against the Owner or the Engineer based on the subsurface investigation or the soil boring logs.





June 5, 2013

City of Canton  
Engineering Department  
Building A  
2436 – 30<sup>th</sup> Street NE  
Canton, Ohio 44705

Attn: Mr. Richard Bodenshatz

Re: Geotechnical Subsurface Exploration Report  
Faircrest Street S.W. Sanitary Sewer  
Faircrest Street S.W.  
Canton, Stark County, Ohio  
**PSI File No. 0145630**

Dear Mr. Bodenshatz:

Professional Service Industries, Inc. (PSI) is pleased to submit this Geotechnical Engineering Services Report for the referenced project. This report includes the results of field and laboratory testing, and recommendations for pavement improvements.

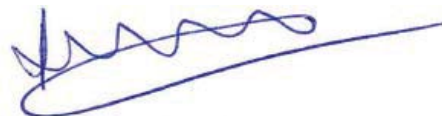
We appreciate the opportunity to perform this geotechnical evaluation and look forward to continued participation during the design and construction phases of this project. If you have any questions pertaining to this report, or if we may be of further service, please contact our office at 330-478-0081.

Respectfully submitted,

**PROFESSIONAL SERVICE INDUSTRIES, INC.**



Eric Olson, E.I.T.  
Staff Engineer



A. Veeramani, P.E.  
District Manager

cc: Mr. Todd Kramer, CTI Engineers, Inc.



**REPORT OF  
GEOTECHNICAL SUBSURFACE EXPLORATION**

**FOR THE PROPOSED**

**FAIRCREST STREET S.W. SANITARY SEWER  
FAIRCREST STREET S.W.  
CANTON, STARK COUNTY, OHIO**

**PREPARED FOR**

**CITY OF CANTON  
ENGINEERING DEPARTMENT  
BUILDING A  
2436 – 30TH STREET NE  
CANTON, OHIO 44705**

**PREPARED BY**

**PROFESSIONAL SERVICE INDUSTRIES, INC.  
4579 NAVARRE ROAD, S.W.  
CANTON, OHIO 44706**

**PSI FILE NUMBER: 0145630**

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## PROJECT INFORMATION

### Project Authorization

This report presents the results of a geotechnical subsurface exploration and analysis, conducted for the City of Canton in connection with the proposed Sanitary Sewer Improvement Project along Faircrest Avenue in the City of Canton, Stark County, Ohio. PSI's service for this project was performed in accordance with PSI Proposal No. 0145-80088, dated October 5, 2013. Authorization to perform this exploration and analysis was provided via email on April 29, 2013 in the form of a signed Purchase Order No. P1206168, dated December 3<sup>rd</sup>, 2012.

### Project Description

Project information has been provided by Mr. Todd Kramer of CTI Engineers, Inc. Included, we have received a site plan showing the general layout of the proposed sanitary sewer system.

From the provided plan, it is understood the proposed system will consist of a sanitary sewer line running approximately 3,700 lineal feet with seven (7) man hole structures and a lift station with a wet well and valve vault. Preliminary designs suggest that the manhole and lift station structures. The proposed sewer lines as well as the manhole and lift station structures will bear at depths of approximately 10 to 14 feet below grade. The sanitary sewer line will be a combination of gravity and forced mains with a diameter varying from 4 to 8 inches and run from Sherman Church Avenue to Interstate 77. Separate from the sanitary sewer project, potential water lines may also be installed near Interstate 77.

The bearing depths of the manholes or lift stations were not available at the time of this report. No other information was available at the time of this proposal. If any of the above project information is incorrect or has changed, please inform PSI so that we may amend the recommendations presented in this report, if appropriate.

### Purpose and Scope of Services

The purpose of this exploration was to evaluate the soil and groundwater conditions at the site to provide recommendations, from a geotechnical engineering viewpoint, relative to the design and installation of the proposed sewer lines. The scope of the exploration and analysis included a reconnaissance of the project site, drilling fifteen (15) test borings along the proposed sewer alignment, a laboratory-testing program, and an engineering analysis

and evaluation of the subsurface materials. (Please note: The test borings near Interstate 77, B-14 and B-15, are for the purpose of a potential water line project rather than for the proposed sanitary sewer line project).

The scope of services did not include an environmental assessment for the presence or absence of wetlands or hazardous or toxic materials in the soil, surface water, groundwater, or air, on or below or around this site. Any statements in this report or on the boring logs regarding odors, colors or unusual or suspicious items or conditions are strictly for the information of the client.

## **SITE AND SUBSURFACE CONDITIONS**

### **Site Location and Description**

The proposed sewer lines, for which this subsurface exploration has been performed, will be located along Faircrest Street S.W. in The City of Canton, Stark County, Ohio. Specifically, the proposed sewer line will be installed along Sherman Church Avenue approximately 300 feet south of Faircrest Street and extending east on Faircrest Street to Interstate 77. The sanitary sewer line will be located on the west side of Sherman Church Avenue and the south side of Faircrest Street. Underground utility lines were observed to be running throughout the site; therefore, all utilities should be checked and marked prior to construction activities.

### **Subsurface Conditions**

The general subsurface conditions at the site were explored with a total of fifteen (15) test borings along the proposed sewer route, which were drilled to depths ranging from approximately 8.8 to 30.0 feet each, below the existing surface grades utilizing conventional truck mounted drilling equipment. The borings were drilled at the approximate locations shown on the Boring Location Plan presented in the *Appendix* of this report. The numbers of test borings were selected by the representatives of the City of Canton field located by the representatives of PSI.

Field and laboratory testing were accomplished in general accordance with ASTM standards. The types of subsurface materials encountered in the test borings have been visually classified. The results of the visual classifications, Standard Penetration tests, moisture contents and water level observations are presented on the boring logs in the *Appendix* of this report. Representative samples of the soils and rocks were placed in sample jars, and

are now stored in the laboratory for further analysis, if requested. Unless notified to the contrary, remaining samples will be retained in our office for a period of 60 days following the date of this report.

The surface materials encountered at all of the boring locations is summarized in the table below:

Boring Location	Surface Material	Boring Location	Surface Material	Boring Location	Surface Material
B-1	2" Gravel and Silt	B-6	3" Topsoil	B-11	1 ½" Limestone Gravel
B-2	1 ½" Gravel and Silt	B-7	4" Topsoil with Gravel	B-12	1 ½" Gravel
B-3	2" Topsoil	B-8	3" Topsoil	B-13	No Surface Material
B-4	3" Topsoil	B-9	2" Topsoil	B-14	2" Topsoil
B-5	3" Topsoil	B-10	3" Gravel	B-15	2" Topsoil

\*\*The thickness of the surface material should be expected to vary throughout the site.

Natural soils were encountered underlying the surface materials. The natural soils consisted of fine and coarse sand, silt, silty clay, and sandy silt. At boring location B-14, a 6 inch black coal seam was encountered at 6.5 feet below surface grade. The natural soils exhibited moisture contents ranging from about 4 to 53 percent, and a very soft to hard consistency for cohesive soil and very loose to dense relative density for granular soils, based on the Standard Penetration tests.

The area's rock formation was encountered at nine (9) of the boring locations and is summarized in the table below:

Boring Location	Depth of Rock Formation (ft.)	Rock Material Description	Boring Location	Depth of Rock Formation (ft.)	Rock Material Description
B-7	18.5	Very Weak to Strong, Brown Shale	B-12	7.0	Very Weak to Slightly Strong, Brown Shale
B-8	13.9		B-13	6.5	
B-9	14.0		B-14	9.0	Very Weak, Gray Sandstone
B-10	11.5			14.5	Very Weak, Gray Shale
B-11	9.0		B-15	0.2	Very Weak to Moderately Strong, Gray Shale

\*\*Note that the rock formation at boring location B-15 was interbedded with a layer of wet lean sandy clay from 3.5 to 6.0 feet.

Note that the subsurface description is of a generalized nature provided to highlight the major strata encountered. The boring logs and laboratory test data included in the Appendix should be reviewed for specific information at the individual boring locations. The stratifications shown on the boring logs represent the conditions only at the actual test positions. Variations may occur and should be expected between the boring locations. The stratifications represent the approximate boundary between the subsurface materials, and the transition may be gradual or not clearly defined.

### **Groundwater Conditions**

Groundwater was encountered at ten (10) of the test boring locations. The following table illustrates the groundwater levels encountered at the test boring locations, during the field drilling operations:

<b>Boring No:</b>	<b>Water Encountered Depths (Feet)</b>	
	<b>During Drilling</b>	<b>After Drilling</b>
B-1	13.5	16.9
B-2	13.5	n/a
B-3	8.5	23.3
B-4	13.5	27.0
B-5	8.5	19.0
B-6	4.5	n/a
B-7	6.0	n/a
B-8	6.0	14.4
B-14	12.0	10.9
B-15	4.5	8.0

No free water was encountered at the remaining test boring locations during field drilling operations. In fine-grained soils, such as silts and clays, the absence of free groundwater infiltration in the boreholes does not necessarily demonstrate that groundwater is below the explored depth of the boreholes. The boreholes remained open for a limited period of time; therefore, groundwater levels may not have stabilized in the boreholes.



## EVALUATION AND RECOMMENDATIONS

### Excavation Support

In view of the results of the test boring operations, laboratory test studies, analysis and provided information, consideration should be given to the following factors in the design and installation of the proposed sanitary sewer lines.

The proposed sewer installations will be located within the right-of-way areas of the existing Sherman Church Road and Faircrest Street S.W. Therefore, based on the locations of the proposed sewer lines and as per OSHA excavation regulations, open cut excavation is possible up to a maximum depth of twenty (20) feet. The excavation slopes should follow OSHA guidelines for type 'C' soils. If temporary excavation support is required, the contractor or specialty subcontractor should be responsible to design and install the required system. For the various subsurface formations encountered, the following soil parameters may be adopted for determining lateral earth pressures:

Type of Soil	Unit Weight (pcf)	Effective Strength	Undrained Strength
Sand	120	$\phi' = 30^\circ, C' = 0 \text{ psf}$	$\phi' = 30^\circ, C' = 0 \text{ psf}$
Sandy Silt/Silt	120	$\phi' = 28^\circ, C' = 0 \text{ psf}$	$\phi' = 26^\circ, C' = 200 \text{ psf}$
Silty Clay	120	$\phi' = 26^\circ, C' = 50 \text{ psf}$	$\phi' = 0^\circ, C' = 1000 \text{ psf}$
Weathered Shale/Sandstone	130	$\phi' = 34^\circ, C' = 100 \text{ psf}$	$\phi = 0^\circ, C = 5000 \text{ psf}$

The design groundwater depth should be determined based on the actual groundwater conditions encountered in the field during construction.

### Pipe Support

For the structural and functional integrity of the sewer lines, it is imperative that the pipes have adequate foundation, i.e., the subsurface materials should have adequate support capabilities and also be able to provide uniform bedding to the pipe. The bedding may be provided either with shaped bottom and tamped backfill, or by compacted granular bedding with tamped backfill. The granular bedding should meet the specification for Type 2 bedding (i.e., ODOT's Construction and Material Specifications Item #603.04). The bedding shall extend up around the pipe for a depth of 6 inches or 30 percent of the outside diameter of the pipe, whichever is greater. The remainder of the backfill should be compacted soil. Granular bedding not only provides firm uniform support for the pipe but also stabilizes the trench bottom.

### **Manhole/Lift Station Structures**

Within the area's overburdened soils, freestanding excavations will not be possible for the proposed below grade structures. Therefore, a lateral support system will be required for the manhole excavations. The magnitude of the lateral earth pressures may be calculated utilizing the previously outlined soil parameters.

It is recommended that the maximum soil pressures resulting from the above-discussed loading conditions as well as the weight of the manhole and other facilities associated with the structure should not exceed 2,500 psf. Based on the recommended bearing pressure, the anticipated settlement will be less than 1.0-inch. It is recommended that suitability of the bearing surfaces be verified by the project's geotechnical engineer.

### **Backfill Operations**

Any backfill required against the manhole structures and sanitary sewers should consist of freely draining granular materials. The backfill is to be placed on a controlled lift-by-lift basis. Individual fill lifts are to be of maximum 8-inch loose measure thickness, and each individual lift is to be adjusted in moisture content to within plus or minus 2 percent of the optimum moisture content as determined by ASTM D-698. The fill materials are to be systematically compacted, such that an in-place density of at least 98 percent of the maximum laboratory density as determined by the above-referenced ASTM method is achieved.

It must be recognized that, over a time period, the backfill against the manholes will be saturated. Under this circumstance it is possible that the bottom slab for the manhole will be subjected to hydrostatic uplift that should be considered in the design. Uplift may be resisted either by assuring that the dead loads of the proposed structure counter balance the buoyancy forces or by providing a system of pressure relief valves. Lateral pressures acting on the manholes can be defined based on the effective strength parameters recommended in a previous section plus hydrostatic pressure. Specifications should require that the resulting fill materials' densities be verified by test measurements conducted by the geotechnical engineer.

### **Groundwater Control**

Groundwater was encountered at ten (10) of the test boring locations at depths of about 4.5 to 27.0 feet below the existing surface grades during the field drilling operations. Therefore, groundwater and/or groundwater seepage will be encountered during the sewer and manhole excavations. Accordingly, a dewatering system, if groundwater and/or seepage encountered,

should be designed by a professional engineer and installed by a dewatering contractor experienced in the project area, such that the groundwater is controlled and maintained at an elevation of at least 2 feet below the excavation bottom at all times. Every effort should be made to keep the excavations dry if water is encountered.

### **Excavations**

In Federal Register, Volume 54, No. 209 (October, 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its "Construction Standards for Excavations, 29 CFR, Part 1926, Subpart P." This document was issued to better insure the safety of workers entering trenches or excavations. It is mandated by this federal regulation that all excavations, whether they be utility trenches, basement excavations or foundation excavations, be constructed in accordance with the new OSHA guidelines. It is our understanding that these regulations are being strictly enforced. If they are not followed closely, the owner and the contractor could be liable for substantial penalties.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's "responsible person" as defined in "CFR Part 1926," should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations.

If the excavations are left open and exposed to the elements for a significant length of time, desiccation of the clays may create minute shrinkage cracks which could allow large pieces of clay to collapse or slide into the excavation. Materials removed from the excavation should not be stockpiled immediately adjacent to the excavation, inasmuch as this load may cause a sudden collapse of the embankment.

We are providing this information solely as a service to our client. PSI is not assuming responsibility for construction site safety or the contractor's activities; such responsibility is not being implied and should not be inferred.

### **Weather Considerations**

The soils encountered at this site are known to be sensitive to disturbances caused by construction traffic and to changes in moisture content. During wet weather periods, increases in the moisture content of the soil can cause significant reduction in the soil strength and support capabilities. Care should be exercised during the grading operations at the site. The traffic of heavy equipment, including heavy compaction equipment, may very well create pumping and a general deterioration of those soils in the presence of water. Therefore, construction, if at all possible, be performed during a dry season. A layer of crushed stone may be required to allow the movement of construction traffic over the site during the rainy season. The contractor should maintain positive site drainage and if wet/pumping conditions occur, the contractor will be responsible to over excavate the wet soils and replace them with a properly compacted structural fill.

### **REPORT LIMITATIONS**

The recommendations submitted are based on the available subsurface information obtained by PSI and design details furnished by Mr. Todd Kramer of CTI Engineers, Inc. for the proposed project. If there are any revisions to the plans for the proposed project, or if deviations from the subsurface conditions noted in this report are encountered during construction, PSI should be retained to determine if changes in the recommendations are required. If PSI is not retained to perform these functions, PSI will not be responsible for the impact of those conditions on the geotechnical recommendations for the project.

The Geotechnical Engineer warrants that the findings, recommendations, specifications, or professional advice contained herein, have been presented after being prepared in accordance with generally accepted professional engineering practice in the fields of foundation engineering, soil mechanics and engineering geology. No other warranties are implied or expressed.

After the plans and specifications are complete, it is recommended that PSI be provided the opportunity to review the final design and specifications, in order to verify that the earthwork and recommendations are properly interpreted and implemented. At that time, it may be necessary to submit supplementary recommendations. This report has been prepared for the exclusive use of The City of Canton for the specific application to the proposed Sanitary Sewer Improvement Project along Faircrest Street S.W., between Sherman Church Avenue and Interstate 77, in the City of Canton, Stark County, Ohio.

## **APPENDIX**

Boring Location Plans

Boring Logs

Reports of Soil Analysis

General Notes

USCS Soil Classification Chart



Proposed Faircrest Sanitary Sewer  
Faircrest Avenue  
Canton, Ohio

Date: 05/13/2013

Drawn By: EO

Scale: NA

Boring Location  
Plan

PSI Project No: 0145630





**Boring Location  
Plan**

Date: 05/13/2013

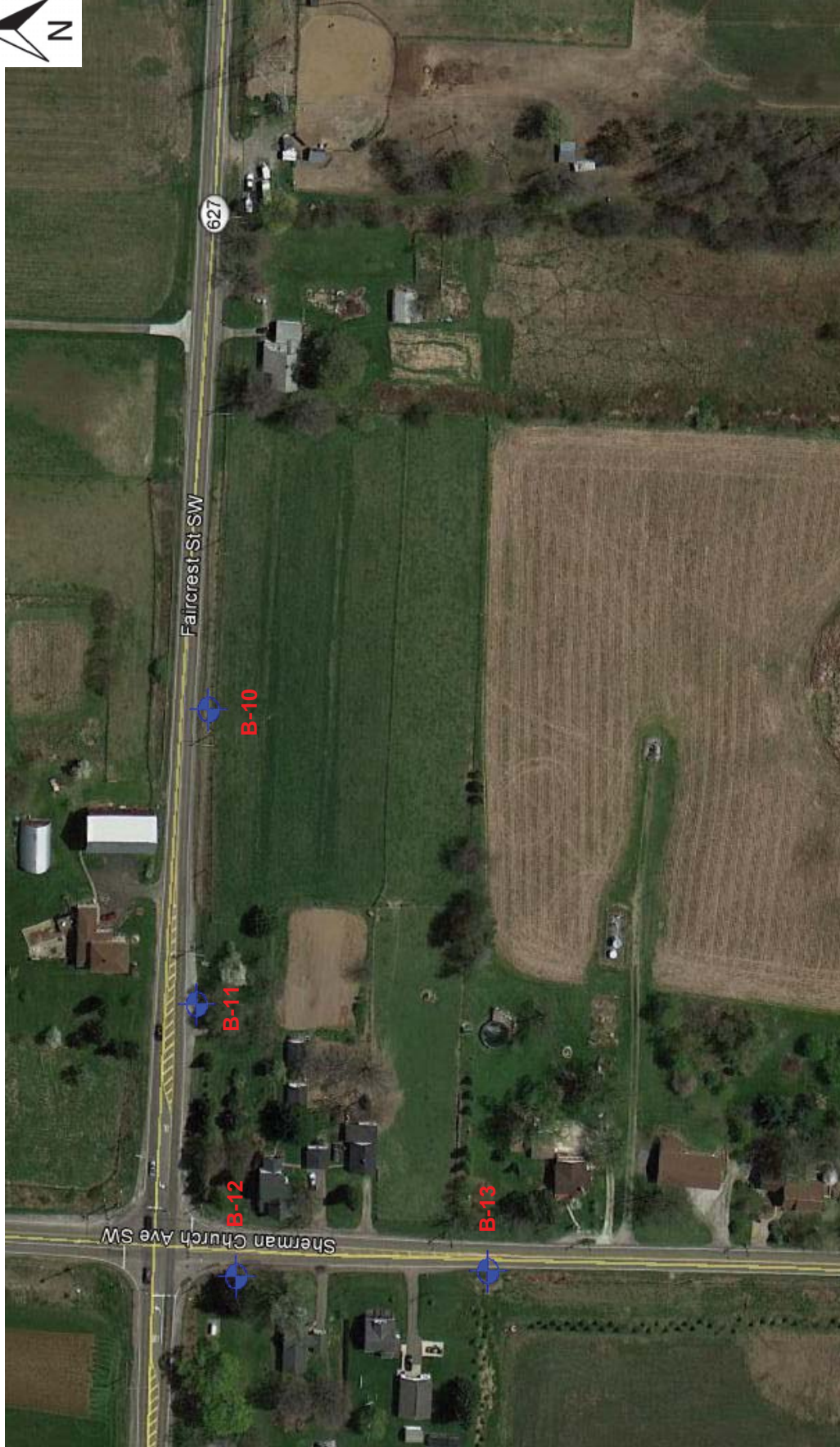
Drawn By: EO

Scale: NA

PSI Project No: 0145630

**Proposed Faircrest Sanitary Sewer  
Faircrest Avenue  
Canton, Ohio**

**PSI** *Information  
To Build On*  
Engineering • Consulting • Testing



**Boring Location  
Plan**

Date: 05/13/2013

Drawn By: EO

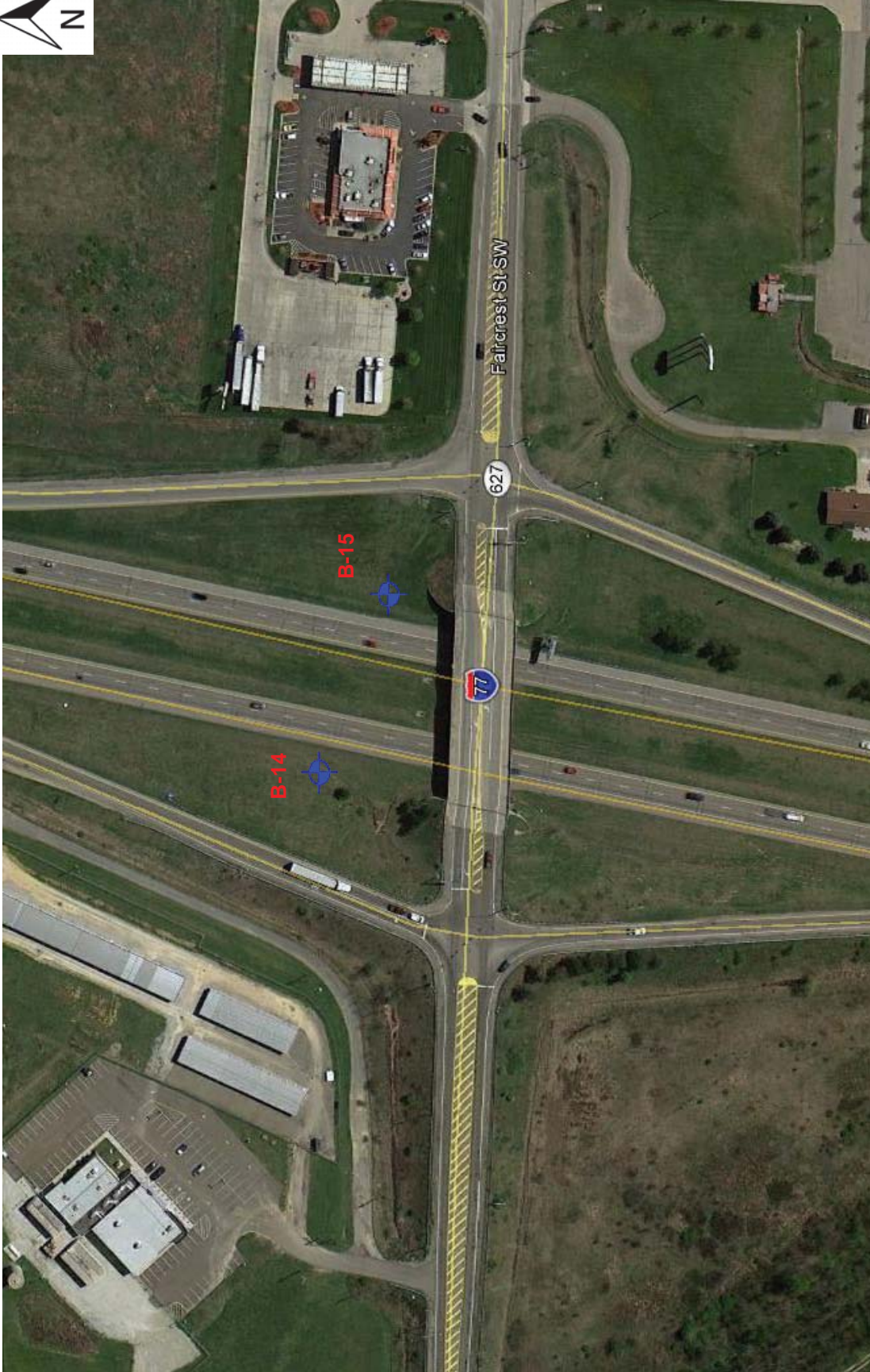
Scale: NA

PSI Project No: 0145630

**Proposed Faircrest Sanitary Sewer  
Faircrest Avenue  
Canton, Ohio**

**PSI** *Information  
To Build On*  
Engineering • Consulting • Testing





Proposed Faircrest Sanitary Sewer  
Faircrest Avenue  
Canton, Ohio

Date: 05/13/2013

Drawn By: EO

Scale: NA

Boring Location  
Plan

PSI Project No: 0145630



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 Canton, OH 44706  
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 Fax: (330) 478-3267

# LOG OF BORING B-1

Sheet 1 of 1

PSI Job No.: 0145630  
 Project: Faircrest Sanitary Sewer  
 Location: Faircrest Avenue  
 Canton, Stark County, Ohio

Drilling Method: 2.25" Hollow Stem Auger  
 Sampling Method: 2-in SS  
 Hammer Type: Automatic  
 Boring Location:

WATER LEVELS	
▽ While Drilling	13.5 feet
▼ Upon Completion	16.9 feet
▼ Delay	N/A

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	STANDARD PENETRATION TEST DATA		Additional Remarks
										N in blows/ft	Moisture, %	
0							2" GRAVEL and Silt	Base				
				1	14		Dense, Damp, Brown, Fine and Coarse SAND, Some Gravel, Trace to Little Silt	SP	8-6-5 N=10	7	⊗	
				2	18				9-17-25 N=42	15	⊗	
				3	8		Soft, Wet, Brown, SILT, Trace Sand, Trace Clay	ML	4-2-2 N=4	44	⊗	
				4	10		Loose, Wet, Brown, Fine and Coarse SAND, Some Silt and Clay, Trace Gravel	SP	1-2-2 N=4	23	⊗	Non-Plastic
				5	18		Loose, Moist, Brown, Fine and Coarse SAND, With Gravel	SP	6-5-3 N=8	9	⊗	
				6	18		Soft, Moist, Brown, SILT, Little to Trace Clay	ML	1-1-2 N=3	29	⊗	

Completion Depth: 20.0 ft  
 Date Boring Started: 5/23/13  
 Date Boring Completed: 5/23/13  
 Logged By: E.O.  
 Drilling Contractor: PSI, Inc.

Sample Types:  
 Auger Cutting  
 Split-Spoon  
 Rock Core  
 Shelby Tube  
 Hand Auger  
 Calif. Sampler  
 Texas Cone

Latitude:  
 Longitude:  
 Drill Rig: CME-55 ATV  
 Remarks: Borings backfilled with auger/soil cuttings  
 \*\* MOVED HOLE 26' WEST \*\*

The stratification lines represent approximate boundaries. The transition may be gradual.



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# LOG OF BORING B-2

Sheet 1 of 1

PSI Job No.: 0145630  
 Project: Faircrest Sanitary Sewer  
 Location: Faircrest Avenue  
 Canton, Stark County, Ohio

Drilling Method: 2.25" Hollow Stem Auger  
 Sampling Method: 2-in SS  
 Hammer Type: Automatic  
 Boring Location:

WATER LEVELS	
▽ While Drilling	13.5 feet
▼ Upon Completion	None
▼ Delay	N/A

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	STANDARD PENETRATION TEST DATA				Additional Remarks
										N in blows/ft		Moisture, %		
0							1.5" GRAVEL and Silt Soft to Medium Stiff, Moist to Wet, Brown, SILT, Little Clay	Base						
				1	18				32	32	32	32		
	5			2	9			ML	28	28	28	28		
				3	18				49	49	49	49		
	10			4	17		Medium Dense, Moist, Brown, Fine and Coarse SAND, With Gravel, Little Silt and Clay	SP	11	11	11	11		Non-Plastic
	15			5	18		Medium Stiff, Moist, Brown, SILT, Little to Some Clay, Trace Sand		26	26	26	26		
	20			6	18			ML	26	26	26	26		
	25			7	18		Very Soft to Medium Stiff, Moist, Brown, Silty CLAY, Trace Sand		28	28	28	28		
	30			8	18			CL	26	26	26	26		

Completion Depth: 30.0 ft  
 Date Boring Started: 5/23/13  
 Date Boring Completed: 5/23/13  
 Logged By: E.O.  
 Drilling Contractor: PSI, Inc.

Sample Types:  
 Auger Cutting  
 Split-Spoon  
 Rock Core  
 Shelby Tube  
 Hand Auger  
 Calif. Sampler  
 Texas Cone

Latitude:  
 Longitude:  
 Drill Rig: CME-55 ATV  
 Remarks: Borings backfilled with auger/soil cuttings

The stratification lines represent approximate boundaries. The transition may be gradual.



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# LOG OF BORING B-3

Sheet 1 of 1

PSI Job No.: 0145630  
 Project: Faircrest Sanitary Sewer  
 Location: Faircrest Avenue  
 Canton, Stark County, Ohio

Drilling Method: 2.25" Hollow Stem Auger  
 Sampling Method: 2-in SS  
 Hammer Type: Automatic  
 Boring Location:

WATER LEVELS	
▽ While Drilling	8.5 feet
▼ Upon Completion	23.3 feet
▽ Delay	N/A

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	STANDARD PENETRATION TEST DATA		Additional Remarks	
										N in blows/ft			
										Moisture, %		STRENGTH, tsf	
										X Moisture		▲ Qu * Qp	
										□ PL		+ LL	
										0 25 50		0 2.0 4.0	
0							2" TOPSOIL	Topsoil					
				1	18		Medium Stiff to Stiff, Very Moist, Brown, SILT, Little to Some Sand and Gravel, Trace to Little Clay	ML	7-4-2 N=6	26	○	X	
				2	16				3-4-6 N=10	31	○	X	
	5			3	18		Loose, Moist, Brown, Fine and Coarse SAND, Trace to Little Gravel, Trace to Little Silt		3-4-4 N=8	22	○	X	
				4	15				6-10-8 N=18	9	X	○	
	10			5	14		Medium Stiff to Stiff, Very Moist, Brown, Silty CLAY, Trace Sand	CL	3-4-5 N=9	14	○	X	
	15			6	18				6-4-5 N=9	24	○	X	
	20			7	14				1-2-2 N=4	30	○	X	
	25			8	18				4-3-3 N=6	28	○	X	
	30												

Completion Depth: 30.0 ft  
 Date Boring Started: 5/21/13  
 Date Boring Completed: 5/21/13  
 Logged By: E.O.  
 Drilling Contractor: PSI, Inc.

Sample Types:  
 Auger Cutting  
 Split-Spoon  
 Rock Core  
 Shelby Tube  
 Hand Auger  
 Calif. Sampler  
 Texas Cone

Latitude:  
 Longitude:  
 Drill Rig: CME-55 ATV  
 Remarks: Borings backfilled with auger/soil cuttings

The stratification lines represent approximate boundaries. The transition may be gradual.



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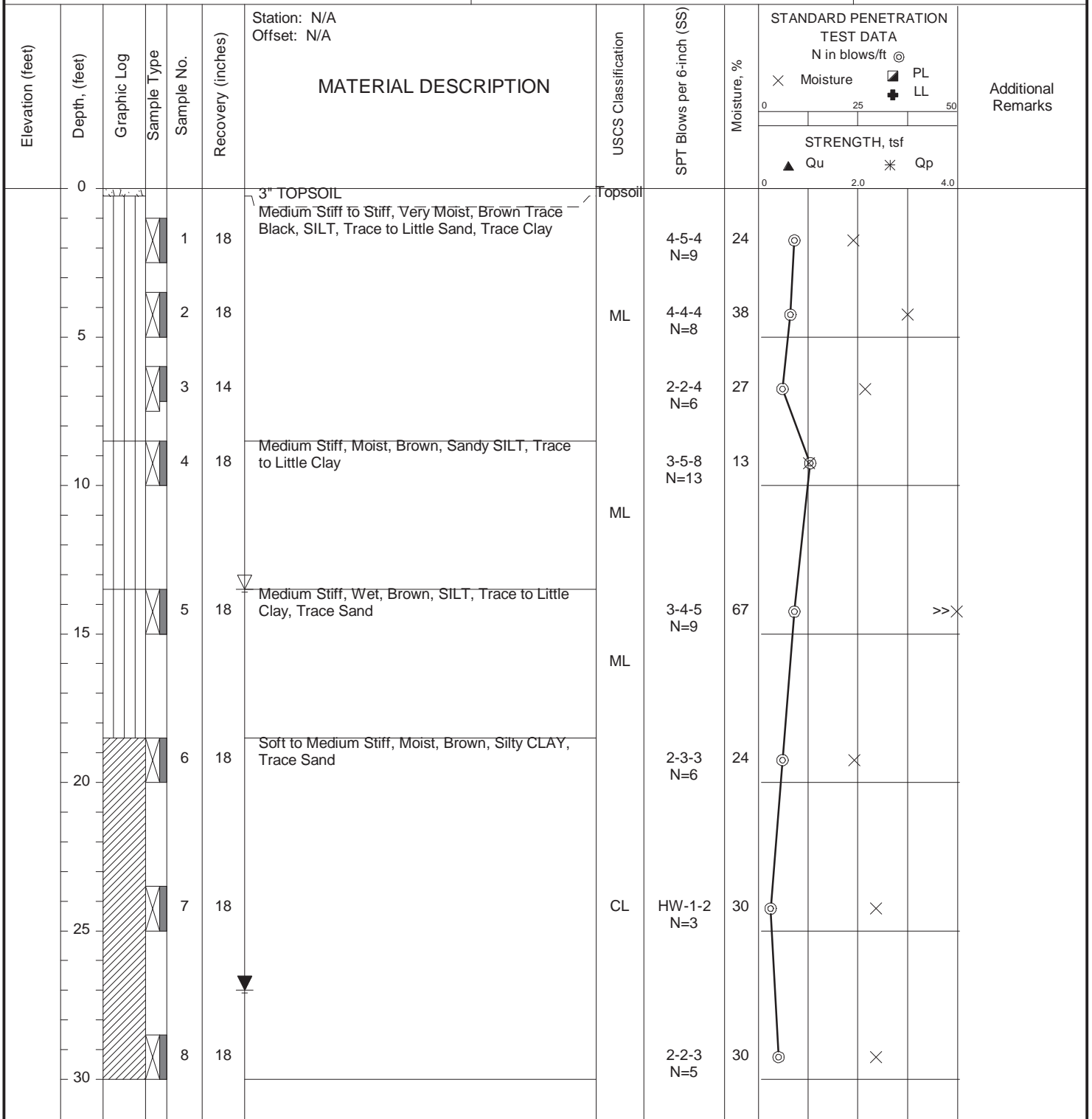
# LOG OF BORING B-4

Sheet 1 of 1

PSI Job No.: 0145630  
 Project: Faircrest Sanitary Sewer  
 Location: Faircrest Avenue  
 Canton, Stark County, Ohio

Drilling Method: 2.25" Hollow Stem Auger  
 Sampling Method: 2-in SS  
 Hammer Type: Automatic  
 Boring Location:

WATER LEVELS	
▽ While Drilling	13.5 feet
▼ Upon Completion	27.0 feet
▼ Delay	N/A



Completion Depth: 30.0 ft  
 Date Boring Started: 5/21/13  
 Date Boring Completed: 5/21/13  
 Logged By: E.O.  
 Drilling Contractor: PSI, Inc.

Sample Types:  
 Auger Cutting  
 Split-Spoon  
 Rock Core  
 Shelby Tube  
 Hand Auger  
 Calif. Sampler  
 Texas Cone

Latitude:  
 Longitude:  
 Drill Rig: CME-55 ATV  
 Remarks: Borings backfilled with auger/soil cuttings

The stratification lines represent approximate boundaries. The transition may be gradual.





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# LOG OF BORING B-5

Sheet 1 of 1

PSI Job No.: 0145630  
 Project: Faircrest Sanitary Sewer  
 Location: Faircrest Avenue  
 Canton, Stark County, Ohio

Drilling Method: 2.25" Hollow Stem Auger  
 Sampling Method: 2-in SS  
 Hammer Type: Automatic  
 Boring Location:

WATER LEVELS	
▽ While Drilling	8.5 feet
▼ Upon Completion	19.0 feet
▼ Delay	N/A

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	STANDARD PENETRATION TEST DATA				Additional Remarks
										N in blows/ft		STRENGTH, tsf		
0							3" TOPSOIL	Topsoil						
				1	18		Medium Stiff to Stiff, Moist, Brown, SILT, Trace to Little Clay, Trace Sand		6-4-4 N=8	21	○	×	*	
				2	18			ML	5-4-4 N=8	24	○	×	*	
				3	18				3-2-3 N=5	28	○	×		
				4	18	▽	Loose, Wet, Brown, Fine and Coarse SAND, Little Silt and Clay, Trace Gravel	SP	3-2-3 N=5	21	■	×		Non-Plastic
				5	18		Medium Stiff to Stiff, Moist, Brown, SILT, Trace to Little Clay, Some Sand		2-2-4 N=6	27	○	×		
				6	18	▼		ML	4-5-5 N=10	23	○	×		

Completion Depth: 20.0 ft  
 Date Boring Started: 5/22/13  
 Date Boring Completed: 5/22/13  
 Logged By: E.O.  
 Drilling Contractor: PSI, Inc.

Sample Types:  
 Auger Cutting  
 Split-Spoon  
 Rock Core  
 Shelby Tube  
 Hand Auger  
 Calif. Sampler  
 Texas Cone

Latitude:  
 Longitude:  
 Drill Rig: CME-55 ATV  
 Remarks: Borings backfilled with auger/soil cuttings

The stratification lines represent approximate boundaries. The transition may be gradual.



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# LOG OF BORING B-6

Sheet 1 of 1

PSI Job No.: 0145630  
 Project: Faircrest Sanitary Sewer  
 Location: Faircrest Avenue  
 Canton, Stark County, Ohio

Drilling Method: 2.25" Hollow Stem Auger  
 Sampling Method: 2-in SS  
 Hammer Type: Automatic  
 Boring Location:

WATER LEVELS	
▽ While Drilling	4.5 feet
▼ Upon Completion	None
▼ Delay	N/A

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	STANDARD PENETRATION TEST DATA		Additional Remarks
										N in blows/ft	Moisture, %	
0							3" TOPSOIL	Topsoil				
				1	18		Medium Stiff to Stiff, Moist, Brown, Sandy SILT, Trace Clay		3-5-6 N=11	15	⊗	
				2	18	▽		ML	3-5-4 N=9	21	⊗	×
	5			3	18				3-3-3 N=6	26	⊗	×
				4	18		Medium Stiff, Moist, Brown, Clayey SILT, Trace Sand		2-3-3 N=6	26	⊗	×
	10											
				5	18			ML	HW-2-2 N=4	26	⊗	×
	15											
				6	18				2-3-4 N=7	27	⊗	×
	20											

Completion Depth: 20.0 ft  
 Date Boring Started: 5/22/13  
 Date Boring Completed: 5/22/13  
 Logged By: E.O.  
 Drilling Contractor: PSI, Inc.

Sample Types:  
 Auger Cutting  
 Split-Spoon  
 Rock Core  
 Shelby Tube  
 Hand Auger  
 Calif. Sampler  
 Texas Cone

Latitude:  
 Longitude:  
 Drill Rig: CME-55 ATV  
 Remarks: Borings backfilled with auger/soil cuttings

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# LOG OF BORING B-7

Sheet 1 of 1

PSI Job No.: 0145630  
 Project: Faircrest Sanitary Sewer  
 Location: Faircrest Avenue  
 Canton, Stark County, Ohio

Drilling Method: 2.25" Hollow Stem Auger  
 Sampling Method: 2-in SS  
 Hammer Type: Automatic  
 Boring Location:

WATER LEVELS	
▽ While Drilling	6.0 feet
▼ Upon Completion	None
▼ Delay	N/A

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	STANDARD PENETRATION TEST DATA		Additional Remarks
										N in blows/ft	Moisture, %	
0							4" TOPSOIL Mixed With Gravel Stiff, Moist, Brown, Sandy SILT, Trace Gravel, Trace Clay	Topsoil				
				1	18			ML	4-4-4 N=8	14	⊗	
				2	10			ML	5-4-5 N=9	25	⊗	
				3	14	▽	Very Loose, Moist, Brown, Fine and Coarse SAND, Little Gravel, Trace Clay	SP	3-3-3 N=6	12	⊗	
				4	18		Stiff, Moist, Brown, SILT, Trace to Little Clay, Trace Sand	ML	3-4-5 N=9	26	⊗	
				5	18			ML	6-7-8 N=15	17	⊗	
				6	14		Strong, Brown, Highly Weathered SHALE	Shale	30-42-50/2"	8	⊗	

Completion Depth: 20.0 ft  
 Date Boring Started: 5/22/13  
 Date Boring Completed: 5/22/13  
 Logged By: E.O.  
 Drilling Contractor: PSI, Inc.

Sample Types:  
 Auger Cutting  
 Split-Spoon  
 Rock Core  
 Shelby Tube  
 Hand Auger  
 Calif. Sampler  
 Texas Cone

Latitude:  
 Longitude:  
 Drill Rig: CME-55 ATV  
 Remarks: Borings backfilled with auger/soil cuttings

The stratification lines represent approximate boundaries. The transition may be gradual.





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# LOG OF BORING B-8

Sheet 1 of 1

PSI Job No.: 0145630  
 Project: Faircrest Sanitary Sewer  
 Location: Faircrest Avenue  
 Canton, Stark County, Ohio

Drilling Method: 2.25" Hollow Stem Auger  
 Sampling Method: 2-in SS  
 Hammer Type: Automatic  
 Boring Location:

WATER LEVELS	
▽ While Drilling	6.0 feet
▼ Upon Completion	14.4 feet
▽ Delay	N/A

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	STANDARD PENETRATION TEST DATA		Additional Remarks
										N in blows/ft	Moisture, %	
0							3" TOPSOIL	Topsoil				
				1	18		Stiff to Very Stiff, Moist, Brown, Sandy SILT, Trace Clay	ML	7-6-6 N=12	16	⊗	>>*
				2	13			ML	7-9-9 N=18	14	⊗	*
				3	18		Stiff, Moist, Brown, SILT, Trace to Little Sand, Trace Clay	ML	4-4-5 N=9	24	⊗	×
				4	17		Loose, Moist, Brown, Fine and Coarse SAND, Trace to Little Gravel, Trace Clay	SP	3-3-2 N=5	22	⊗	×
				5	18		Very Weak to Strong, Dry, Brown, Highly Weathered SHALE, Trace Silt and Clay	Shale	12-22-50 N=72	10	⊗	>>⊗
				6	2				50/2"	7	⊗	>>⊗

Completion Depth: 18.7 ft  
 Date Boring Started: 5/22/13  
 Date Boring Completed: 5/22/13  
 Logged By: E.O.  
 Drilling Contractor: PSI, Inc.

Sample Types:  
 Auger Cutting  
 Split-Spoon  
 Rock Core  
 Shelby Tube  
 Hand Auger  
 Calif. Sampler  
 Texas Cone

Latitude:  
 Longitude:  
 Drill Rig: CME-55 ATV  
 Remarks: Borings backfilled with auger/soil cuttings

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# LOG OF BORING B-9

Sheet 1 of 1

PSI Job No.: 0145630  
 Project: Faircrest Sanitary Sewer  
 Location: Faircrest Avenue  
 Canton, Stark County, Ohio

Drilling Method: 2.25" Hollow Stem Auger  
 Sampling Method: 2-in SS  
 Hammer Type: Automatic  
 Boring Location:

WATER LEVELS	
▽ While Drilling	None
▼ Upon Completion	None
▼ Delay	N/A

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	STANDARD PENETRATION TEST DATA		Additional Remarks
										N in blows/ft	Moisture, %	
0							2" TOPSOIL	Topsoil				
				1	18		Stiff, Damp to Moist, Brown, SILT, With Trace to Little Sand and Gravel, Trace Clay	ML	6-6-5 N=11	12	⊗	
				2	18			ML	4-6-7 N=13	17	⊗	
5				3	18		Very Stiff, Damp, Brown, SILT, Trace Sand and Gravel (Possible Till)		7-12-17 N=29	10	⊗	
				4	18			ML	8-9-13 N=22	12	⊗	
10				5	10		Weak to Strong, Brown, Highly Weathered SHALE	Shale	25-50/4"	9	⊗	>>⊗
15				6	1			Shale	50/1"			>>⊗

Completion Depth: 18.6 ft  
 Date Boring Started: 5/23/13  
 Date Boring Completed: 5/23/13  
 Logged By: E.O.  
 Drilling Contractor: PSI, Inc.

Sample Types:  
 Auger Cutting  
 Split-Spoon  
 Rock Core  
 Shelby Tube  
 Hand Auger  
 Calif. Sampler  
 Texas Cone

Latitude:  
 Longitude:  
 Drill Rig: CME-55 ATV  
 Remarks: Borings backfilled with auger/soil cuttings

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# LOG OF BORING B-10

Sheet 1 of 1

PSI Job No.: 0145630  
 Project: Faircrest Sanitary Sewer  
 Location: Faircrest Avenue  
 Canton, Stark County, Ohio

Drilling Method: 2.25" Hollow Stem Auger  
 Sampling Method: 2-in SS  
 Hammer Type: Automatic  
 Boring Location:

WATER LEVELS	
▽ While Drilling	None
▼ Upon Completion	None
▼ Delay	N/A

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	STANDARD PENETRATION TEST DATA		Additional Remarks
										N in blows/ft	Moisture, %	
0							3" GRAVEL	Base				
				1			Loose, Damp, Dark Brown, SILT, Little to Some Rooting, Some Gravel ** Auger Sample	ML	4-5-5 N=10	4	⊗	
				2	18		Very Stiff, Damp, Brown, SILT, Little to Some Sand and Gravel, Trace Clay		8-9-10 N=19	13	⊗	
	5			3	18			ML	5-6-12 N=18	12	⊗	
				4	15				6-7-8 N=15	13	⊗	
	10						Strong, Brown, Highly Weathered SHALE	Shale	50/1"	9	⊗	>>⊗

Completion Depth: 13.6 ft  
 Date Boring Started: 5/24/13  
 Date Boring Completed: 5/24/13  
 Logged By: E.O.  
 Drilling Contractor: PSI, Inc.

Sample Types:  
 Auger Cutting  
 Split-Spoon  
 Rock Core  
 Shelby Tube  
 Hand Auger  
 Calif. Sampler  
 Texas Cone

Latitude:  
 Longitude:  
 Drill Rig: CME-55 ATV  
 Remarks: Borings backfilled with auger/soil cuttings

The stratification lines represent approximate boundaries. The transition may be gradual.



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# LOG OF BORING B-11

Sheet 1 of 1

PSI Job No.: 0145630  
 Project: Faircrest Sanitary Sewer  
 Location: Faircrest Avenue  
 Canton, Stark County, Ohio

Drilling Method: 2.25" Hollow Stem Auger  
 Sampling Method: 2-in SS  
 Hammer Type: Automatic  
 Boring Location:

WATER LEVELS	
▽ While Drilling	None
▼ Upon Completion	None
▼ Delay	N/A

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	STANDARD PENETRATION TEST DATA		Additional Remarks
										N in blows/ft	Moisture, %	
0							1.5" Limestone GRAVEL	Gravel				
				1	18		Stiff to Very Stiff, Damp Brown, SILT, Trace to Little Sand and Gravel, Trace Clay, Trace Rooting	ML	4-4-8	12	⊗	
			2	18		9-9-13			12	×	⊙	
			3	18		9-10-11			13	×	⊙	
			4	18		17-25-40		10	×	>>⊙		
				5	0		Very Strong, Brown, Highly Weathered SHALE	Shale	50/0"			>>⊙

Completion Depth: 13.5 ft  
 Date Boring Started: 5/24/13  
 Date Boring Completed: 5/24/13  
 Logged By: E.O.  
 Drilling Contractor: PSI, Inc.

Sample Types:  
 Auger Cutting  
 Split-Spoon  
 Rock Core  
 Shelby Tube  
 Hand Auger  
 Calif. Sampler  
 Texas Cone

Latitude:  
 Longitude:  
 Drill Rig: CME-55 ATV  
 Remarks: Borings backfilled with auger/soil cuttings  
 \*\* MOVED HOLE 26' WEST \*\*

The stratification lines represent approximate boundaries. The transition may be gradual.



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# LOG OF BORING B-12

Sheet 1 of 1

PSI Job No.: 0145630  
 Project: Faircrest Sanitary Sewer  
 Location: Faircrest Avenue  
 Canton, Stark County, Ohio

Drilling Method: 2.25" Hollow Stem Auger  
 Sampling Method: 2-in SS  
 Hammer Type: Automatic  
 Boring Location:

WATER LEVELS	
▽ While Drilling	None
▼ Upon Completion	None
▽ Delay	N/A

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	STANDARD PENETRATION TEST DATA		Additional Remarks
										N in blows/ft	Moisture, %	
0							1.5" GRAVEL	Base				
				1	18		Stiff to Very Stiff, Damp, Brown, SILT, Trace to Little Sand and Gravel, Trace to Little Highly Weathered Sandstone		5-5-5 N=10	6	×	
				2	18			ML	8-8-9 N=17	17	⊙	>>*
5				3	18				14-25-31 N=56	10	×	
				4	14		Very Weak, Brown, Highly Weathered SHALE	Shale	27-50-50 N=100	7	×	>>⊙
10										14	×	>>⊙

Completion Depth: 10.0 ft  
 Date Boring Started: 5/24/13  
 Date Boring Completed: 5/24/13  
 Logged By: E.O.  
 Drilling Contractor: PSI, Inc.

Sample Types:  
 Auger Cutting  
 Split-Spoon  
 Rock Core  
 Shelby Tube  
 Hand Auger  
 Calif. Sampler  
 Texas Cone

Latitude:  
 Longitude:  
 Drill Rig: CME-55 ATV  
 Remarks: Borings backfilled with auger/soil cuttings  
 \*\* MOVED HOLE 18' SOUTH \*\*

The stratification lines represent approximate boundaries. The transition may be gradual.



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# LOG OF BORING B-13

Sheet 1 of 1

PSI Job No.: 0145630  
 Project: Faircrest Sanitary Sewer  
 Location: Faircrest Avenue  
 Canton, Stark County, Ohio

Drilling Method: 2.25" Hollow Stem Auger  
 Sampling Method: 2-in SS  
 Hammer Type: Automatic  
 Boring Location:

WATER LEVELS	
▽ While Drilling	None
▼ Upon Completion	None
▼ Delay	N/A

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	STANDARD PENETRATION TEST DATA				Additional Remarks	
										N in blows/ft		Moisture, %			
0							Stiff to Very Stiff, Damp, Brown, SILT, Trace Sand and Gravel, Trace to Little Clay, Trace Sandstone	ML	6-5-4 N=9	16	⊗	×	*		
	5			1	18									⊗	×
				2	18				8-9-9 N=18	13		⊗	×	*	
				3	18		Very Weak to Slightly Strong, Brown, Highly Weathered SHALE	Shale	12-17-21 N=38	10		×		⊗	>>*
				4	14							20-25-50/4"	7		×

Completion Depth: 9.8 ft  
 Date Boring Started: 5/24/13  
 Date Boring Completed: 5/24/13  
 Logged By: E.O.  
 Drilling Contractor: PSI, Inc.

Sample Types:  
 Auger Cutting  
 Split-Spoon  
 Rock Core  
 Shelby Tube  
 Hand Auger  
 Calif. Sampler  
 Texas Cone

Latitude:  
 Longitude:  
 Drill Rig: CME-55 ATV  
 Remarks: Borings backfilled with auger/soil cuttings  
 \*\* MOVED HOLE 5' EAST \*\*

The stratification lines represent approximate boundaries. The transition may be gradual.



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# LOG OF BORING B-14

Sheet 1 of 1

PSI Job No.: 0145630  
 Project: Faircrest Sanitary Sewer  
 Location: Faircrest Avenue  
 Canton, Stark County, Ohio

Drilling Method: 2.25" Hollow Stem Auger  
 Sampling Method: 2-in SS  
 Hammer Type: Automatic  
 Boring Location:

WATER LEVELS	
▽ While Drilling	12.0 feet
▼ Upon Completion	10.9 feet
▽ Delay	N/A

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	STANDARD PENETRATION TEST DATA		Additional Remarks	
										N in blows/ft	Moisture, %		
0							2" TOPSOIL Very Stiff, Damp, Brown, SILT, Trace Clay, Trace Coal	Topsoil					
				1	18			ML	6-8-8 N=16	6	×	⊙	*
				2	18			ML	6-7-8 N=15	14	×	⊙	
				3	18		6" Black Coal Seam Hard, Damp, Gray, SILT, Trace to Little Clay, Trace Sand and Gravel	Coal	22-20-19 N=39	16	×	⊙	
				4	17		Very Weak, Gray, Highly Weathered Sandstone	ML	18-22-33 N=55	4	×	⊙	>>
								Sandstone					
				5	18		Very Weak, Gray, Highly Weathered Shale	Shale	18-22-16 N=38	3	×	⊙	

Completion Depth: 15.0 ft  
 Date Boring Started: 5/31/13  
 Date Boring Completed: 5/31/13  
 Logged By: E.O.  
 Drilling Contractor: PSI, Inc.

Sample Types:  
 Auger Cutting  
 Split-Spoon  
 Rock Core  
 Shelby Tube  
 Hand Auger  
 Calif. Sampler  
 Texas Cone

Latitude:  
 Longitude:  
 Drill Rig: CME-55 ATV  
 Remarks: Borings backfilled with auger/soil cuttings  
 \*\* MOVED HOLE 18' SOUTH \*\*

The stratification lines represent approximate boundaries. The transition may be gradual.



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# LOG OF BORING B-15

Sheet 1 of 1

PSI Job No.: 0145630  
 Project: Faircrest Sanitary Sewer  
 Location: Faircrest Avenue  
 Canton, Stark County, Ohio

Drilling Method: 2.25" Hollow Stem Auger  
 Sampling Method: 2-in SS  
 Hammer Type: Automatic  
 Boring Location:

WATER LEVELS	
▽ While Drilling	4.5 feet
▼ Upon Completion	8.0 feet
▽ Delay	N/A

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA		Additional Remarks
											N in blows/ft	Strength, tsf	
0							2" TOPSOIL	Topsoil					
				1	18		Very Weak, Gray, Highly to Severely Weathered SHALE	Shale	21-30-30 N=60	9	×	>>⊙	
				2	15	▽	Soft, Wet, Brown, Sandy CLAY, Trace Silt	CL	5-2-2 N=4	49	⊙	■	LL = 44 PL = 26
	5			3	9		Very Weak to Moderately Strong, Gray, SHALE	Shale	23-50/3"	26	×	>>⊙	
				4	3	▼			50/3"	3	×	>>⊙	

Completion Depth: 8.8 ft  
 Date Boring Started: 5/31/13  
 Date Boring Completed: 5/31/13  
 Logged By: E.O.  
 Drilling Contractor: PSI, Inc.

Sample Types:  
 Auger Cutting  
 Split-Spoon  
 Rock Core  
 Shelby Tube  
 Hand Auger  
 Calif. Sampler  
 Texas Cone

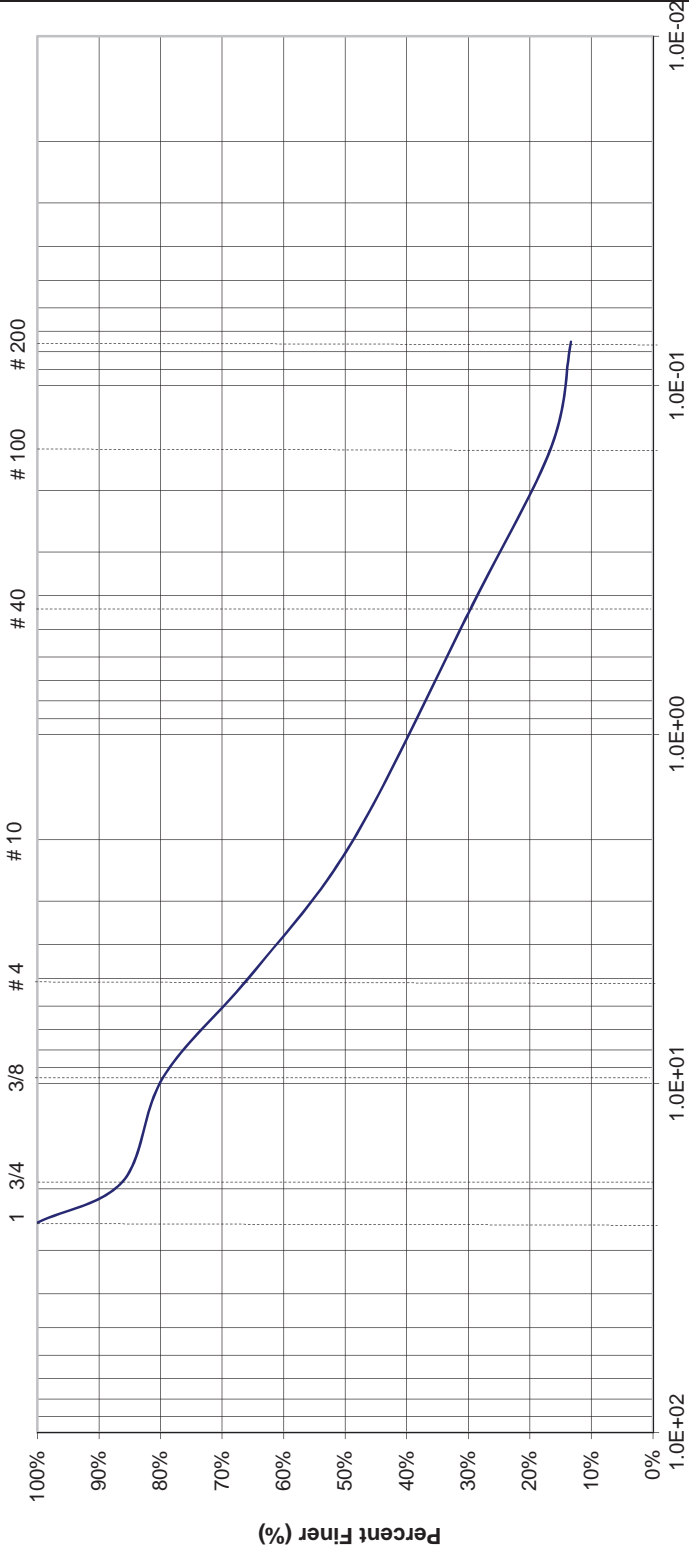
Latitude:  
 Longitude:  
 Drill Rig: CME-55 ATV  
 Remarks: Borings backfilled with auger/soil cuttings  
 \*\* MOVED HOLE 18' SOUTH \*\*

The stratification lines represent approximate boundaries. The transition may be gradual.





U.S. STANDARD SIEVE OPENINGS IN INCHES      U.S. STANDARD SIEVE NUMBERS      HYDROMETER



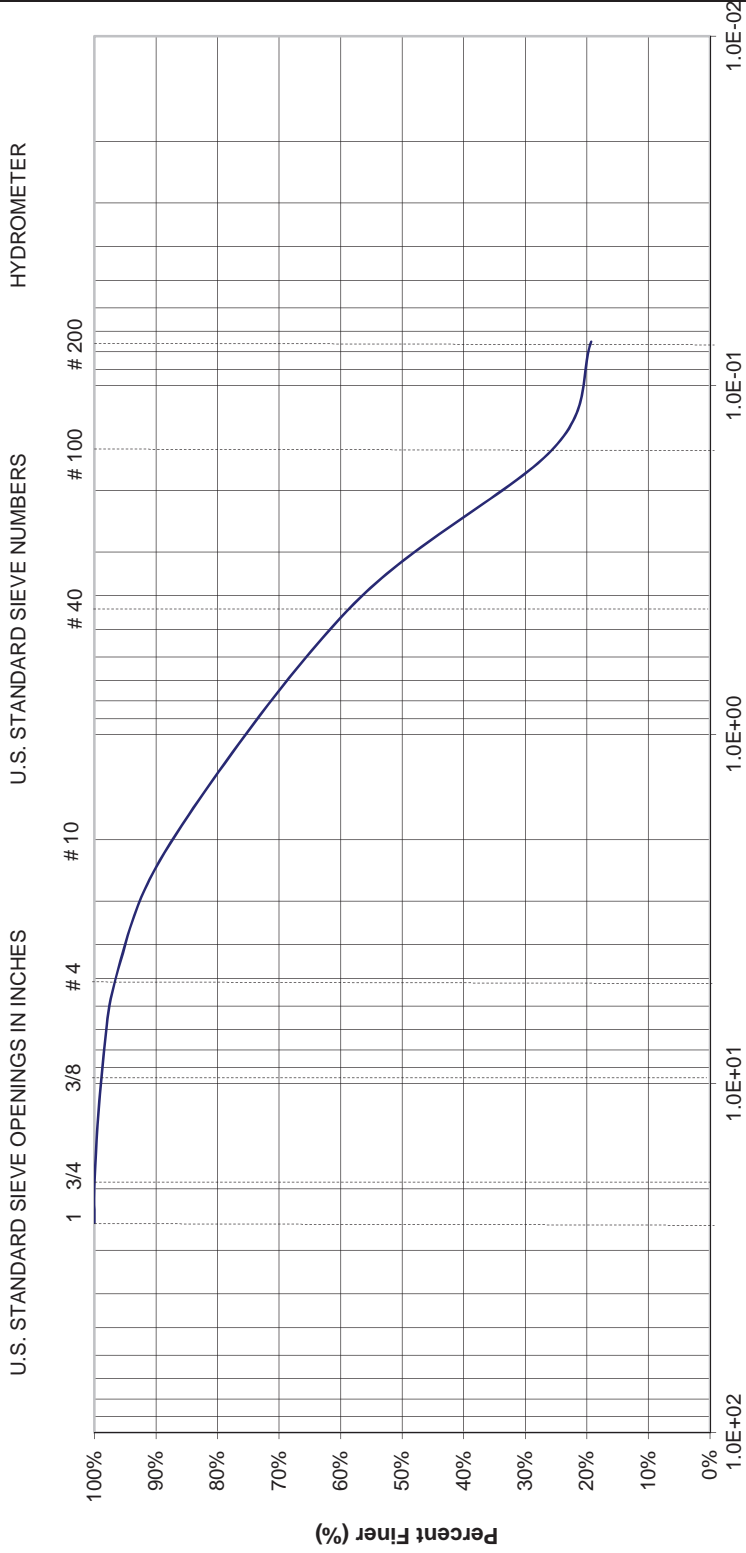
Particle Size Diameter (mm)

COBBLE	GRAVEL		SAND			SILT OR CLAY	
	COARSE	FINE	COARSE	MEDIUM	FINE		

Boring No.	Sample No.	Depth	Classification	Nat. w	LL	PL	PI	Project
B-2	SS-4	8.5 - 10.0'	Fine to Coarse SAND, With Gravel, Little Silt and Clay (SP)	11	NP	NP	NP	CTI Engineers Inc. Faircrest Avenue Sanitary Sewer Improvements Canton, Ohio
Max. Particle Size (in)								

**REPORT OF SOIL ANALYSIS**

File No. 0145-630



Particle Size Diameter (mm)

COBBLE	GRAVEL		SAND			SILT OR CLAY	
	COARSE	FINE	COARSE	MEDIUM	FINE		

Boring No.	Sample No.	Depth	Classification	Nat. w	LL	PL	PI	Project
B-5	SS-4	8.5 - 10.0'	Fine to Coarse SAND, Trace Gravel, Little Silt and Clay (SP)	21	NP	NP	NP	CTI Engineers Inc. Faircrest Avenue Sanitary Sewer Improvements Canton, Ohio
Max. Particle Size (in)								

**REPORT OF SOIL ANALYSIS**

File No. 0145-630




## GENERAL NOTES

### SAMPLE IDENTIFICATION

The Unified Soil Classification System is used to identify the soil unless otherwise noted.

### SOIL PROPERTY SYMBOLS

- N: Standard "N" penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2 inch O.D. split-spoon.
- Qu: Unconfined compressive strength, tsf.
- Qp: Penetrometer value, index value of unconfined compressive strength, tsf.
- Mc: Water content, %.
- PL: Plastic limit, %.
- LL: Liquid Limit, %.
- PI: Plasticity Index.
- $\gamma_d$ : Natural dry density, pcf.
-  Groundwater level observed at time noted after completion of boring.

### DRILLING AND SAMPLING SYMBOLS

- SS: Split-Spoon – 1 3/8" I.D., 2" O.D., except where noted.
- ST: Shelby Tube – 3" O.D., except where noted.
- AU: Auger Sample.
- DB: Diamond Bit.
- CB: Carbide Bit.
- WS: Washed Sample.






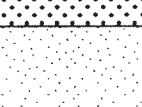
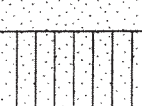


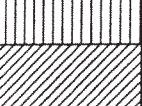
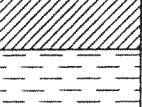



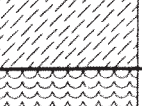

### RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION (Terzaghi & Peck, 1948)

<u>TERM (COHESIONLESS SOILS)</u>	<u>STANDARD PENETRATION RESISTANCE</u>
Very Loose	0 – 4
Loose	4 – 10
Medium	10 – 30
Dense	30 – 50
Very Dense	Over 50
<u>TERM (COHESIVE SOILS)</u>	<u>Qu – (TSF)</u>
Very Soft	0 – 0.25
Soft	0.25 – 0.50
Medium	0.50 – 1.00
Stiff	1.00 – 2.00
Very Stiff	2.00 – 4.00
Hard	4.00+

### PARTICLE SIZE (ASTM D2487 AND D422)

Boulders $\geq$ 12 in. (300mm)	Medium Sand <2mm (10 sieve) to 425 $\mu$ m (#40 sieve)
Cobbles < 12 in.(300mm) to 3 in. (75mm)	Fine Sand <425 $\mu$ m (#40 sieve) to 75 $\mu$ m (#200 sieve)
Gravel < 3 in. (75mm) to 4.75mm (#4 sieve)	Silt <75 $\mu$ m (#200 sieve) to 5 $\mu$ m
Coarse Sand <4.75mm (#4 sieve) to 2mm (#10 sieve)	Clay <5 $\mu$ m

# SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS	
			GRAPH	LETTER		
<p><b>COARSE GRAINED SOILS</b></p> <p>MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE</p>	<p>GRAVEL AND GRAVELLY SOILS</p> <p>(LITTLE OR NO FINES)</p>	CLEAN GRAVELS		<b>GW</b>	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES	
		(LITTLE OR NO FINES)		<b>GP</b>	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES	
		GRAVELS WITH FINES		<b>GM</b>	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES	
	<p>MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE</p>	<p>GRAVELS WITH FINES</p> <p>(APPRECIABLE AMOUNT OF FINES)</p>	(APPRECIABLE AMOUNT OF FINES)		<b>GC</b>	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
			CLEAN SANDS		<b>SW</b>	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			(LITTLE OR NO FINES)		<b>SP</b>	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
	<p>MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE</p>	<p>SANDS WITH FINES</p> <p>(APPRECIABLE AMOUNT OF FINES)</p>	SANDS WITH FINES		<b>SM</b>	SILTY SANDS, SAND - SILT MIXTURES
			(APPRECIABLE AMOUNT OF FINES)		<b>SC</b>	CLAYEY SANDS, SAND - CLAY MIXTURES
			SANDS WITH FINES		<b>ML</b>	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
	<p><b>FINE GRAINED SOILS</b></p> <p>MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE</p>	<p>SILTS AND CLAYS</p> <p>LIQUID LIMIT LESS THAN 50</p>	(LIQUID LIMIT LESS THAN 50)		<b>CL</b>	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
(LIQUID LIMIT LESS THAN 50)				<b>OL</b>	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	
(LIQUID LIMIT LESS THAN 50)				<b>MH</b>	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS	
<p>SILTS AND CLAYS</p> <p>LIQUID LIMIT GREATER THAN 50</p>		<p>LIQUID LIMIT GREATER THAN 50</p>	(LIQUID LIMIT GREATER THAN 50)		<b>CH</b>	INORGANIC CLAYS OF HIGH PLASTICITY
			(LIQUID LIMIT GREATER THAN 50)		<b>OH</b>	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
			(LIQUID LIMIT GREATER THAN 50)		<b>PT</b>	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS
<p>HIGHLY ORGANIC SOILS</p>				<b>PT</b>	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS	

NOTE DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

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**Section VII: Project Utility Note**

It is the sole responsibility of the contractor to coordinate and insure the relocation of and/or modifications to all utilities. The City is not responsible for any cost associated with the non-timely relocation or delays caused by utility work or the cost of the relocation work itself.

**Project Utility Note:**

Excusable, Non-Compensable Delays shall be in accordance with ODOT Specification 108.06B, and shall include any delays due to utility interference within the project limits. No compensation will be allowed for utility delays.

Bidders are advised that the following utility companies or entities may have facilities in the project area:

**Dominion East Ohio (DEO)**

**Enervest Gas**

**Marathon Pipe Line**

**Time Warner Cable**

**City of Canton Engineering Department (Sanitary & Storm)**

**City of Canton Traffic Engineering Department**

**AT&T**

**American Electric Power (AEP)**

**City of Canton Water**

Contact information for the above utilities is found on plan sheet C5.

The locations of the utilities shown in the project construction plans are the original locations and may not be the current locations in the field. Contractor should coordinate all activities that may be in conflict with the appropriate utility owner. Furthermore, the Contractor must notify OUPS (1-800-362-2764) and also contact any non-members directly before performing any digging on the project.

All utility coordination and necessary work by the utility company or contractor shall be addressed in accordance with applicable construction plan notes and contract documents.

**Marathon and Enervest.** No excavation activity is permitted within 50 feet of Marathon Pipe Line and Enervest Gas lines without a representative from the respective company on site. Marathon Pipe Line and Enervest Gas are responsible for all costs related to their on-site representative. See sheets C11 and C14 for location of these pipe lines. As noted on the plan, maintain 2 feet minimum vertical separation between exist Marathon Gas and 8" SAN and 6" FM.

**AEP transmission towers** are shown on sheet C11. It is the Contractor's responsibility by their means and method of installing the sanitary sewer to not adversely affect the integrity of the tower foundation and support. The City will not pay additional expenses that may be incurred to

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assure said foundation support.

**AT&T Fiber Optic** is shown on Sheet C11. Contractor is required to expose this Fiber Optic Cable prior to construction where crossing may occur.

**Traffic Signal.** As noted on the plan, temporary bracing will be required on an existing strain pole at the southeast corner of Faircrest/ Sherman Church for the installation of the force main through that area. Contractor will not be required to replace traffic loops in conflict with sewer alignment, but must coordinate work with the Canton City Traffic Signal Division.

**Dominion East Ohio** has gas line as shown on Sheets C8, C9, C11 & C14 that may cross the new sewer(s) construction. Contractor is required to be aware of these locations these locations during construction.

These notes are for the benefit of the contractor. Other utilities may be present. Futhermore, actual location of these utilities is the Contractor's responsibility. Additional information may be found in CONSTRUCTION INCIDENTALS found on Sheet C5.

See General Notes page C5 of the plans for additional Utility Note Details.



## **Section VIII: Change Order Policy**

### Canton Engineering Change Order Policy

The need for a Change Order for work or materials not included in the scope of the contract or exceeding plan quantities may occur at any time during the contract. The LPA Construction Manager or the LPA Contractor may initiate the Change Order process. The LPA Project Inspector will document the date that the change is first encountered. The LPA Construction Manager will determine if a change in the contract is needed. (Note: LPA Project Inspector may be a Consultant Construction Contract Administrator or the Canton Project Inspector assigned to the project.) The project record shall include record of all changes.

Change Orders will be categorized into the following Tiers:

Tier 1: A quantity adjustment for projects less than \$500,000.00 cannot exceed \$25,000.00 to qualify as a Tier 1 Change Order. A quantity adjustment for projects greater than \$500,000.00 cannot exceed the lesser of 5% or \$100,000.00 to qualify as a Tier 1 Change Order. The change of the quantities will be adjusted on a Change Order that will address these changes after an accumulation of adjustments for the project is received. Requests for adjustment may occur at any time before the final payment is made.

Tier 2: Changes that cannot be addressed using contract unit prices, exceed the Tier 1 limits, extend the contract limits, or change the environmental impact will be presented formally on a Change Order. Contractor shall submit an estimated cost and scope of the work to be performed to the LPA Project Manager. The LPA Project Manager will assemble the documentation, including purpose and analysis of the cost of the proposed change for submission to the LPA Construction Manager. LPA Construction Manager shall review the submitted documentation for availability of funds, acceptability of costs and need for the said changes. Further, the LPA Construction Manager will secure concurrence from ODOT Construction Monitor and make recommendation to the Canton City Engineer for acceptance.

The Change Order will then be recommended to the Board of Control for approval. If the sum of all Change Orders exceeds the lesser of \$100,000.00 or 10% of the total of the original contract cost, the Change Order will be presented to the Canton City Council for approval before being submitted to the Board of Control.

Execution of the work will not be performed until authorization is given to the contractor from the LPA. In the event that an agreed price cannot be negotiated, LPA will adhere to force account procedures.

Authorization of Change Order Work:

Tier 1: The Canton City Engineering will authorize the work prior to submission of the Change Order. Contractor cannot proceed until such authorization.

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Tier 2: The contractor must receive written authorization, from the Canton City Engineer, before the execution of any of the Change Order work. This authorization will not be given until the Change Order has been approved by the Board of Control, Canton City Council, and ODOT, as needed. The Canton City Engineer may override Tier 2 Authorization procedure for any circumstances to assure safety, environment, or protection of property.

NOTE: Canton City Council must approve all Change Orders prior to authorization for both Tier 1 and Tier 2 should the individual or aggregate cost of all Change Orders exceed the lesser of 100,000.00 or 10% of the project original cost.

## **Section IX: Claims Management Policy**

### City of Canton Engineering Department’s Claims Management Policy

The City of Canton recognizes the need to contend with claims experienced by the contractor that are not addressed by the contract. This policy acts as directive to provide stability and expertise in the management of its claims and to ensure they are investigated, evaluated, and resolved in a timely and professional manner.

#### Claims

A dispute is not identified as a claim until a *Notice of Intent to File a Claim*. The *Notice of Intent to File a Claim* cannot be made until Steps 1 and 2 are completed. A claim is defined as formal assertion by the contractor for something due or believed to be due to the contractor. This claim may include monetary compensation and/or time extension for the completion of the contract. All claims must be presented by the Prime Contractor. Claims submitted by a sub-contractor or supplier against the City or Prime Contractor shall not be accepted.

#### Purpose

This policy attempts to resolve disputes in a fair and cost-effective manner. The documentation resulting from this procedure will provide information needed to make a reasonable and unbiased decision. City of Canton Engineering acknowledges that costs can be kept to a minimum when the resolution is found at the departmental level.

#### Process

The Contractor must follow this policy to be eligible for any compensation (time or monetary) for any and all claims not covered by the Change Order Policy. All steps in the policy must be completed prior to moving to the next step. The Contractor shall continue with all Work, including that which is in dispute. The City will continue to pay for work being performed.

Prior to entering into the formal claim resolution process, both the contractor superintendent and the City’s Inspector and Construction Manager agree to attempt to resolve any disputes in a good faith effort that is fair and equitable to both the contractor and the City within the guidelines and requirements established by the contract. If this good faith effort does not resolve the problem, the contractor may proceed into the Claims Management Procedure.

#### Step 1 City Project Manager

The City Project Manager shall meet with the Contractor’s superintendent and City Construction Inspector within two (2) working days of receipt of the Contractor Written Early Notice set forth in 104.02.G of the ODOT Construction and Material Specifications. The City Project Manager will negotiate in an effort to reach a resolution according to the Contract Documents. The City Project Manager will issue a written decision of Step 1 within fourteen (14) calendar days of the meeting. If the dispute is not resolved, the Contractor must either abandon or escalate the dispute to Step 2. The claim along with all pertinent information and contract provisions shall be presented to the City Project Manager by the contractor and City representatives.

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**Step 2 City Engineer**

Within seven (7) calendar days of receipt of the Step 1 decision, the Contractor must submit a written request for a Step 2 meeting to the City Engineer. The City Engineer will assign the dispute a dispute number. Within fourteen (14) calendar days of receipt of the request for a Step 2 meeting, the Contractor shall submit the Dispute Documentation as follows:

1. The Contractor shall submit three (3) complete copies of the documentation of the dispute to the City Engineer.
2. The Dispute Documentation shall be identified on a cover page by G.P.# (project number), Contractor name, subcontractor or supplier if involved in the dispute, and dispute number.
3. The Dispute Documentation shall be an original document that clearly and in detail gives the required information for each item of additional compensation and time extension requested.
4. A narrative of the disputed work or project circumstance at issue. This section must include the dates of the disputed work and the date of early notice.
5. References to the applicable provisions of the plans, specifications, proposal, or other contract documents. Copies of the cited provisions shall be included in the Dispute Documentation.
6. The dollar amount of additional compensation and length of contract time extension being requested.
7. The cost and supporting documents that served as the basis for the requested compensation stated in number six (6) above.
8. A detailed schedule analysis must be included in the Dispute Documentation for any dispute concerning additional contract time, actual or constructive acceleration, or delay damages. At a minimum, the schedule analysis must include the Schedule Update immediately preceding the occurrence of the circumstance alleged to have caused delay and must comply with accepted industry practices. Failure to submit the required schedule analysis will result in the denial of that portion of the Contractor's request.
9. Copies of relevant correspondence and other pertinent documents.

The City Engineer shall review and recommend a resolution to the claim. If recommended by the City Engineer, the process will cease and the claim will be processed as a Change Order. Otherwise, the City Engineer will meet with the contractor's representative, the City Project and Construction Managers within fourteen (14) days to hear each party's stance and as a last chance

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opportunity to resolve the claim before escalating to Step 3. The City Engineer will issue a written determination of Step 2 to the contractor and project file within fourteen (14) days. If the dispute is not resolved, the Contractor must either abandon or escalate the dispute to Step 3.

**Step 3 Canton Service Director**

Within fourteen (14) calendar days of receipt of the Step 2 decision, the Contractor must submit a written *Notice of Intent to File a Claim* to the Canton City Service Director. This notice shall state the Contractor's request for a Canton Service Director hearing on the claim. The dispute becomes a claim when the Service Director receives the *Notice of Intent to File a Claim*. The City of Canton Law and Purchasing Departments will provide advice to the Canton Service Director. The Canton Service Director will be responsible for deciding claims.

The Contractor shall submit six (6) complete copies of its Claim Documentation to the City Engineer within thirty (30) calendar days of receipt of the *Notice of Intent to File a Claim*. This time frame may be extended upon mutual agreement of the parties and with approval of the Committee. In addition to the documentation submitted at Step 2, the narrative shall be enhanced to include sufficient description and information to enable understanding by a third party who has no knowledge of the dispute or familiarity with the project. This documentation must also include a discussion of the efforts taken to resolve the dispute. When submitting the Claim Documentation, the Contractor must certify the claim in writing. Such certification shall attest to the following:

1. The claim is made in good faith.
2. To the best of the Contractor's knowledge, all data offered to support the claim is accurate and complete.
3. The claim amount accurately reflects the Contractor's actual incurred costs and additional time impacts.

This claim certification shall also be notarized pursuant to the laws of the State of Ohio. The following is an example of the correct form for a claim certification:

*(The Contractor) certifies that this claim is made in good faith, that all supporting data is accurate and complete to the best of (the Contractor's) knowledge and belief, and that the claim amount accurately reflects the contract amendment for which (the Contractor) believes the City of Canton is liable.*

By: \_\_\_\_\_

*(The Contractor, Name and Title)*

*Date of Execution:* \_\_\_\_\_

Within thirty (30) calendar days of receipt of the Contractor's Claim Documentation, the City Engineer shall submit six (6) complete copies of its Claim Documentation to the Canton Service Director. In the event that the Contractor is granted a time extension for the submission of its Claim Documentation, the City Engineer will be granted an equal time extension for

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submission of its Claim Documentation. At a minimum, the City Engineer's Claim Documentation must include:

1. A narrative of the disputed work or project circumstance at issue with sufficient description and information to enable understanding by a third party who has no knowledge of the dispute or familiarity with the project. This section must include the dates of the disputed work and the date of early notice. The narrative must also discuss the prior efforts taken to resolve the dispute.
2. References to the applicable provisions of the plans, specifications, proposal, or other contract documents. Copies of the cited provisions shall be included in the claim document.
3. Response to each argument set forth by the Contractor.
4. Any counter-claims, accompanied by supporting documentation, the Canton Service Director Claims Committee wishes to assert.
5. Copies of relevant correspondence and other pertinent documents.

Within fourteen (14) calendar days of receipt of the Construction Manager's Claim Documentation, the City Engineer will forward one (1) complete copy to the Contractor and will schedule a hearing on the dispute. Once a hearing date has been established, both the Contractor and Construction Manager shall provide the Canton City Engineer with the list of names and telephone numbers of each person who may present information at the hearing. Reasonable time, generally not to exceed 60 days, will be provided for submission and review of additional documentation by either party prior to the hearing date. However, unless otherwise permitted by the Committee, the exchange of documentation and all disclosures specified in this step of the process shall be completed at least fourteen (14) calendar days prior to the hearing. Upon request or at the Committee's discretion, the Committee may delay the hearing one (1) time to allow more time for review and requests for more documentation. In the event of multiple claims, the Committee may order that they be considered in a single hearing. The Committee may hold this hearing after the completion of the project or until such time that it is assured that all disputes on the project have been processed through Steps 1 and 2. The Contractor and Construction Manager will each be allowed adequate time to present their respective positions before the Committee. The Contractor and Construction Manager will also each be allowed adequate time for one (1) rebuttal limited to the scope of the opposing party's presentation. The Contractor's position will be presented by a Contractor's representative who is thoroughly knowledgeable of the claim. Similarly, the Construction Manager's position will be presented by the Construction Manager or a representative who is thoroughly knowledgeable of the claim. Each party may have others assist in the presentation. The Committee may, on its own initiative, request information of the Contractor in addition to that submitted for the hearing. If the Contractor fails to reasonably comply with such request, the Committee may render its decision without such information. Upon completion of the hearing and consideration of any additional information submitted upon request, the Committee will submit a written recommendation on the disposition of the claim to the Canton Service Director. The Canton Service Director will ratify, modify, or reject the recommendation of the Committee and render its decision within sixty (60) calendar days of the hearing. Within thirty (30) calendar days of receipt of the Committee's decision, the Contractor must either accept or reject the decision in writing. In the event the Contractor fails to

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do so, the Committee may revoke any offers of settlement contained in the decision. The decision of the Committee is the final step of Canton Engineering Department Dispute Resolution Process and may not be appealed within the Department. The Committee is not bound by any offers of settlement or findings of entitlement made during Steps 1 and 2 of the Dispute Resolution Process.

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**Section X: Signature and Proposal Pages**

**Signature Page**  
**GP 1142 Faircrest Sanitary Sewer Project**

To the City of Canton Public Service Director:

The undersigned, having carefully examined the complete bid packet, herewith propose to furnish all the labor and materials required to complete the **GP 1142 Faircrest Sanitary Sewer Project** in accordance with the specifications on file, including any and all work and materials that may be necessary to complete the project in a proper and workmanlike manner, and in accordance with the instructions in the bid packet and under the direction of and to the satisfaction of the Canton Public Service Director.

The bidder hereby agrees that the Director has the right to reject any and all bids and to accept the bid(s) deemed most beneficial to the City of Canton.

The bidder hereby certifies that the undersigned \_\_\_\_\_ is the only person interested in the bid and the bidder herewith certifies that no officer or employee of the City of Canton is in any manner interested therein.

The bidder agrees, that should said bid (s) be accepted, to enter into the prescribed contract within ten (10) days from and after the date of service of notice of such acceptance, for the faithful performance of the labor and furnishing of the materials in such bid or bids so accepted, and to fully complete the said work within \_\_\_\_\_ working days from and after the date of notice from the Director to commence the work.

The bidder herewith encloses a \_\_\_\_\_ **(BID BOND, CERTIFIED/CASHIER'S CHECK)** in the sum of \$ \_\_\_\_\_ dollars made payable to the CITY OF CANTON as a guarantee that if awarded the contract for the work included in the proposal, \_\_\_\_\_ will enter into contract therefore, with sureties satisfactory to the Director, within the prescribed time of ten (10) days from the date of service of notice of award, otherwise such bond or checks shall become the property of said City, as liquidated damages of the failure on the bidder's part to do said contract within the specified time.

The bidder acknowledges receipt of Addenda Numbers: \_\_\_\_\_

SIGNATURE OF BIDDER: \_\_\_\_\_

**NOTE:** If bidder is a corporation, set forth the legal name of the corporation, together with the signature of the officer or officers authorized to sign contracts on behalf of the corporation. If bidder is a partnership, set forth the name of the firm, together with the signature of the partner or partners authorized to sign contracts on behalf of the partnership.

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**Proposal Page**

We (I), the below signed hereby propose to furnish the following article(s) and/or service(s) at the price(s) and terms stated subject to all instructions, conditions, specifications, and all attachments hereto. We (I) have read all attachments including the specifications and fully understand what is required.

<b>Ref #</b>	<b>Item No.</b>	<b>Description</b>	<b>Units</b>	<b>Quantity</b>	<b>Unit Price</b>	<b>Total Price</b>
<b>1</b>	<b>ODOT 624</b>	<b>Mobilization/Demobilization</b>	<b>LS</b>	<b>1</b>		
<b>2</b>	<b>02110</b>	<b>Site Clearing</b>	<b>LS</b>	<b>1</b>		
<b>3</b>	<b>ODOT 623</b>	<b>Construction Staking</b>	<b>LS</b>	<b>1</b>		
<b>4</b>	<b>02270</b>	<b>Erosion Control</b>	<b>LS</b>	<b>1</b>		
<b>5</b>	<b>02485</b>	<b>Seeding And Mulching</b>	<b>LS</b>	<b>1</b>		
<b>6</b>	<b>ODOT 614</b>	<b>Maintaining Traffic</b>	<b>LS</b>	<b>1</b>		
<b>7</b>	<b>02200</b>	<b>Rock Excavation, Contingency</b>	<b>CY</b>	<b>100</b>		
<b>8</b>	<b>02500</b>	<b>Pavement Removal Including Saw Cutting</b>	<b>SY</b>	<b>150</b>		
<b>9</b>	<b>02567</b>	<b>Manhole And Lift Station Wet Well Sealing With Protective Polymer Lining</b>	<b>VF</b>	<b>52</b>		
<b>10</b>	<b>02830</b>	<b>Chain Link Fence And Gates, Complete</b>	<b>LF</b>	<b>240</b>		
<b>11</b>	<b>11313</b>	<b>Faircrest Lift Station, Complete</b>	<b>LS</b>	<b>1</b>		
<b>12</b>	<b>16010</b>	<b>Faircrest Lift Station Electrical, Complete</b>	<b>LS</b>	<b>1</b>		

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<b>Ref #</b>	<b>Item No.</b>	<b>Description</b>	<b>Units</b>	<b>Quantity</b>	<b>Unit Price</b>	<b>Total Price</b>
13	ODOT 304	Limestone, 6 Inches For Pump Station And Road Crossing	CY	144		
14	ODOT 301	Asphalt Concrete Base Coarse, Variable Thickness	CY	84		
15	ODOT 448	Asphalt Concrete Intermediate Coarse, 1.75 Inches	CY	8		
16	ODOT 448	Asphalt Concrete Surface, Variable Thickness	CY	21		
17	ODOT 604	Manhole Exterior Waterproofing, Coal Tar	VF	100		
18	ODOT 611	Misc. Drain Replacement Contingency, 4-6 Inch	LF	15		
19	ODOT 611	Misc. Drain Replacement Contingency, 8-10 Inch	LF	15		
20	ODOT 611	Misc. Drain Replacement Contingency, 12-18 Inch	LF	15		
21	02620	Sanitary Sewer, 8 Inch HDPE, Directionally Drilled	LF	278		
22	02630	Sanitary Sewer, 8 Inch PVC	LF	1856		
23	02630	Sanitary Lateral, 6 Inch PVC	LF	15		
24	02630	Sanitary 8x6 Inch WYE and Lateral Cap, 6 Inch PVC	EA	3		
25	02560	Standard Sanitary Manhole, 4 Feet Diameter	EA	8		
26	Item No.	Description	Units	Quantity	Unit Price	Total Price

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<b>Ref #</b>	<b>02620</b>	<b>Force Main, 6 Inch HDPE</b>	<b>LF</b>	<b>3100</b>		
<b>27</b>	<b>11280 02560</b>	<b>Air/Vacuum Release Valve With 5 Foot Manhole</b>	<b>EA</b>	<b>1</b>		
<b>28</b>	<b>ODOT 703</b>	<b>#57 Limestone For Driveway Replacement, As Required</b>	<b>CY</b>	<b>5</b>		
<b>29</b>	<b>SPECIAL</b>	<b>Petroleum Contaminated Soil Remediation, Contingency</b>	<b>TON</b>	<b>5</b>		
<b>30</b>	<b>ODOT 611</b>	<b>Sewer Television Inspection And Documentation</b>	<b>LF</b>	<b>1856</b>		
<b>31</b>	<b>VARIOUS</b>	<b>Remove And Restore Mailboxes, Highway Signage,And Guardrail</b>	<b>LS</b>	<b>1</b>		
					<b>TOTAL COST</b>	

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**Bid Price in Figures** \_\_\_\_\_

**Bid Price in Words** \_\_\_\_\_

**For Informational Purposes Only. Total unit costs will govern.**

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**GP 1142 – Faircrest Sanitary Sewer Project  
The City of Canton Engineering Department**

**Section XI: Project Labor Agreement**

**Note:** this project requires the contractor to assent to a project labor agreement (PLA). The applicable PLA for this project is contained on the following pages. **Failure to sign and return the “Letter of Assent to the Project Labor Agreement” (page 28 of the following PLA) may result in your bid being disqualified. Note: Original page numbers have been maintained in this section.**

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**PROJECT LABOR AGREEMENT  
FOR THE  
I-77 FAIRCREST AREA SANITARY TRUNK SEWER PROJECT (GP1142)  
ENTERED INTO BETWEEN  
CITY OF CANTON  
AND  
EAST CENTRAL OHIO BUILDING AND CONSTRUCTION  
TRADES COUNCIL AFL-CIO  
AND  
SIGNATORY LOCAL UNIONS**

**Effective** \_\_\_\_\_

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## ARTICLE I

### INTENT AND DURATION

**Section 1. Intent And Duration.** This Project Labor Agreement (the "Agreement") is entered into between the City of Canton (the "Owner"); the East Central Ohio Building and Construction Trades Council, AFL-CIO ("ECOB & CTC" or "Council"); and Local Unions affiliated with the Council that are signatory hereto (the "Unions"), and applies exclusively to the construction, renovation, replacement and installation work within the scope of this Agreement to be performed on the I-77 Faircrest Area Sanitary Trunk Sewer Project (the "Project"). The purpose of this Agreement is to promote efficiency in the installation of the improvements and/or renovation involving the Project and to provide for the peaceful settlement of any and all labor disputes and grievances without strikes or lockouts, thereby promoting the public interest in assuring the timely and economical completion of the Project. This Agreement shall expire and be of no further force or effect upon the completion of the Project.

Upon execution of this Agreement by all parties, all construction, installation, remodeling and renovation work covered by this Agreement shall be performed by the Union and shall be contracted exclusively to Contractors, of whatever tier, who agree to execute and be bound by the terms of this Agreement. The Union agrees that Contractors may execute the Agreement, or the Letter of Assent attached as Appendix I, for purposes of performing such work. The Owner (or its permitted designee) shall monitor compliance with this Agreement by all contractors and subcontractors. For purposes of the Agreement, the term "Contractor" shall be deemed to include all construction contractors and subcontractors of whatever tier engaged in on-site construction and renovation work on the Project. The Owner, the Union and all signatory Contractors agree to abide by the terms and conditions contained in the Agreement. This Agreement represents the complete understanding of all parties, and no Contractor is or will be required to sign any other agreement with the Union as a condition of performing work coming within the scope of this Agreement. No practice, understanding or agreement between a Contractor and a Union, which conflicts with any provisions in this Agreement, will be binding on any other party unless endorsed in writing by the Owner.

**Section 2. Limitation Of Agreement To Project.** The Union agrees that this Agreement will be made available to, and will fully apply to, any successful bidder for work on the Project, without regard to whether that successful bidder performs work at other sites on either a union or a non-union basis, and without regard to whether employees of such bidder are or are not members of any union. The Union further agrees that this Agreement applies only to this Project. Nothing in this agreement is intended to, or shall, interfere with, or negate, any existing contractual relationship or collective bargaining agreement between the Union and any contractor or subcontractor that may execute this Agreement.

## **ARTICLE II**

### **PURPOSE**

**Section 1. Purpose.** The parties to this Agreement understand and acknowledge the fact that the timely replacement of sanitary trunk sewer systems and the installation of new trunk sewer systems under the Project is critical to the safety and health of the residents of the City of Canton and to users of Canton water; and to the economic development of the City of Canton. The parties signatory to this Agreement accordingly pledge their complete good faith and trust to work towards an on-time completion of the Project.

**Section 2. Time Is Of The Essence.** The parties to this Agreement understand and agree that time is of the essence for this Project. The parties understand and agree that the Owner has a critical need for timely completion of the Project and that timely completion of the Project is therefore vital. The parties understand and agree that timely completion of the Project will require the use of substantial numbers of employees from construction and supporting crafts possessing skills and qualifications that are essential to the Project. The Union pledges that it has members who are competent, skilled, and qualified to perform the required construction work. The parties also understand that on-budget completion of the Project is most critical; it is therefore essential that construction work on the Project be done in an efficient, economical manner with optimum productivity and with no delays. In recognition of those special needs of the Project, the Union and its members agree not to initiate, authorize, sanction, participate in or condone, or permit their members to engage in, any strike, sympathy strike, jurisdictional strike, recognitional strike, slowdown,

sabotage, work to rule, sickout, sit down, picketing of any type (including informational picketing), handbilling, boycott, interruption of work or any disruptive activity that interferes with or interrupts in any way work on the Project or other operations of the City of Canton. Contractors agree not to engage in any lockouts.

### **ARTICLE III**

#### **BENEFITS OF THE AGREEMENT**

**Section 1. Benefits Of The Agreement.** This Agreement is intended to foster the achievement of a timely and on-budget completion of the Project by, among other things:

- (a) reducing and/or eliminating the tension and potential disagreements that might otherwise exist between Union and non-union workers on the Project;
- (b) avoiding the costly delays of strikes, sympathy strikes, jurisdictional strikes, slowdowns, walkouts, picketing, handbilling and any other disruptions or interference with work, and promoting labor harmony and peace for the duration of the Project;
- (c) standardizing terms and conditions governing the employment of labor on the Project;
- (d) permitting flexibility in work scheduling and shift hours and times;
- (e) achieving negotiated adjustments as to work rules and staffing requirements from those which otherwise might obtain;
- (f) providing comprehensive and standardized mechanisms for the settlement of work disputes;
- (g) ensuring a reliable source of skilled and experienced labor; and
- (h) furthering public policy objectives, to the extent lawful, as to improved employment opportunities for minorities, women and the economically disadvantaged in the construction industry in Stark County. Mindful of the economic condition and unemployment rate in Stark County, the Owner anticipates and expects that all construction workers and employees on this Project will be residents of Stark County. In view of the very technical and specialized work that is inherent in the construction industry, all parties acknowledge that this expectation by the Owner is a goal, not a mandate. To this end, all Contractors working under this Agreement pledge that they

will make a good-faith effort to reach this goal expressed by the Owner.

## **ARTICLE IV**

### **SCOPE OF AGREEMENT**

**Section 1. The Work.** This Agreement is specifically defined and limited to onsite construction, renovation, replacement and installation of sanitary trunk sewer systems, and related work, as required under the Project.

**Section 2. Exclusions From Scope.** Items specifically excluded from the scope of this Agreement, even if performed in connection with the Project, include the following:

- (a) Work of non-manual employees, including but not limited to, superintendents, supervisors, staff engineers, inspectors, quality control and quality assurance personnel, timekeepers, mail carriers, clerks, office workers, including messengers, guards, safety personnel, emergency medical and first aid technicians, and other professional, engineering, administrative, supervisory and management employees.
- (b) Equipment and machinery owned or controlled and operated by the Owner.
- (c) All off-site manufacture, fabrication or handling of materials, equipment or machinery (except at dedicated lay-down or storage areas and except as provided in Article IV, Section 10), and all deliveries of any type to and from the Project site.
- (d) All employees of the Owner, the Construction Supervisor, design team or any environmental, engineering or other consultant when such employees do not perform labor coming within the scope of this Agreement.
- (e) Any work performed on or near or leading to or onto the site of work on the Project and undertaken by state, county, city or other governmental bodies, or their contractors; or by public utilities or their contractors.
- (f) Off-site maintenance of leased equipment and on-site supervision of all such maintenance work.
- (g) Work by employees of a manufacturer or vendor necessary to maintain such manufacturer's or vendor's warranty or guarantee, or work

performed by supervisors or technicians employed by the manufacturer or vendor to oversee the testing of equipment once installed to insure that the equipment is fully operational.

- (h) Laboratory work for specialty testing or inspections not ordinarily done by the Union.
- (i) All work done by employees of any State agency, authority or entity or employees of any municipality or other public employer.

The Union agrees that there shall be no interference with or disruption of work, of those contractors, employers, and employees exempted from coverage of this Agreement by subparagraph (a) through (i) above.

**Section 3. Contract Award and Consent to Agreement.**

- (a) The Owner, and/or Contractors, as appropriate, have the absolute right to award contracts or subcontracts on the Project notwithstanding the existence or nonexistence of any agreements between such Contractor and the Union, provided only that such Contractor is willing, ready and able to execute and comply with this Agreement or a Letter of Assent thereto, should such Contractor be awarded work covered by this Agreement.
- (b) All subcontractors of a Contractor, of whatever tier, who have been awarded contracts of work covered by this Agreement, on or after the effective date of this Agreement, shall also be required to accept and to be bound by the terms and conditions of this Agreement, and shall evidence their acceptance by the execution of this Agreement or a Letter of Assent thereto, prior to the commencement of work. A copy of this Agreement or Letter of Assent executed by each Contractor shall be immediately provided to the Union upon execution.

**Section 4. Stand-Alone Agreement.** This Agreement is a stand-alone Agreement. While this Agreement expressly does not incorporate any local area collective bargaining agreements, such local area collective bargaining agreements may be referenced for the limited purposes as hereinafter set forth in this Agreement. However, to the extent, if any, that any provisions of this Agreement conflict with any provision of a local area collective bargaining agreement, the provisions of this

Agreement shall control, except for all work performed under the NTL Articles of Agreement, the National Stack/Chimney Agreement, the National Cooling Tower Agreement, all instrument calibration work and loop checking shall be performed under the terms of the UA/IBEW Joint National Agreement for Instrument and Control Systems Technicians, and the National Agreement of the International Union of Elevator Constructors, with the exception of Articles VII, VIII and X of this Agreement, which shall apply to such work.

**Section 5. Craft Jurisdiction.** This Agreement shall recognize the traditional craft jurisdiction of the Union. Any and all jurisdictional disputes shall be settled in accordance with Article VIII below. While this Agreement is a stand-alone Agreement, the Agreement will utilize the local area collective bargaining agreements of the Union as a reference to define the Union's craft jurisdiction. Jurisdictional disputes shall be settled in accordance with Article VIII.

**Section 6. Subcontracting.** The Owner agrees that neither it nor any of its contractors or subcontractors will subcontract any work covered by this Agreement to be done on the Project except to a person, firm or corporation who is or agrees to become party to this Agreement. Any contractor or subcontractor working on the Project shall, as a condition to working on said Project, become signatory to and perform all work under the terms of this Agreement. Contractors who are signatory to local collective bargaining agreements shall be bound by the terms of their respective local collective bargaining agreements on subcontracting to the extent such terms are consistent with Article IV, Section 2 of this Agreement. Disputes concerning compliance with such local subcontracting provisions for this Project shall be subject to all of the dispute resolution provisions of this Agreement.

**Section 7. Security.** All employees covered by this Agreement in the employ of the Contractors shall remain members of the Union during the term of this Agreement, and all workers hereinafter employed by the Contractors shall become members of the Union seven (7) days after the date of their employment and shall remain members of the Union during the term of this Agreement. (This clause shall be applied to the extent permitted by law). A Contractor shall not discharge any employee for non-membership in the Union if: (a) he has reasonable grounds for believing that such membership was not available to the employee on the same terms



and conditions generally applicable to other members, or (b) he has reasonable grounds for believing that membership was denied or terminated for reasons other than the failure of the employee to tender the periodic dues and initiation fee uniformly required as a condition of acquiring or retaining membership.

**Section 8. Liability.** It is understood that the liability of the Contractor and the liability of the Union under this Agreement shall be several and not joint. The Union agrees that this Agreement does not have the effect of creating any joint employer status between or among the Owner, Construction Supervisor and/or any Contractor, and neither the Owner nor Construction Supervisor shall assume any liabilities of the Contractors.

**Section 9. Abatement of Agreement.** As areas of covered work on the Project are accepted by the Owner, this Agreement shall have no further force or effect on such areas except where the Contractor is directed by the Owner to engage in repairs or punch list modifications.

**Section 10. Miscellaneous.** Notwithstanding any other provision of this Agreement, this Agreement applies and is limited to the recognized and accepted historical definition of demolition and any construction, replacement or installation work under the direction of and performed by the contractor(s), of whatever tier, who have contracts awarded for such work on the project. Such work shall include dedicated off-site work except for the contractors and subcontractors specifically excluded in the agreement. Any off-site prefabrication of any building materials, systems and/or components traditionally performed on site shall be performed by the appropriate craft signatory to this agreement and approved by the owner.

**ARTICLE V**

**LABOR/MANAGEMENT COOPERATION**

**JOINT ADMINISTRATIVE COMMITTEE**

**Section 1.** The parties to this Agreement shall establish a Project Joint Administrative Committee ("Committee"). This Committee will be a two-person committee comprised of one member each appointed by the Owner (or its designee) and the Union , with an alternate appointee Union member available to replace the regular appointee when a problem or grievance concerns the regular appointee's Union. Each member of the Committee shall designate an alternate who shall serve in the absence of the

member for any purpose contemplated by this Agreement.

**Section 2.** The Committee shall meet at least quarterly, or more often if special circumstances warrant, to discuss the administration of the Agreement, the progress of the Project, labor/management problems that may arise, and any other relevant matters. Any need for interpretation which might arise from the application of the terms and conditions of the Agreement shall be referred directly to the Committee for resolution.

## ARTICLE VI

### **UNION RECOGNITION AND EMPLOYMENT**

**Section 1. Pre-Hire Recognition.** Each Contractor and subcontractor recognizes the Union as the sole and exclusive bargaining representative of all craft and trade employees within its respective jurisdiction working on the Project under the Agreement.

**Section 2. Contractor's Right of Selection.** Each Contractor shall have the right to determine the competency of all employees, the number of employees required and shall have the sole responsibility for selecting employees to be laid off. To the extent any training or vendor education is required to fill any position, said training shall be undertaken at no cost or expense to Owner.

**Section 3. Union Referral.** Each Contractor agrees to comply with the Union's referral system, and the referral system shall be used exclusively by such Contractor, except as modified by this Article. Such job referral system will be operated in a non-discriminatory manner and in full compliance with Federal, state, and local laws and regulations requiring equal employment opportunities and nondiscrimination, and referrals shall not be affected in any way by the rules, regulations, bylaws, constitutional provisions or any other aspects or obligations of union membership, policies or requirements. The Union shall indemnify and hold each Contractor harmless with respect to any claim arising out of how the Union operates and administers its referral system. All hiring procedures, including related practices affecting apprenticeship and training, will be operated so as to facilitate the ability of the contractors to meet any and all equal employment opportunity/affirmative action obligations. The Contractor may reject any referral and request another, different referral; provided, however, the Contractor shall furnish, upon request from the Union,

a written explanation for the rejection.

**Section 4. Unavailability of Union Referrals.** In the event that the Union is unable to fill any requisitions for qualified employees within forty-eight hours (48) after such requisition is made by the Contractor (Saturdays, Sundays, and Holidays excepted), the Contractor may employ applicants from any other available source. The Contractor shall inform the Union of the name, address and telephone number of any applicants hired from other sources and refer the applicant for the Local Union for dispatch to the Project.

**Section 5. Union Best Efforts.** The Union will exert its utmost effort to recruit sufficient numbers of skilled craft workers to fulfill the manpower requirements of each Contractor, including calls to local unions in other geographic areas when its referral lists have been exhausted. The parties to this Agreement support the development of increased numbers of skilled construction workers from the residents of the area of the Project. Toward that end, the Union agrees to encourage the referral and utilization, to the extent permitted by law and the hiring hall procedures, of qualified residents as journeymen, apprentices and trainees on the Project.

## ARTICLE VII

### **GRIEVANCE ARBITRATION PROCEDURE**

**Section 1.** This Agreement is intended to provide close cooperation between management and labor. The Union will assign a representative to this Project for the purpose of completing the construction of the Project economically, efficiently, continuously, and without interruptions, delays, or work stoppages.

**Section 2.** The Contractors, the Union, and the employees, collectively and individually, realize the importance to all parties to maintain continuous and uninterrupted performance of the work of the Project, and agree to resolve disputes in accordance with the grievance-arbitration provisions set forth in this Article.

**Section 3.** Any question or dispute arising out of and during the term of this Agreement (other than trade jurisdictional disputes) shall be considered a grievance and subject to resolution under the following procedures:

**Step 1.** (a) When any employee subject to the provisions of this Agreement feels he or she is aggrieved by a violation of this Agreement, he or she, through his or her local union

business representative or job steward, shall, within five (5) working days after the occurrence of the violation, give notice to the work-site representative of the involved Contractor stating the provision(s) alleged to have been violated. The business representative of the Union or the job steward and the work-site representative of the involved Contractor shall meet and endeavor to adjust the matter within three (3) working days after timely notice has been given. The representative of the Contractor shall keep the meeting minutes and shall respond to the Union representative in writing at the conclusion of the meeting but not later than twenty-four (24) hours thereafter. If they fail to resolve the matter within the prescribed period, the Union may, within forty-eight (48) hours thereafter, pursue Step 2 of the Grievance Procedure, provided the grievance is reduced to writing, setting forth the relevant information concerning the alleged grievance, including a short description hereof, the date on which the grievance occurred, and the provisions of the Agreement alleged to have been violated.

- (a) Should the Union or the Project Contractor or any Contractor have a dispute with the other party and if, after conferring, a settlement is not reached within three (3) working days, the dispute may be reduced to writing and proceed to Step 2 in the same manner as outlined herein for the adjustment of an employee complaint.

**Step 2.** An International Union Representative and the involved Contractor shall meet within seven (7) working days of the referral of a dispute to this second step to arrive at a satisfactory settlement thereof. Meeting minutes shall be kept by the Contractor. If the parties fail to reach an agreement, the dispute may be appealed by the Union, in writing, in accordance with the provisions of Step 3.

**Step 3.** (a) If the grievance has been submitted but not

adjusted under Step 2, either party may request in writing, within seven (7) calendar days thereafter, that the grievance be submitted to an Arbitrator mutually agreed upon by them. The Contractor and the Union shall attempt mutually to select an arbitrator, but if they are unable to do so, they shall request the Federal Mediation and Conciliation Services (FMCS) to provide them with a list of arbitrators from which the Arbitrator shall be selected. The rules of FMCS shall govern the conduct of the arbitration hearing. The decision of the Arbitrator shall be final and binding on all parties. The fee and expenses of such Arbitration shall be borne equally by the Contractor and the Union.

**Section 4.** Failure of the grieving party to adhere to the time limits established herein shall render the grievance null and void. Failure of the Contractor to adhere to the time limits established herein shall result in the grievance being sustained. The time limits established herein may be extended only by written consent of the parties involved at the particular step where the extension is agreed upon. The Arbitrator shall have the authority to make decisions only on issues presented to him or her, and he or she shall not have authority to change, amend, add to or detract from any of the provisions of this Agreement.

**Section 5.** The Owner shall be notified of all actions at Steps 2 and 3 and shall, upon their request, be permitted to participate in all proceedings at these steps.

## **ARTICLE VIII**

### **JURISDICTIONAL DISPUTES**

**Section 1.** The assignment of work will be the responsibility of the Contractor performing the work involved and such work assignments will be in accordance with decisions issued under the Plan for the Settlement of Jurisdictional Disputes in the Construction Industry (the "Plan"), or any successor Plan, adopted by the National Building and Construction Trades Department.

**Section 2.** All jurisdictional disputes on this Project, between or among Building and Construction Trades Unions and employers, parties to this Agreement, shall be settled and adjusted according to the present Plan established by the Building and

Construction Trades Department or any other plan or method of procedure that may be adopted in the future by the Building and Construction Trades Department. Decisions rendered shall be final, binding and conclusive on the Contractors and Unions parties to this Agreement.

**Section 3.** All jurisdictional disputes shall be resolved without the occurrence of any strike, work stoppage, or slow-down of any nature, and the Contractor's assignment shall be adhered to until the dispute is resolved. Individuals violating this section shall be subject to immediate discharge.

**Section 4.** Each Contractor will conduct a pre job conference with the appropriate Council prior to commencing work. The Owner will be advised in advance of all such conferences and may participate if they wish.

## ARTICLE IX

### **MANAGEMENT'S RIGHTS**

**Section 1. Exclusive Owner - Workforce.** Except as otherwise provided in this Agreement, the Owner (or its designee) and the Contractors retain the authority for the management of their operations and workforces.

**Section 2. Materials, Design, Machinery, Equipment.** There shall be no limitation or restriction by the Union upon a Contractor's choice of materials or design, nor, regardless of source or location, upon the full use and utilization of equipment, machinery packaging, pre-cast, pre-fabricated, pre-finish, or pre-assembled materials, tools or other labor saving devices. The on-site installation or application of all items shall be performed by the craft having jurisdiction of such work; provided, however, that installation of specialty items may be performed by employees employed under this Agreement who may be directed by other personnel in a supervisory role, in circumstances requiring special knowledge of the particular items.

**Section 3. New Technology, Equipment.** The use of new technology, equipment, machinery, tools and/or labor saving devices and methods of performing work may be initiated by any Contractor from time to time during the Project. The Union agrees that it will not in any way restrict the implementation of such new devices or work methods.

**Section 4. Disputes.** If there is any disagreement between any Contractor and the Union concerning the manner or implementation of such device or method of

work, the implementation shall proceed as directed by the Contractor, and the Union shall have the right to grieve and/or arbitrate the dispute as set forth in Article VII of this Agreement.

## **ARTICLE X**

### **WORK STOPPAGES**

**Section 1. No Strikes or Work Disruptions.** There shall be no strike, sympathy strike, jurisdictional strike, recognitional strike, slowdown, sabotage, work to rule, sickout, sit down, picketing of any type (including informational picketing), handbilling, boycott, interruption of work or any disruptive activity that interferes with or interrupts in any way work on the Project. The Union shall not sanction, aid or abet, encourage or continue any work stoppage, strike, picketing or other disruptive activity which violates this Article and shall undertake all reasonable means to prevent or to terminate any such activity. No employee shall engage in activity which violates this Article. Any employee who participates in or encourages any activity which violates this Article shall be subject to disciplinary action, including discharge, and if justifiably discharged for the above reasons, shall not be eligible for rehire on the Project for a period of not less than ninety (90) days. Further, if the Union is unable to provide qualified replacements for those employees who are in violation of this Article by the beginning of the next shift, the Employer is free to hire from any source.

**Section 2. Union Responsibilities.** The Union shall not be liable for acts of employees for which it has no responsibility. The principal officers of the Union will immediately instruct, order and use their best efforts to cause the members of the Union they represent to cease any violations of this Article. If it complies with this obligation, the Union shall not be responsible for unauthorized acts of employees it represents.

## **ARTICLE XI**

### **WAGES AND BENEFITS**

**Section 1. Wages.** All employees covered by this Agreement shall be classified in accordance with work performed and paid 100% of the wages and 100% of the benefits as established in the Union's Building Trades Collective Bargaining Agreement and any subsequent modifications thereto. The Contractor, upon request, shall provide the Union and Owner with substantiation that wages and benefits are

being paid on the Project. The Union shall provide the Owner, and any Contractor or subcontractor that is party to this Agreement, with wage, fringe benefit and dues reporting forms.

**Section 2. Payment of Benefits/Contributions.** Each Contractor will also pay all required contributions in the amounts required by Section 1 of this Article to the established employee benefit funds that accrue to the direct benefit of the employees (such as pension and annuity, health and welfare, vacation, apprenticeship, training funds). With respect to contributions required in this Section to Employer-Union jointly trusted funds, the Contractor adopts and agrees to be bound by the written terms of the legally established trust agreement specifying the detailed basis on which payments are to be made into, and benefits paid out of, such Trust Funds. The Contractor authorizes the parties to such Trust Funds to appoint Trustees and successor Trustees to administer the Trust Funds and hereby ratifies and accepts the Trustees so appointed as if made by Contractor.

**Section 3. Non-Affiliated Labor Organizations.** The Contractor shall deduct from each employee's wages all uniform dues and working assessments set forth in the Employee's Local Collective Bargaining Agreement. If a labor organization is not affiliated with the Council, and supplies its members or referrals for work on the Project, such labor organization shall pay to the Council the dues and assessments it would owe the Council if affiliated, for all periods during which the labor organization has members or referrals working on the Project. Any disputes under this paragraph shall be resolved exclusively between the labor organization and the Council by using the grievance procedure appearing in Article VII, as provided herein. All grievances shall be reduced to writing within thirty (30) days of the date on which the aggrieved party discovered the dispute. The grievance shall be initiated at Article VII, Section 3, Step 3.

## ARTICLE XII

### LOCAL UNION NEGOTIATIONS DURING THE PENDENCY OF THE AGREEMENT

**Section 1.** All parties to this Agreement understand and acknowledge that the Union's local collective bargaining agreement may expire prior to the projected completion of the Project. All parties understand and agree that irrespective of whether



such collective bargaining agreement negotiations are successful or unsuccessful, there shall be no strike, sympathy strike, jurisdictional strike, recognitional strike, slowdown, sabotage, work to rule, sickout, sit down, picketing of any type (including informational picketing), handbilling, boycott, interruption of work or any disruptive activity that interferes with or interrupts in any way work on the Project by the Union involved in such local negotiations, or by any of its members, nor shall there be any lockout by a Contractor on the Project affecting the Union or its members during the course of such negotiations. Irrespective of the status of any such local collective bargaining agreement negotiations, the Union and all of its members will observe and fully comply with the provisions of this Agreement. Should the Union fail or refuse to provide and/or refer qualified employees for work on the Project during an economic strike, any affected Contractor shall be permitted to utilize the procedures appearing in Article VI, Section 5 of this Agreement.

**Section 2. Wage/Benefit Increases.** Should the Union negotiate an increase in wages or an increase in benefits with any Contractor to become effective during the term of the Project, those wage and/or benefit increases shall be paid by the affected Contractor, as of the effective date of those increases.

### **ARTICLE XIII**

#### **HOURS OF WORK, OVERTIME, SHIFTS AND HOLIDAY**

**Section 1. Work Day and Work Week.** Except as provided in Section 4, the first shift shall consist of eight (8), four and one-half (4½) or ten (10) hours per day between the hours of 6:00 a.m. and 8:00 p.m., plus one-half (1/2) hour unpaid for lunch, approximately mid-way through the shift. Forty (40) hours per week shall constitute a regular week's work, whether consisting of five (5) eight (8) hour days, or four (4) ten (10) hour days. The work week will start on Monday and conclude on Sunday. A uniform starting time will be established by the Contractor. Nothing herein shall be construed as guaranteeing any employee eight (8), four and one-half (4½) or ten (10) hours per day or forty (40) hours per week. The Union shall be informed of the work starting time set by the contractor at the pre-job conference which may be changed thereafter upon three (3) days' notice to the Union and the employees.

**Section 2. Starting Times.** Employees shall be at their place of work at the

starting time and shall remain at their place of work (as designated by the Contractor) performing their assigned functions until quitting time, which is defined as the scheduled end of the shift. The parties reaffirm their policy of a fair day's work for a fair day's wage. There shall be no pay for time not worked unless the employee is otherwise engaged at the direction of the Contractor.

**Section 3. Overtime.** Overtime shall be defined as all hours worked in excess of eight (8) hours during a work shift or forty (40) hours in a work week or in excess of ten (10) hours for 10-hour shifts. Work performed on Saturdays shall be paid at one and one-half times the straight time rate of pay. However, in scheduled four (4) day/ten hour shift work weeks, Friday may be scheduled as a "makeup" day at straight time to make up for a day lost (Monday through Thursday) due to inclement weather. In addition, if a "make-up" day is scheduled, all employees directed to work on such day will be guaranteed a minimum of four (4) hours work or pay. Work on Sundays and holidays shall be at double time. There shall be no restriction on any contractor's scheduling of overtime or the non-discriminatory designation of employees who will work. The contractor shall have the right to schedule work so as to minimize overtime. There shall be no pyramiding of overtime pay under any circumstances.

**Section 4. Shifts.**

- (a) Shift work may be performed at the option of the Contractor(s) upon three (3) days' prior notice to the Union and shall continue for a period of not less than five (5) working days. Saturdays and Sundays, if worked, may be used for establishing the five (5) day minimum work shift. If two shifts are worked, each shall consist of at least eight (8) hours of continuous work exclusive of a one-half (½) hour non-paid lunch period. A premium of \$.25 per hour shall be paid for work on the second shift.
- (b) The Contractor may establish a work week of four (4) consecutive ten (10) hour work days (exclusive of one-half (½) hour unpaid lunch, approximately midway through the shift) between Monday through Thursday.

**Section 5. Minimum Pay.** An employee who reports for work at the regular starting time and for whom no work is provided shall receive pay equivalent to two (2) hours at the applicable hourly rate, provided the employee at the employer's discretion remains available for work. Any employee who reports for work and for

whom work is provided shall be paid for actual time worked but not less than two (2) hours. It will not be a violation of this Agreement when the employer considers it necessary to shut down to avoid the possible loss of human life; or because of an emergency situation that could endanger the life and safety of an employee. In such cases, employees will be compensated only for the actual time worked. In the case of a situation described above, where the employer requests employees to remain available for work, the employees will be compensated for such time. If this Project is shut down because of weather, employees, who report for work, shall be paid actual time worked but not less than two (2) hours. Procedures for prior notification of work cancellation shall be determined at the pre-job conference. The provisions of this section are not applicable where the employee voluntarily quits or lays off.

**Section 6. Holidays.** Holidays shall be New Year's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day, the Day after Thanksgiving Day, and Christmas Day. A holiday falling on Saturday shall be observed on the preceding Friday. A holiday falling on Sunday shall be observed on the following Monday.

**Section 7. Meal Period.** The Contractor will schedule a meal period of not more than one-half hour duration at the work location at approximately the mid-point of the scheduled work shift (4 hours in a five day work week, 5 hours in a four-day work week), consistent with Section 1. If an employee is required to work through his meal period, he shall be compensated for the time worked at the applicable overtime rate and the employee shall, when work permits, eat his lunch "on the fly".

**Section 8. No Organized Work Breaks.** There will be one (1) break during the first four (4) hours of a shift which shall be taken at the employee's work station. Individual nonalcoholic beverage containers will be permitted at the employee's work station.

**Section 9. Helmets to Hardhats.**

- (a) The Employers and the Union recognize a desire to facilitate the entry into the building and construction trades of veterans who are interested in careers in the building and construction industry. The Employers and Union agree to utilize the services of the Center for Military Recruitment, Assessment and Veterans Employment (hereinafter "Center") and the

Center's "Helmets to Hardhats" program to serve as a resource for preliminary orientation, assessment of construction aptitude, referral to apprenticeship programs or hiring halls, counseling and mentoring, support network, employment opportunities and other needs as identified by the parties.

- (b) The Union and Employers agree to coordinate with the Center to create and maintain an integrated database of veterans interested in working on this Project and of apprenticeship and employment opportunities for this Project. To the extent permitted by law, the Union will give credit to such veterans for bona fide, provable past experience.

#### **ARTICLE XIV**

#### **APPRENTICES**

**Section 1. Need For.** The parties recognize the need to maintain continuing support of programs designed to develop adequate numbers of competent workers in the construction industry. The Contractor(s) will accordingly employ apprentices to perform work on the Project within the apprentice's capabilities.

**Section 2. Ratios.** The Union agrees to cooperate with the Contractor in furnishing qualified apprentices as requested and if available. Apprentices shall perform the work in accordance with the ratios and terms in their governing collective bargaining agreements. To the extent requested by the Owner, the Contractor(s) may use the maximum number of apprentices permitted by local collective bargaining agreements.

#### **ARTICLE XV**

#### **DRUG AND ALCOHOL POLICY AND CRIMINAL BACKGROUND CHECK**

**Section 1. Drug and Alcohol Policy.** All parties understand and agree that a drug and alcohol policy, approved by the Council, will be in force for all work performed under the Agreement. The drug and alcohol policy will prohibit the use, sale, transfer, purchase and/or possession of a controlled substance, alcohol and/or firearms while on the Project's premises and will require testing of employees. The drug and alcohol policy, attached hereto as Appendix 2, is incorporated into and made part of this Agreement and is implemented for all Contractors and employees working on the Project.

**Section 2. Criminal Background Checks.** The Owner may require criminal

background checks of employees working on the Project to determine whether there exist any active criminal warrants, pending criminal cases or criminal convictions involving employees. An employee who fails a criminal background check may be prohibited from performing work on this Project. The Owner, at its expense, may require employees to wear, and display, appropriate badges to indicate their clearance to work on the Project.

## **ARTICLE XVI**

### **NON-DISCRIMINATION**

**Section 1. Policy.** It is the continuing policy of the Owner, the Contractors and the Union that the provisions of this Agreement shall be applied without discrimination because of age, race, sex, color, religion, creed, national origin, sexual orientation or any other basis prohibited by applicable law.

## **ARTICLE XVII**

### **SOLE AND COMPLETE AGREEMENT**

**Section 1.** The parties agree that this Agreement constitutes the sole and complete agreement between them governing the rates of pay and working conditions of the construction employees working on the Project. This Agreement settles all demands and issues on the matters subject to collective bargaining and it shall not be modified or supplemented in any way except by written agreement executed by the Owner and all parties.

## **ARTICLE XVIII**

### **SEPARABILITY AND SAVINGS CLAUSE**

**Section 1. Intent of Parties.** If any article or section of this Agreement shall be held invalid by law or by a tribunal of competent jurisdiction, or if compliance with or enforcement of any article should be restrained pending a final determination as to its validity, the remainder of this Agreement shall not be affected and shall remain in full force and effect. In the event that any article or section is held invalid, the parties hereto shall, upon the request of the Union, enter into collective bargaining negotiations for the purpose of arriving at a mutually satisfactory replacement for such article during the period of invalidity or restraint. If the Owner, the Council and the Union cannot agree on a mutually satisfactory replacement, either party shall be permitted to submit its demand to formal interest arbitration.

**Section 2. Force of Agreement.** The parties recognize the right of the Owner

to withdraw, at its absolute discretion, the utilization of this Agreement as part of any bid specification should a court of competent jurisdiction issue any order which could result, temporarily or permanently, in delay of the bidding, awarding, and/or construction work on the Project. Notwithstanding such an action by the Owner, or such court order, the parties agree that the Agreement shall remain in full force and effect on the Project, to the maximum extent legally possible. It is hereby agreed that this Agreement covers all of the signatory local unions listed below.

**Section 3. Delegation.** The Owner, in its sole and absolute discretion may delegate its duties hereunder to a representative and/or designee who may be either an employee of the Owner or a third party with whom the Owner has contracted for contractor services.

OWNER  
CITY OF CANTON

By: William L. Bartos  
Name: William L. Bartos  
Title: Director of Public Services  
Date: 6/30/14

EAST CENTRAL OHIO BUILDING &  
CONSTRUCTION TRADES COUNCIL,  
AFL-CIO

By: Dave Kirven  
Name: DAVE KIRVEN  
Title: PRESIDENT  
Date: 3-13-14

**SIGNATORY LOCAL UNIONS**

I.B.E.W. 540  
Name of Union

By: Philip D. Williams

Bus. Mngr / Financ. Secy  
Title

Glaziers Local 1162  
Name of Union

By: Scott Hunter

Bus. Rep  
Title

Painter Local 841  
Name of Union

By: Scott Hunter

Bus. Rep  
Title

Laborers Local 1015  
Name of Union

By: Curt Mayle

Business Manager  
Title

Bricklayers Local No 6  
Name of Union

By: Brett J. Fines

Field Representative  
Title



SHEET METAL WORKERS LOCAL 33

Name of Union

By: Jay Dunning

BUSINESS AGENT  
Title

CEMENT MASONS 109  
Name of Union

By: Ray Daniel

BUSINESS mgr.  
Title

\_\_\_\_\_  
Name of Union

By: \_\_\_\_\_

\_\_\_\_\_  
Title

\_\_\_\_\_  
Name of Union

By: \_\_\_\_\_

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Title

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Name of Union

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Name of Union

By: \_\_\_\_\_

\_\_\_\_\_  
Title

\_\_\_\_\_  
Name of Union

By: \_\_\_\_\_

\_\_\_\_\_  
Title



**APPENDIX 1**  
**LETTER OF ASSENT TO THE PROJECT LABOR AGREEMENT**

**FOR THE I-77 FAIRCREST AREA SANITARY TRUNK SEWER PROJECT**

Pursuant to Article I, Section 1 of the Project Labor Agreement (the "Agreement") for the I-77 Faircrest Area Sanitary Trunk Sewer Project, the undersigned party hereby agrees that it will comply with and be bound by all of the terms and conditions of the Agreement and agrees to all approved amendments or revisions thereto.

This Letter of Assent shall ONLY apply to the above-referenced Project and shall remain in effect for the duration of the above-referenced Project, after which this understanding will automatically terminate without further notice.

**For the Contractor (or Subcontractor of whatever tier):**

**Name of Contractor/Subcontractor:** \_\_\_\_\_

**Name and Signature of Authorized Person:**

**(Print Name)** \_\_\_\_\_

**(Title)** \_\_\_\_\_

**(Signature)** \_\_\_\_\_

**(Phone #)** \_\_\_\_\_

**(Date)** \_\_\_\_\_



**APPENDIX 2**  
**EMPLOYEE DRUG AND ALCOHOL TESTING POLICY**  
**SPECIFICATIONS**

The Owner is committed to providing a safe workplace for the workers assigned the Project, promoting high standards of employment health, and fostering productivity that satisfies its quality expectations. Consistent with the intent and spirit of this commitment, the Owner and ECOB & CTC have established a substance abuse testing specification for the Project with the goal of maintaining a work environment that is free from the effects of the use of illegal drugs and alcohol. The Owner will implement the terms of this policy.

This specification is not intended as a substitute for the Contractors' complete written substance abuse policy. Normally, such policies include other important features, including, but not limited to, an employee education and awareness Program, a supervisor training program and an employee assistance program.

The policy for this Project requires that any construction employee entering the project site will comply with the substance abuse testing requirements as outlined in this section. The Owner reserves the right to amend this specification upon written notice to the Contractor and the Union on the Project. The parties to this agreement shall recognize the Drug Free Work Site Program as implemented through participating Unions and/or Contractors as administered by the contractor, or for contractors who are not signatory to agreements with signatory unions belonging to ECOB & CTC, and their core employees, an equivalent program that meets the specifications, contractual requirements, and testing requirements as set forth in this Appendix 1.

**CONTRACTUAL REQUIREMENTS**

All Contractors must have and enforce a written Substance Abuse Program incorporating the testing requirements, term, and conditions set forth in this specification. This specification is applicable to all employees, current and prospective, in order to be eligible to perform work at the Project. The Contractors must comply with the specification. Suppliers, vendors, and visitors are subject to confirmation of their abstinence from the possession or use of substances indicated in this specification. A copy of each contractor's substance abuse program must be

submitted to the Owner for approval prior to commencement of any work on the Project site.

The substance abuse program must apply to all employees working on the Project and subcontractors' of any of tier working on the Project site. This includes workers, new hires, replacement workers, and supervisory personnel. No employee or prospective employee of a Contractor shall be permitted to work on the Project site unless such employee has submitted to testing by this specification and unless the results of such testing are negative as hereinafter defined. The Contractor must provide the Owner with a Monthly Summary Report of the Substance Abuse Program compliance.

All Contractors must train their respective employees in methods that will allow them to recognize substance abusers. Supervisory Employees of the Owner or its subcontractor shall be trained to take action, and to confront a substance abuser in a manner consistent with generally accepted safety-training procedures.

The cost of implementing the Substance Abuse program shall be borne by each respective Contractor affected by this specification.

Suppliers, vendors, and visitors must become signatory to the terms of this specification and their abstinence from substance abuse, and their continued avoidance of violations of the specification at the project site. Furthermore, in the event of an incident and/or accident occurrences involving suppliers, vendors, and/or visitors, the same agrees to submit to the substance abuse testing when requested. Refusal to comply would be grounds to have the supplier, vendor, or visitor permanently barred from the Project site by regulators.

### TESTING REQUIREMENTS

The Project requires:

- Post-offer/Pre-engagement drug and alcohol testing.
- Testing for reasonable suspicion of illegal drug use or alcohol use.
- Post accident and post incident drug and alcohol testing upon reasonable suspicion.
- Drug testing following discovery of illegal or unauthorized drugs or paraphernalia as creating reasonable suspicion.

All Prime Contractors must perform post-offer/pre-engagement, and post



accident/incident testing upon reasonable suspicion, as follows:

- a. All drug testing must be conducted by a National Institute of Drug Abuse (NIDA) certified laboratory with test results interpreted by a licensed medical review officer (MRO).
- b. The initial screen tests for alcohol shall be performed by using either a saliva test or breathalyzer test comparable to the type used by state or local law enforcement officials. Furthermore, alcohol confirmatory tests shall be performed by using either blood alcohol test or a Breathalyzer test comparable to the type used by state or local law enforcement officials.
- c. Evidence of the negative test results of individual employees required by this specification shall be furnished to the Owner prior to the commencement of work by the individual employee and promptly after performance of any subsequent testing required by this specification. Acceptable negative test result format.
  - A certificate signed by the testing laboratory, setting forth the nature and results of performed; or
  - An identification card signed by the respective Prime Contractor and issued to the individual employee, setting forth as reported on a certificate issued by the testing laboratory. The name of the testing laboratory shall also appear on the identification card; provided the affected employee authorizes the issuance of such identification card.

#### COMPLIANCE PROCEDURE

The Owner reserves the right to audit any substance abuse program required by this specification to verify compliance results within twenty-four (24) hours of notification of the intent to audit. The Owner shall have free right of access to all relevant records of the Prime Contractor and their subcontractors and supplies for this purpose, provided such record disclosures are within the scope of the States guidelines pertaining to confidentiality of employee records.

The Contractor's pre-engagement employees who receive a positive test result shall immediately leave the Project Site. Transportation of employees receiving the positive test result is the direct responsibility of the employing Prime Contractor, including employees of its subcontractors. Furthermore, pre-engagement employees

receiving a positive test shall not be permitted to return to the Project Site earlier than 90 days from the date of the positive test. At this time the employee may begin the process outlined by this specification again.

DEFINITIONS/ CONFIDENTIALITY/RULES- DISCIPLINARY ACTIONS-  
GRIEVANCE PROCEDURES

1. DEFINITIONS:

- (a) Company Premises - the term "Company Premises" as used in this policy includes all property, facilities, land, building, structures, automobiles, trucks and other vehicles owned, leased or used by the Contractor on the Project. Construction job sites for which the Contractor has responsibility are included.
- (b) Prohibited Items & Substances - Prohibited substances include illegal drugs (including controlled substances, look alike drugs and designer drugs, alcoholic beverages, and drug paraphernalia in the possession of or being used by an employee on the job.
- (c) Employee - Individuals, who perform work for the Contractor, including, but not limited to management, supervision, engineering, craft workers and clerical personnel.
- (d) Accident - Any event resulting in injury to a person or property to which an employee, or contractor/contractor's employee, contributed as a direct or indirect cause.
- (e) Incident - An event which has all the attributes of an accident, except that no harm was caused to person or property.
- (f) Reasonable Cause - Reasonable cause shall be defined as tardiness, excessive absenteeism, and erratic behavior such as noticeable imbalance, incoherence, and disorientation.

2. CONFIDENTIALITY

- (a) All parties to this policy and program have only the interests of employees in mind; therefore, encourage any employee with a substance abuse problem to come forward and voluntarily accept our assistance in dealing with the illness. An employee assistance program will provide guidance and direction for you during your recovery period. If you volunteer for help, the Contractor

will make every reasonable effort to return you to work upon your recovery. The Contractor will also take action to assure that your illness is handled in a confidential manner.

- (b) All actions taken under this policy and program will be confidential and disclosed only to those with a "need to know."
- (c) When a test is required, the specimen will be identified with a code number, not by name, to insure confidentiality of the donor. Each specimen container will be properly label and made tamper proof. The donor must witness this procedure.
- (d) Unless an initial positive result is confirmed as positive, it shall be deemed negative and reported by the laboratory as such.
- (e) The handling and transportation of each specimen will be properly documented through the strict chain of custody procedures.

3. RULES - all employees must report to work in a physical condition that will enable them to perform their jobs in a safe and efficient manner. Employees shall not:

- (a) Use, possess, dispense or receive prohibited substances on or at the Project job site; or
- (b) Report to work at or on the Project with any measurable amount of prohibited substances in their system.

4. DISCIPLINE - When the Contractor has reasonable cause to believe an employee is under the influence of a prohibited substance, for reasons of safety, the employee may be suspended until test results are available. If no test results are received after three (3) working days, the employee, if available, shall return to work with back pay. If the test results prove negative, the employee shall be reinstated with back pay. In all other cases:

- (a) Applicants testing positive for drug use will not be hired.
- (b) Employees who have not voluntarily come forward, and who test positive for a drug use, will be terminated.
- (c) Employees who refuse to cooperate with testing procedures will be terminated.
- (d) Employees found in possession of drugs or drug paraphernalia will be terminated.

(e) Employees found under the influence of alcohol while on duty, or while operating a company vehicle, will be subject to termination.

5. PRESCRIPTION DRUGS - Employees using a prescribed medication which, in their physician's opinion, may impair the performance of their duties, either mental or motor functions, must immediately inform the supervisor of such prescription drug use if instructed by their physician to do so. For the safety of all employees, the Contractor will consult with you and your physician to determine if a reassignment of duties is necessary. The Contractor will attempt to accommodate your needs by making an appropriate reassignment. However, if a reassignment is not possible, you will be placed on temporary medical leave until released as fit for duty by the prescribing physician.

**GP 1142 – Faircrest Sanitary Sewer Project  
The City of Canton Engineering Department**

**Section XII: Prevailing Wage Requirements and Rates**

This project will utilize Ohio Prevailing Wage Rates. Prevailing wage rates, as of the first day of this bid advertisement, are listed on the following pages. If you have questions regarding these requirements, please contact Robert Kersey, Prevailing Wage Coordinator at [robert.kersey@cantonohio.gov](mailto:robert.kersey@cantonohio.gov) or 330-438-4725.

**GP 1142 – Faircrest Sanitary Sewer Project  
The City of Canton Engineering Department**

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# Department of Commerce

Division of Industrial Compliance

Bureau of Wage and Hour Administration  
6606 Tussing Road - PO Box 4009  
Reynoldsburg, OH 43068-9009  
Phone 614-644-2239 | Fax 614-728-8639  
TTY/TDD 800-750-0750  
www.com.ohio.gov

An Equal Opportunity Employer and Service Provider

John R. Kasich, Governor  
Andre T. Porter, Director

## Affidavit Of Compliance

### PREVAILING WAGES

I, \_\_\_\_\_  
(Name of person signing affidavit) (Title)

do hereby certify that the wages paid to all employees of

\_\_\_\_\_  
(Company Name)

for all hours worked on the

\_\_\_\_\_  
(Project name and location)

project, during the period from \_\_\_\_\_ to \_\_\_\_\_ are in  
(Project Dates)

compliance with prevailing wage requirements of Chapter 4115 of the Ohio Revised Code. I further certify that no rebates or deductions have been or will be made, directly or indirectly, from any wages paid in connection with this project, other than those provided by law.

\_\_\_\_\_  
(Signature of Officer or Agent)

Sworn to and subscribed in my presence this \_\_\_\_\_ day of \_\_\_\_\_,  
20\_\_\_\_\_.

\_\_\_\_\_  
(Notary Public)

**The above affidavit must be executed and sworn to by the officer or agent of the contractor or subcontractor who supervises the payment of employees. This affidavit must be submitted to the owner (public authority) before the surety is released or final payment due under the terms of the contract is made.**

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Austinburg, Geneva, Harpersfield, Jefferson, Plymouth and Saybrook. Erie except Sandusky city limits.

**Details :**

The removal of all insulation materials, whether they contain asbestos or not, from mechanical systems (pipes, boilers, ducts, flues, breaching, etc.) is recognized as being the exclusive work of the Asbestos Workers.

On all mechanical systems (pipes, boilers, ducts, flues, breaching, etc.) that are going to be demolished, the removal of all insulating materials whether they contain asbestos or not shall be the exclusive work of the Laborers.



SHELBY, STARK, SUMMIT, TRUMBULL,  
TUSCARAWAS, UNION, VINTON, WARREN\*,  
WAYNE

**Special Jurisdictional Note :** Butler County:( townships of Fairfield,Hanover,Liberty,Milford,Morgan,Oxford,Ripley,Ross,StClair,Union & Wayne.) (Lemon & Madison) Warren County: (townships of: Deerfield, Hamilton, Harlan, Salem, Union & Washington). ( Clear Creek, Franklin, Mossie, Turtle Creek & Wayney). Ashtabula County: (post offices & townships of Ashtabula, Austinburg, Geneva, Harperfield, Jefferson, Plymouth & Saybrook) (townships of Andover, Cherry Valley, Colbrook, Canneaut, Denmark, Dorset, East Orwell, Hartsgrove, Kingville, Lenox, Monroe,Morgan,New Lyme,North Kingsville, Orwell, Pierpoint, Richmond Rock Creek, Rome, Sheffield, Trumbull, Wayne, Williamsfield & Windsor) Erie County: (post offices & townships of Berlin, Berlin Heights,Birmingham,Florence ,Huron, Milan, Shinrock & Vermilion)

**Details :**

Asbestos & lead paint abatement including, but not limited to the removal or encapsulation of asbestos & lead paint, all work in conjunction with the preparation of the removal of same & all work in conjunction with the clean up after said removal. The removal of all insulation materials, whether they contain asbestos or not, from mechanical systems (pipes, boilers, ducts, flues, breaching, etc.) is recognized as being the exclusive work of the Asbestos Abatement Workers.

On all mechanical systems (pipes, boilers, ducts, flues, breaching, etc.) that are going to be demolished, the removal of all insulating materials whether they contain asbestos or not shall be the exclusive work of the Laborers.

An Abatement Journeyman is anyone who has more than 300 hours in the Asbestos Abatement field.

# Prevailing Wage Rate Skilled Crafts

Name of Union: **Boilermaker Local 744**

**Change # : CN01-2008Loc744**

**Craft : Boilermaker Effective Date : 07/01/2009 Last Posted : 06/30/2010**

	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
<b>Classification</b>											
Boilermaker	\$36.84	\$6.82	\$6.46	\$0.35	\$0.00	\$3.75	\$0.00			\$54.22	\$72.64
<b>Apprentice</b>	<b>Percent</b>										
1st 6 months	70.00	\$25.79	\$6.62	\$6.46	\$0.30	\$0.00	\$3.75	\$0.00		\$42.92	\$55.81
2nd 6 months	72.52	\$26.72	\$6.62	\$6.46	\$0.30	\$0.00	\$3.75	\$0.00		\$43.85	\$57.20
3rd 6 months	75.00	\$27.63	\$6.62	\$6.46	\$0.30	\$0.00	\$3.75	\$0.00		\$44.76	\$58.58
4th 6 months	77.51	\$28.55	\$6.62	\$6.46	\$0.30	\$0.00	\$3.75	\$0.00		\$45.68	\$59.96
5th 6 months	80.02	\$29.48	\$6.62	\$6.46	\$0.30	\$0.00	\$3.75	\$0.00		\$46.61	\$61.35
6th 6 months	85.00	\$31.31	\$6.62	\$6.46	\$0.30	\$0.00	\$3.75	\$0.00		\$48.44	\$64.10
7th 6 months	90.00	\$33.16	\$6.62	\$6.46	\$0.30	\$0.00	\$3.75	\$0.00		\$50.29	\$66.86
8th 6 months	95.02	\$35.01	\$6.62	\$6.46	\$0.30	\$0.00	\$3.75	\$0.00		\$52.14	\$69.64
Helper	60.00	\$22.10	\$6.82	\$6.46	\$0.35	\$0.00	\$3.75	\$0.00		\$39.48	\$50.54

**Special Calculation Note :** No special calculations for this skilled craft wage rate are required at this time.

**Ratio :** **Jurisdiction ( \* denotes special**

5 Journeymen to 1 Apprentice to 1 Helper

**jurisdictional note ) :**

ASHTABULA, CARROLL, COSHOCTON,  
CUYAHOGA, GEAUGA, HARRISON,  
HOLMES, LAKE, LORAIN, MAHONING,  
MEDINA, PORTAGE, STARK, SUMMIT,  
TRUMBULL, TUSCARAWAS, WAYNE

**Special Jurisdictional Note :**

**Details :**

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Bricklayer Local 6 Tile Setters & Finishers**

**Change # : LCN1-2012jcLoc6**

**Craft : Bricklayer Effective Date : 05/02/2012 Last Posted : 05/02/2012**

	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification											
Bricklayer Tile Setter	\$23.89	\$4.55	\$4.66	\$0.55	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$33.65	\$45.60
Marble Mason	\$23.89	\$4.55	\$4.66	\$0.55	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$33.65	\$45.60
Terrazzo worker	\$23.89	\$4.55	\$4.66	\$0.55	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$33.65	\$45.60
Finisher Support	\$21.28	\$4.55	\$4.66	\$0.55	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$31.04	\$41.68
APPRENTICE Finisher Support Only											
1ST 6 months	\$12.77	\$4.55	\$4.66	\$0.55	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$22.53	\$28.92
2ND 6 months	\$14.90	\$4.55	\$4.66	\$0.55	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$24.66	\$32.11
3RD 6 months	\$15.96	\$4.55	\$4.66	\$0.55	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$25.72	\$33.70
4TH 6 months	\$17.02	\$4.55	\$4.66	\$0.55	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$26.78	\$35.29
5TH 6 months	\$18.09	\$4.55	\$4.66	\$0.55	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$27.85	\$36.89
6TH 6 months	\$19.15	\$4.55	\$4.66	\$0.55	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.91	\$38.49
Apprentice	Percent										
1st 30 Days	35.00	\$8.36	\$4.55	\$4.66	\$0.55	\$0.00	\$0.00	\$0.00	\$0.00	\$18.12	\$22.30
31st day thru 1st 6 months	40.00	\$9.56	\$4.55	\$4.66	\$0.55	\$0.00	\$0.00	\$0.00	\$0.00	\$19.32	\$24.09
2nd 6 months	45.00	\$10.75	\$4.55	\$4.66	\$0.55	\$0.00	\$0.00	\$0.00	\$0.00	\$20.51	\$25.89
3rd 6 months	50.00	\$11.95	\$4.55	\$4.66	\$0.55	\$0.00	\$0.00	\$0.00	\$0.00	\$21.71	\$27.68
4th 6 months	58.00	\$13.86	\$4.55	\$4.66	\$0.55	\$0.00	\$0.00	\$0.00	\$0.00	\$23.62	\$30.54
5th 6 months	65.00	\$15.53	\$4.55	\$4.66	\$0.55	\$0.00	\$0.00	\$0.00	\$0.00	\$25.29	\$33.05
6th 6 months	75.00	\$17.92	\$4.55	\$4.66	\$0.55	\$0.00	\$0.00	\$0.00	\$0.00	\$27.68	\$36.64
7th 6 months	81.00	\$19.35	\$4.55	\$4.66	\$0.55	\$0.00	\$0.00	\$0.00	\$0.00	\$29.11	\$38.79

8th 4 months	90.00	\$21.50	\$4.55	\$4.66	\$0.55	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$31.26	\$42.01

**Special Calculation Note :** Classification title contains "Bricklayer" because contract originates within the Bricklayer Local.

Note that the classification description is clarified after the local union number at the top of the page.

**Ratio :**

5 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

CARROLL, COLUMBIANA, COLUMBIANA\*, STARK, TUSCARAWAS

**Special Jurisdictional Note :** Tile Setter Work for Townships of Butler, Hanover, Knox, and West in Columbiana County

**Details :**





is 3rd year												
36 through 48 months is 4th year	90.00	\$23.99	\$5.95	\$5.72	\$0.50	\$0.00	\$0.00	\$0.05	\$0.00	\$0.00	\$36.21	\$48.21

**Special Calculation Note :** OTHER IS DRUG TESTING

**Ratio :**

4 Journeymen to 1 Apprentice

9 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

CARROLL, STARK, TUSCARAWAS

**Special Jurisdictional Note :**

**Details :**



6th 6 months	89.88	\$20.83	\$5.00	\$7.85	\$0.20	\$0.00	\$0.37	\$0.37	\$0.00	\$0.00	\$34.62	\$45.03
7th 6 months	94.88	\$21.98	\$5.00	\$7.85	\$0.20	\$0.00	\$0.37	\$0.37	\$0.00	\$0.00	\$35.77	\$46.77
8th 6 months	94.88	\$21.98	\$5.00	\$7.85	\$0.20	\$0.00	\$0.37	\$0.37	\$0.00	\$0.00	\$35.77	\$46.77

**Special Calculation Note :** Other \$.40 is for International Masonry Training. Classification title contains "Bricklayer" because contract originates within the Bricklayer Local. Note that the classification description is clarified after the local union number at the top of the page.

**Ratio :**

Journeyman 4 to 1 Apprentice  
 Journeyman 6 to 1 Apprentice thereafter

**Jurisdiction ( \* denotes special jurisdictional note ) :**

ASHTABULA, CARROLL, COLUMBIANA, COSHOCTON, HARRISON, HOLMES, JEFFERSON, MAHONING, PORTAGE, STARK, TRUMBULL, TUSCARAWAS, WAYNE

**Special Jurisdictional Note :** Townships in Columbiana County are as follows: Salem, Perry, Fairfield, Center Elkrun, Middletown and Unity

**Details :**

Mechanic's assistants shall do all the handling, of sand, cement, lime, tile, marble, terrazzo and other materials used by the mechanics upon being delivered to the building or at the job. Hand rubbing, rolling, mixing, formulating, grinding, grouting, and cleaning of all marble, tile, mosaic, and terrazzo floors, and wainscoting, and such other work as is required in helping a mechanic as is the established custom of the trade. No limit to the tools, equipment or machinery used.

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Bricklayer Local 8 Zone 2 Tile Setters & Finishers**

**Change # : LCN1-2014fbLoc6**

**Craft : Bricklayer Effective Date : 06/11/2014 Last Posted : 06/11/2014**

	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification											
Bricklayer Tile Setter	\$24.13	\$5.00	\$4.78	\$0.20	\$0.00	\$0.00	\$0.35	\$0.00	\$0.00	\$34.46	\$46.53
Marble Mason	\$24.13	\$5.00	\$4.78	\$0.20	\$0.00	\$0.00	\$0.35	\$0.00	\$0.00	\$34.46	\$46.53
Terrazzo worker	\$24.13	\$5.00	\$4.78	\$0.20	\$0.00	\$0.00	\$0.35	\$0.00	\$0.00	\$34.46	\$46.53
Finisher Support	\$21.55	\$5.00	\$4.78	\$0.20	\$0.00	\$0.00	\$0.32	\$0.00	\$0.00	\$31.85	\$42.63
APPRENTICE Finisher Support Only											
1st 30 days	\$12.91	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$12.91	\$19.37
30 days ro 6 months	\$12.91	\$5.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$17.91	\$24.37
2ND 6 months	\$15.06	\$5.00	\$4.78	\$0.20	\$0.00	\$0.00	\$0.32	\$0.00	\$0.00	\$25.36	\$32.89
3RD 6 months	\$16.14	\$5.00	\$4.78	\$0.20	\$0.00	\$0.00	\$0.32	\$0.00	\$0.00	\$26.44	\$34.51
4TH 6 months	\$17.22	\$5.00	\$4.78	\$0.20	\$0.00	\$0.00	\$0.32	\$0.00	\$0.00	\$27.52	\$36.13
5TH 6 months	\$18.29	\$5.00	\$4.78	\$0.20	\$0.00	\$0.00	\$0.32	\$0.00	\$0.00	\$28.59	\$37.74
6TH 6 months	\$19.37	\$5.00	\$4.78	\$0.20	\$0.00	\$0.00	\$0.32	\$0.00	\$0.00	\$29.67	\$39.36
7TH 6 months	\$20.44	\$5.00	\$4.78	\$0.20	\$0.00	\$0.00	\$0.32	\$0.00	\$0.00	\$30.74	\$40.96
8TH 6 months	\$20.44	\$5.00	\$4.78	\$0.20	\$0.00	\$0.00	\$0.32	\$0.00	\$0.00	\$30.74	\$40.96
<b>Apprentice</b>	<b>Percent</b>										
1st 30 Days	60.00	\$14.48	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$14.48	\$21.72
31st day thru 1st 6 months	60.00	\$14.48	\$5.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.48	\$26.72
2nd 6 months	70.00	\$16.89	\$5.00	\$4.78	\$0.20	\$0.00	\$0.35	\$0.00	\$0.00	\$27.22	\$35.67
3rd 6 months	75.00	\$18.10	\$5.00	\$4.78	\$0.20	\$0.00	\$0.35	\$0.00	\$0.00	\$28.43	\$37.48
4th 6 months	80.00	\$19.30	\$5.00	\$4.78	\$0.20	\$0.00	\$0.35	\$0.00	\$0.00	\$29.63	\$39.29

5th 6 months	85.00	\$20.51	\$5.00	\$4.78	\$0.20	\$0.00	\$0.00	\$0.35	\$0.00	\$0.00	\$30.84	\$41.10
6th 6 months	90.00	\$21.72	\$5.00	\$4.78	\$0.20	\$0.00	\$0.00	\$0.35	\$0.00	\$0.00	\$32.05	\$42.91
7th 6 months	95.00	\$22.92	\$5.00	\$4.78	\$0.20	\$0.00	\$0.00	\$0.35	\$0.00	\$0.00	\$33.25	\$44.72
8th 4 months	95.00	\$22.92	\$5.00	\$4.78	\$0.20	\$0.00	\$0.00	\$0.35	\$0.00	\$0.00	\$33.25	\$44.72

**Special Calculation Note :** Other \$0.35 is for Internatioanl Masonry training. Classification title contains "Bricklayer" because contract originates within the Bricklayer Local. Note that the classification description is clarified after the local union number at the top of the page.

**Ratio :**

4 Journeymen to 1 Apprentice  
 6 Journeymen to 1 Apprentice (Thereafter)

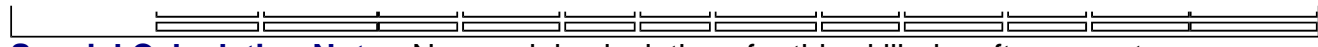
**Jurisdiction ( \* denotes special jurisdictional note ) :**

CARROLL, COLUMBIANA, COLUMBIANA\*,  
 STARK, TUSCARAWAS

**Special Jurisdictional Note :** Tile Setter Work for Townships of Butler, Hanover, Knox, and West in Columbiana County

**Details :**





**Special Calculation Note :** No special calculations for this skilled craft wage rate are required at this time.

Extra \$.02 (\$.47) is for Training for Floorlayers and Floorlayers Apprentice.

**Ratio :**

3 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

CARROLL, STARK, TUSCARAWAS, WAYNE

**Special Jurisdictional Note :**

**Details :**





HARRISON, HENRY, HIGHLAND, HOCKING,  
HOLMES, HURON, JACKSON, JEFFERSON,  
KNOX, LAKE, LAWRENCE, LICKING,  
LOGAN, LORAIN, LUCAS, MADISON,  
MAHONING, MARION, MEDINA, MEIGS,  
MERCER, MIAMI, MONROE,  
MONTGOMERY, MORGAN, MORROW,  
MUSKINGUM, NOBLE, OTTAWA,  
PAULDING, PERRY, PICKAWAY, PIKE,  
PORTAGE, PREBLE, PUTNAM, RICHLAND,  
ROSS, SANDUSKY, SCIOTO, SENECA,  
SHELBY, STARK, SUMMIT, TRUMBULL,  
TUSCARAWAS, UNION, VAN WERT,  
VINTON, WARREN, WASHINGTON, WAYNE

**Special Jurisdictional Note :**

**Details :**



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**Special Calculation Note :** No special calculations for this skilled craft wage rate are required at this time.

**Ratio :**

3 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

CARROLL, STARK, TUSCARAWAS, WAYNE

**Special Jurisdictional Note :**

**Details :**

If certain projects warrant a larger percentage of apprentices, it will be agreed to increase the ratio of apprentices to journeymen, but Not to exceed (1) Apprentice to (4) Journeymen.

The following classifications will be paid at the amount above Journeyman Rate:

Certified Welder \$1.00

Lay Out Man on Monorail \$1.25



KNOX, LAKE, LAWRENCE, LICKING,  
LOGAN, LORAIN, LUCAS, MADISON,  
MAHONING, MARION, MEDINA, MEIGS,  
MERCER, MIAMI, MONROE,  
MONTGOMERY, MORGAN, MORROW,  
MUSKINGUM, NOBLE, OTTAWA,  
PAULDING, PERRY, PICKAWAY, PIKE,  
PORTAGE, PREBLE, PUTNAM, RICHLAND,  
ROSS, SANDUSKY, SCIOTO, SENECA,  
SHELBY, STARK, SUMMIT, TRUMBULL,  
TUSCARAWAS, UNION, VAN WERT,  
VINTON, WARREN, WASHINGTON, WAYNE,  
WILLIAMS, WOOD, WYANDOT

**Special Jurisdictional Note :** Industrial Dock and Door is the installation of overhead doors, roll up doors and dock leveling equipment

**Details :**

10/27/10 New Contract jc

# Prevailing Wage Rate Skilled Crafts

Name of Union: Carpenter NE Insulation C

Change # : LCN01-2013fbLocNEC

Craft : Carpenter Effective Date : 09/25/2013 Last Posted : 09/25/2013

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
<b>Classification</b>												
Carpenter Insulation	\$25.44		\$6.45	\$5.56	\$0.45	\$0.00	\$0.34	\$0.00	\$0.00	\$0.00	\$38.24	\$50.96
<b>Apprentice</b>	<b>Percent</b>											
1st 3 months	40.00	\$10.18	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$10.18	\$15.26
2nd 3 months	45.00	\$11.45	\$6.45	\$0.00	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$18.35	\$24.07
2nd 6 months	50.00	\$12.72	\$6.45	\$0.00	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.62	\$25.98
3rd 6 months	55.00	\$13.99	\$6.45	\$0.00	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$20.89	\$27.89
4th 6 months	60.00	\$15.26	\$6.45	\$0.00	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$22.16	\$29.80
5th 6 months	70.00	\$17.81	\$6.45	\$3.89	\$0.45	\$0.00	\$0.24	\$0.00	\$0.00	\$0.00	\$28.84	\$37.74
6th 6 months	75.00	\$19.08	\$6.45	\$4.17	\$0.45	\$0.00	\$0.26	\$0.00	\$0.00	\$0.00	\$30.41	\$39.95
7th 6 months	80.00	\$20.35	\$6.45	\$4.45	\$0.45	\$0.00	\$0.27	\$0.00	\$0.00	\$0.00	\$31.97	\$42.15
8th 6 months	85.00	\$21.62	\$6.45	\$4.73	\$0.45	\$0.00	\$0.29	\$0.00	\$0.00	\$0.00	\$33.54	\$44.36

**Special Calculation Note :** No special calculations for this skilled craft wage rate are required at this time.

**Ratio :**

3 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

CARROLL, STARK, TUSCARAWAS, WAYNE

**Special Jurisdictional Note :**

**Details :**





**Ratio :**

3 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

STARK, WAYNE, CARROLL, TUSCARAWAS

**Special Jurisdictional Note :**

**Details :**

If certain projects warrant a larger percentage of apprentices, it will be agreed to increase the ratio of apprentices to journeymen, but Not to exceed (1) Apprentice to (2) Journeymen.

Employees working with creosoted, chemically treated or toxic materials, shall receive \$.50 above regular rate.



**Ratio :**

1 Installer to 1 Trainee or 1 Helper

**Jurisdiction ( \* denotes special jurisdictional note ) :**

ADAMS, ALLEN, ASHLAND, ASHTABULA, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, CUYAHOGA, DARKE, DEFIANCE, DELAWARE, ERIE, FAIRFIELD, FAYETTE, FRANKLIN, FULTON, GALLIA, GEAUGA, GREENE, GUERNSEY, HAMILTON, HANCOCK, HARDIN, HARRISON, HENRY, HIGHLAND, HOCKING, HOLMES, HURON, JACKSON, JEFFERSON, KNOX, LAKE, LAWRENCE, LICKING, LOGAN, LORAIN, LUCAS, MADISON, MAHONING, MARION, MEDINA, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, OTTAWA, PAULDING, PERRY, PICKAWAY, PIKE, PORTAGE, PREBLE, PUTNAM, RICHLAND, ROSS, SANDUSKY, SCIOTO, SENECA, SHELBY, STARK, SUMMIT, TRUMBULL, TUSCARAWAS, UNION, VAN WERT, VINTON, WARREN, WASHINGTON, WAYNE, WILLIAMS, WOOD, WYANDOT

**Special Jurisdictional Note :****Details :**

Office systems is defined as modular systems with demountable units such as desks, partitions and shelving. All work in connection with the assembly, reconfiguration and repair of all work in the office system field.

INSTALLER: is defined as a qualified office systems mechanic capable of laying out, estimating and installing various office system manufactured products.

INSTALL TRAINEE: is defined as a person training in the estimating, layout and installation in all facets of the office systems industry. An installer trainee will work to assist an installer or lead installer in all installations. He is NOT permitted to work without the assistance of lead installer

INSTALL HELPER: is defined as a person who assists in the delivery, staging and clean up of related office system work. He is NOT to be involved with the installation or layout of work related to office systems.

Receiving, unloading, unpacking, & removal of rubbish shall be done by install helpers.

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Cement Mason & Plasterer Local 109**

**Change # : LCN01-2012jcLoc109**

**Craft : Cement Effective Date : 01/19/2012 Last Posted : 01/19/2012**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
<b>Classification</b>												
Cement Mason	\$27.04		\$6.05	\$4.00	\$0.00	\$0.00	\$3.50	\$0.00	\$0.00	\$0.00	\$40.59	\$54.11
Plasterer	\$27.18		\$6.25	\$4.00	\$0.35	\$0.00	\$3.25	\$0.00	\$0.00	\$0.00	\$41.03	\$54.62
<b>Apprentice Cement Mason</b>	<b>Percent</b>											
1st year	60.00	\$16.22	\$6.05	\$4.00	\$0.00	\$0.00	\$3.50	\$0.00	\$0.00	\$0.00	\$29.77	\$37.89
2nd year	75.00	\$20.28	\$6.05	\$4.00	\$0.00	\$0.00	\$3.50	\$0.00	\$0.00	\$0.00	\$33.83	\$43.97
3rd year	90.00	\$24.34	\$6.05	\$4.00	\$0.00	\$0.00	\$3.50	\$0.00	\$0.00	\$0.00	\$37.89	\$50.05
<b>Plasterer Apprentice</b>												
1st year	60.17	\$16.27	\$6.25	\$4.00	\$0.35	\$0.00	\$3.25	\$0.00	\$0.00	\$0.00	\$30.12	\$38.25
2nd year	70.25	\$19.00	\$6.25	\$4.00	\$0.35	\$0.00	\$3.25	\$0.00	\$0.00	\$0.00	\$32.85	\$42.34
3rd year	80.32	\$21.72	\$6.25	\$4.00	\$0.35	\$0.00	\$3.25	\$0.00	\$0.00	\$0.00	\$35.57	\$46.43
4th year	90.43	\$24.45	\$6.25	\$4.00	\$0.35	\$0.00	\$3.25	\$0.00	\$0.00	\$0.00	\$38.30	\$50.53

**Special Calculation Note :** No special calculations for this skilled craft wage rate are required at this time.

**Ratio :**

1 Journeymen to 1 Apprentice  
5 Journeymen to 2 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

CARROLL, HOLMES, MEDINA, PORTAGE,  
STARK, SUMMIT, TUSCARAWAS, WAYNE

**Special Jurisdictional Note :**

**Details :**

Finishers when applying colorshake shall be paid an additional \$2.00 per DAY.

Swing Scaffolds up to 50 feet shall be paid \$0.25 above the Journeymen rate.

Swing Scaffolds over 50 feet shall be paid \$0.35 above the Journeymen rate.



GALLIA, GEAUGA, GREENE, GUERNSEY,  
HAMILTON, HANCOCK, HARDIN,  
HARRISON, HENRY, HIGHLAND, HOCKING,  
HOLMES, HURON, JACKSON, JEFFERSON,  
KNOX, LAKE, LAWRENCE, LICKING,  
LOGAN, LORAIN, LUCAS, MADISON,  
MAHONING, MARION, MEDINA, MEIGS,  
MERCER, MIAMI, MONROE,  
MONTGOMERY, MORGAN, MORROW,  
MUSKINGUM, NOBLE, OTTAWA,  
PAULDING, PERRY, PICKAWAY, PIKE,  
PORTAGE, PREBLE, PUTNAM, RICHLAND,  
ROSS, SANDUSKY, SCIOTO, SENECA,  
SHELBY, STARK, SUMMIT, TRUMBULL,  
TUSCARAWAS, UNION, VAN WERT,  
VINTON, WARREN, WASHINGTON, WAYNE

**Special Jurisdictional Note :**

**Details :**

(A) Highway Construction, Sewer, Waterworks And Utility Construction, Industrial & Building Site Heavy Construction, Airport Construction Or Railroad Construction Work.

(B) Power Plant, Tunnels, Amusement Park, Athletic Stadium Site Work ,Pollution Control,Sewer Plant, Waste Plant, & Water Treatment Facilities, Construction.





FAIRFIELD, FAYETTE, FRANKLIN, FULTON,  
GALLIA, GEAUGA, GREENE, GUERNSEY,  
HAMILTON, HANCOCK, HARDIN,  
HARRISON, HENRY, HIGHLAND, HOCKING,  
HOLMES, HURON, JACKSON, JEFFERSON,  
KNOX, LAKE, LAWRENCE, LICKING,  
LOGAN, LORAIN, LUCAS, MADISON,  
MAHONING, MARION, MEDINA, MEIGS,  
MERCER, MIAMI, MONROE,  
MONTGOMERY, MORGAN, MORROW,  
MUSKINGUM, NOBLE, OTTAWA,  
PAULDING, PERRY, PICKAWAY, PIKE,  
PORTAGE, PREBLE, PUTNAM, RICHLAND,  
ROSS, SANDUSKY, SCIOTO, SENECA,  
SHELBY, STARK, SUMMIT, TRUMBULL,  
TUSCARAWAS, UNION, VAN WERT,  
VINTON, WARREN, WASHINGTON, WAYNE

**Special Jurisdictional Note :**

**Details :**

(A) Highway Construction, Sewer, Waterworks And Utility Construction, Industrial & Building Site Heavy Construction, Airport Construction Or Railroad Construction Work.

(B) Power Plant, Tunnels, Amusement Park, Athletic Stadium Site Work ,Pollution Control,Sewer Plant, Waste Plant, & Water Treatment Facilities, Construction.



**Details :**

(A) Highway Construction, Sewer, Waterworks And Utility Construction, Industrial & Building Site, Heavy Construction, Airport Construction Or Railroad Construction Work.

(B) Power Plant, Tunnels, Amusement Park, Athletic Stadium Site Work ,Pollution Control,Sewer Plant, Waste Plant, & Water Treatment Facilities, Construction.



**Details :**

(A) Highway Construction, Sewer, Waterworks And Utility Construction, Industrial & Building Site, Heavy Construction, Airport Construction Or Railroad Construction Work.

(B) Power Plant, Tunnels, Amusement Park, Athletic Stadium Site Work ,Pollution Control,Sewer Plant, Waste Plant, & Water Treatment Facilities, Construction.

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Electrical Local 71 High Tension Pipe Type Cable**

**Change # : LCN01-2013fbLoc7**

**Craft : Lineman Effective Date : 01/16/2013 Last Posted : 01/16/2013**

	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification											
Electrical Lineman	\$37.30	\$5.00	\$1.12	\$0.37	\$0.00	\$7.46	\$0.15	\$0.00	\$0.00	\$51.40	\$70.05
Certified Lineman Welder	\$37.30	\$5.00	\$1.12	\$0.37	\$0.00	\$7.46	\$0.15	\$0.00	\$0.00	\$51.40	\$70.05
Certified Cable Splicer	\$37.30	\$5.00	\$1.12	\$0.37	\$0.00	\$7.46	\$0.15	\$0.00	\$0.00	\$51.40	\$70.05
Operator A	\$33.53	\$5.00	\$1.01	\$0.34	\$0.00	\$6.71	\$0.15	\$0.00	\$0.00	\$46.74	\$63.51
Operator B	\$29.77	\$5.00	\$0.89	\$0.30	\$0.00	\$5.95	\$0.15	\$0.00	\$0.00	\$42.06	\$56.95
Operator C	\$24.13	\$5.00	\$0.72	\$0.24	\$0.00	\$4.83	\$0.15	\$0.00	\$0.00	\$35.07	\$47.14
Groundman 0-12 months Exp	\$18.65	\$5.00	\$0.56	\$0.19	\$0.00	\$3.73	\$0.15	\$0.00	\$0.00	\$28.28	\$37.60
Groundman 0-12 months Exp w/CDL	\$20.51	\$5.00	\$0.62	\$0.21	\$0.00	\$4.10	\$0.15	\$0.00	\$0.00	\$30.59	\$40.85
Groundman 1 yr or more	\$20.51	\$5.00	\$0.62	\$0.21	\$0.00	\$4.10	\$0.15	\$0.00	\$0.00	\$30.59	\$40.85
Groundman 1 yr or more w/CDL	\$24.25	\$5.00	\$0.73	\$0.24	\$0.00	\$4.85	\$0.15	\$0.00	\$0.00	\$35.22	\$47.35
Equipment Mechanic A	\$29.77	\$5.00	\$0.89	\$0.30	\$0.00	\$5.95	\$0.15	\$0.00	\$0.00	\$42.06	\$56.95
Equipment	\$26.95	\$5.00	\$0.81	\$0.27	\$0.00	\$5.39	\$0.15	\$0.00	\$0.00	\$38.57	\$52.05

Mechanic B												
Equipment Mechanic C	\$24.13	\$5.00	\$0.72	\$0.24	\$0.00	\$4.83	\$0.15	\$0.00	\$0.00	\$35.07	\$47.14	
X-Ray Technician	\$37.30	\$5.00	\$1.12	\$0.37	\$0.00	\$7.46	\$0.15	\$0.00	\$0.00	\$51.40	\$70.05	
<b>Apprentice</b>	<b>Percent</b>											
1st 1000 hrs	60.00	\$22.38	\$5.00	\$0.67	\$0.22	\$0.00	\$4.48	\$0.15	\$0.00	\$0.00	\$32.90	\$44.09
2nd 1000 hrs	65.01	\$24.25	\$5.00	\$0.73	\$0.24	\$0.00	\$4.85	\$0.15	\$0.00	\$0.00	\$35.22	\$47.34
3rd 1000 hrs	70.00	\$26.11	\$5.00	\$0.78	\$0.26	\$0.00	\$5.22	\$0.15	\$0.00	\$0.00	\$37.52	\$50.57
4th 1000 hrs	75.01	\$27.98	\$5.00	\$0.84	\$0.28	\$0.00	\$5.60	\$0.15	\$0.00	\$0.00	\$39.85	\$53.84
5th 1000 hrs	80.00	\$29.84	\$5.00	\$0.90	\$0.30	\$0.00	\$5.97	\$0.15	\$0.00	\$0.00	\$42.16	\$57.08
6th 1000 hrs	85.01	\$31.71	\$5.00	\$0.95	\$0.32	\$0.00	\$6.34	\$0.15	\$0.00	\$0.00	\$44.47	\$60.32
7th 1000 hrs	90.00	\$33.57	\$5.00	\$1.01	\$0.34	\$0.00	\$6.71	\$0.15	\$0.00	\$0.00	\$46.78	\$63.57

**Special Calculation Note :**

Operator "A"

John Henry Rock Drill, D-6 (or equivalent) and above, Trackhoe Digger, (320 Track excavator), Cranes (greater then 25 tons and less than 45 tons).

Operator "B"

Cranes (greater than 6 tons and up to 25 tons), Backhoes, Road Tractor, Dozer up to D-5, Pressure Digger- wheeled or tracked, all Tension wire Stringing equipment.

Operator "C"

Trench, Backhoe, Riding type vibratory Compactor, Ground Rod Driver, Boom Truck (6 ton & below), Skid Steer Loaders, Material Handler.

\*All Operators of cranes 45 ton or larger shall be paid the journeyman rate of pay. \$0.15 is for Health Retirement Account.

**Ratio :**

1 Journeyman to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

ADAMS, ASHLAND, ASHTABULA, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA,



COSHOCTON, CRAWFORD, CUYAHOGA,  
DARKE, DELAWARE, FAIRFIELD, FAYETTE,  
FRANKLIN, GALLIA, GEAUGA, GREENE,  
GUERNSEY, HAMILTON, HARRISON,  
HIGHLAND, HOCKING, HOLMES, JACKSON,  
JEFFERSON, KNOX, LAKE, LAWRENCE,  
LICKING, LOGAN, LORAIN, MADISON,  
MAHONING, MARION, MEDINA, MEIGS,  
MERCER, MIAMI, MONROE,  
MONTGOMERY, MORGAN, MORROW,  
MUSKINGUM, NOBLE, PERRY, PICKAWAY,  
PIKE, PORTAGE, PREBLE, RICHLAND,  
ROSS, SCIOTO, SHELBY, STARK, SUMMIT,  
TRUMBULL, TUSCARAWAS, UNION,  
VINTON, WARREN, WASHINGTON, WAYNE

**Special Jurisdictional Note :**

**Details :**

Heli - Arc Welding will be paid \$.30 above Journeyman rate. Additional compensation of 10% over the Journeyman Lineman and Journeyman Technician for performing work on structures outside of buildings such as water towers, smoke stacks, radio and television towers, more than 75' above the ground.

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Electrical Local 71 Outside (North Central Ohio)**

**Change # : LCN01-2013fbLoc71CentralOhio**

**Craft : Lineman Effective Date : 01/16/2013 Last Posted : 01/16/2013**

	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification											
Electrical Lineman	\$33.50	\$5.00	\$1.01	\$0.34	\$0.00	\$5.70	\$0.00	\$0.00	\$0.00	\$45.55	\$62.30
Traffic Signal & Lighting Journeyman	\$32.25	\$5.00	\$0.97	\$0.32	\$0.00	\$5.48	\$0.00	\$0.00	\$0.00	\$44.02	\$60.14
Equipment Operator	\$30.15	\$5.00	\$0.90	\$0.30	\$0.00	\$5.13	\$0.00	\$0.00	\$0.00	\$41.48	\$56.55
Groundman 0-12 months	\$18.43	\$5.00	\$0.55	\$0.18	\$0.00	\$3.13	\$0.00	\$0.00	\$0.00	\$27.29	\$36.50
Groundman 1 year plus	\$21.78	\$5.00	\$0.65	\$0.22	\$0.00	\$3.70	\$0.00	\$0.00	\$0.00	\$31.35	\$42.24
=====											
Traffic Signal Apprentices											
1st 1,000 hours	\$19.35	\$5.00	\$0.58	\$0.19	\$0.00	\$3.29	\$0.00	\$0.00	\$0.00	\$28.41	\$38.09
2nd 1,000 hours	\$20.96	\$5.00	\$0.63	\$0.21	\$0.00	\$3.56	\$0.00	\$0.00	\$0.00	\$30.36	\$40.84
3rd 1,000 hours	\$22.58	\$5.00	\$0.68	\$0.23	\$0.00	\$3.84	\$0.00	\$0.00	\$0.00	\$32.33	\$43.62
4th 1,000 hours	\$24.19	\$5.00	\$0.73	\$0.24	\$0.00	\$4.11	\$0.00	\$0.00	\$0.00	\$34.27	\$46.37
5th 1,000 hours	\$25.80	\$5.00	\$0.77	\$0.26	\$0.00	\$4.39	\$0.00	\$0.00	\$0.00	\$36.22	\$49.12
6th 1,000 hours	\$29.03	\$5.00	\$0.87	\$0.29	\$0.00	\$4.94	\$0.00	\$0.00	\$0.00	\$40.13	\$54.64
=====											
<b>Apprentice Lineman</b>	<b>Percent</b>										

1st 1,000 Hours	60.00	\$20.10	\$5.00	\$0.60	\$0.20	\$0.00	\$3.42	\$0.00	\$0.00	\$0.00	\$29.32	\$39.37
2nd 1,000 Hours	65.00	\$21.78	\$5.00	\$0.65	\$0.22	\$0.00	\$3.70	\$0.00	\$0.00	\$0.00	\$31.34	\$42.23
3rd 1,000 Hours	70.01	\$23.45	\$5.00	\$0.70	\$0.23	\$0.00	\$3.99	\$0.00	\$0.00	\$0.00	\$33.37	\$45.10
4th 1,000 Hours	75.01	\$25.13	\$5.00	\$0.75	\$0.25	\$0.00	\$4.27	\$0.00	\$0.00	\$0.00	\$35.40	\$47.96
5th 1,000 Hours	80.00	\$26.80	\$5.00	\$0.80	\$0.27	\$0.00	\$4.56	\$0.00	\$0.00	\$0.00	\$37.43	\$50.83
6th 1,000 Hours	85.01	\$28.48	\$5.00	\$0.85	\$0.28	\$0.00	\$4.84	\$0.00	\$0.00	\$0.00	\$39.45	\$53.69
7th 1,000 Hours	90.00	\$30.15	\$5.00	\$0.90	\$0.30	\$0.00	\$5.13	\$0.00	\$0.00	\$0.00	\$41.48	\$56.56

**Special Calculation Note :** Other is National Electrical Benefit Fund (NEBF) and Safety & Education Fund.

**Ratio :**

1 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

BELMONT, CARROLL, HARRISON, HOLMES, JEFFERSON, MEDINA, PORTAGE, STARK, SUMMIT, WAYNE

**Special Jurisdictional Note :**

**Details :**

A groundman when directed shall assist a Journeyman in the performance of his/her work on the ground, including the use of hand tools. A Groundman under no circumstances shall climb poles, towers, ladders, or work from an elevated platform or bucket truck.

Scope of Work: installation and maintenance of highway and street lighting, highway and street sign lighting, electronic message boards and traffic control systems, camera systems, traffic signal work, substation and line construction including overhead and underground projects for private and industrial work as in accordance with the IBEW Constitution. This Agreement includes the operation of all tools and equipment necessary for the installation of the above projects.

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Electrical Local 71 Outside Utility Power**

**Change # : LCN01-2013fbLoc7**

**Craft : Lineman Effective Date : 01/16/2013 Last Posted : 01/16/2013**

	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification											
Electrical Lineman	\$35.38	\$5.00	\$1.06	\$0.35	\$0.00	\$7.08	\$0.15	\$0.00	\$0.00	\$49.02	\$66.71
Substation Technician	\$35.38	\$5.00	\$1.06	\$0.35	\$0.00	\$7.08	\$0.15	\$0.00	\$0.00	\$49.02	\$66.71
Cable Splicer	\$37.02	\$5.00	\$1.11	\$0.37	\$0.00	\$7.40	\$0.15	\$0.00	\$0.00	\$51.05	\$69.56
Operator A	\$31.82	\$5.00	\$0.95	\$0.32	\$0.00	\$6.36	\$0.15	\$0.00	\$0.00	\$44.60	\$60.51
Operator B	\$28.22	\$5.00	\$0.85	\$0.28	\$0.00	\$5.64	\$0.15	\$0.00	\$0.00	\$40.14	\$54.25
Operator C	\$22.86	\$5.00	\$0.69	\$0.23	\$0.00	\$4.57	\$0.15	\$0.00	\$0.00	\$33.50	\$44.93
Groundman 0-12 months Exp	\$17.69	\$5.00	\$0.53	\$0.18	\$0.00	\$3.54	\$0.15	\$0.00	\$0.00	\$27.09	\$35.94
Groundman 0-12 months Exp w/CDL	\$19.46	\$5.00	\$0.58	\$0.19	\$0.00	\$3.89	\$0.15	\$0.00	\$0.00	\$29.27	\$39.00
Groundman 1 yr or more	\$19.46	\$5.00	\$0.58	\$0.19	\$0.00	\$3.89	\$0.15	\$0.00	\$0.00	\$29.27	\$39.00
Groundman 1 yr or more w/CDL	\$23.00	\$5.00	\$0.69	\$0.23	\$0.00	\$4.60	\$0.15	\$0.00	\$0.00	\$33.67	\$45.17
Equipment Mechanic A	\$28.23	\$5.00	\$0.85	\$0.28	\$0.00	\$5.65	\$0.15	\$0.00	\$0.00	\$40.16	\$54.28
Equipment Mechanic B	\$25.55	\$5.00	\$0.77	\$0.26	\$0.00	\$5.11	\$0.15	\$0.00	\$0.00	\$36.84	\$49.62

Equipment Mechanic C	\$22.86	\$5.00	\$0.69	\$0.23	\$0.00	\$4.57	\$0.15	\$0.00	\$0.00	\$33.50	\$44.93	
Line Truck w/uuger	\$25.18	\$5.00	\$0.76	\$0.25	\$0.00	\$5.04	\$0.15	\$0.00	\$0.00	\$36.38	\$48.97	
<b>Apprentice</b>	<b>Percent</b>											
1st 1000 hrs	60.00	\$21.23	\$5.00	\$0.63	\$0.21	\$0.00	\$4.25	\$0.15	\$0.00	\$0.00	\$31.47	\$42.08
2nd 1000 hrs	65.00	\$23.00	\$5.00	\$0.69	\$0.23	\$0.00	\$4.60	\$0.15	\$0.00	\$0.00	\$33.67	\$45.17
3rd 1000 hrs	70.00	\$24.77	\$5.00	\$0.74	\$0.25	\$0.00	\$4.95	\$0.15	\$0.00	\$0.00	\$35.86	\$48.24
4th 1000 hrs	75.00	\$26.54	\$5.00	\$0.80	\$0.27	\$0.00	\$5.31	\$0.15	\$0.00	\$0.00	\$38.07	\$51.33
5th 1000 hrs	80.00	\$28.30	\$5.00	\$0.85	\$0.28	\$0.00	\$5.66	\$0.15	\$0.00	\$0.00	\$40.24	\$54.40
6th 1000 hrs	85.00	\$30.07	\$5.00	\$0.90	\$0.30	\$0.00	\$6.01	\$0.15	\$0.00	\$0.00	\$42.43	\$57.47
7th 1000 hrs	90.00	\$31.84	\$5.00	\$0.96	\$0.32	\$0.00	\$6.37	\$0.15	\$0.00	\$0.00	\$44.64	\$60.56

**Special Calculation Note :**

Operator "A"

John Henry Rock Drill, D-6 (or equivalent) and above, Trackhoe Digger, (320 Track excavator), Cranes (greater then 25 tons and less than 45 tons).

Operator "B"

Cranes (greater than 6 tons and up to 25 tons), Backhoes, Road Tractor, Dozer up to D-5, Pressure Digger- wheeled or tracked, all Tension wire Stringing equipment.

Operator "C"

Trench, Backhoe, Riding type vibratory Compactor, Ground Rod Driver, Boom Truck (6 ton & below), Skid Steer Loaders, Material Handler.

**Ratio :**

(1) Journeyman Lineman to (1) Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

ADAMS, ASHLAND, ASHTABULA, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, CUYAHOGA, DARKE, DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN, GALLIA, GEAUGA, GREENE, GUERNSEY, HAMILTON, HARRISON, HIGHLAND, HOCKING, HOLMES, JACKSON,

JEFFERSON, KNOX, LAKE, LAWRENCE,  
LICKING, LOGAN, LORAIN, MADISON,  
MAHONING, MARION, MEDINA, MEIGS,  
MERCER, MIAMI, MONROE,  
MONTGOMERY, MORGAN, MORROW,  
MUSKINGUM, NOBLE, PERRY, PICKAWAY,  
PIKE, PORTAGE, PREBLE, RICHLAND,  
ROSS, SCIOTO, SHELBY, STARK, SUMMIT,  
TRUMBULL, TUSCARAWAS, UNION,  
VINTON, WARREN, WASHINGTON, WAYNE

**Special Jurisdictional Note :** 0.15 is for Health Retirement Account.

**Details :**

Heli - Arc Welding will be paid \$.30 above Journeyman rate. Additional compensation of 10% over the Journeyman Lineman and Journeyman Technician for performing work on structures outside of buildings such as water towers, smoke stacks, radio and television towers, more than 75' above the ground.

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Electrical Local 540 Inside Lt Commercial Northern**

**Change # : LCN01-2014fbLoc540in**

**Craft : Electrical Effective Date : 02/12/2014 Last Posted : 02/12/2014**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Electrician	\$27.60		\$5.70	\$7.71	\$0.77	\$2.07	\$2.60	\$0.89	\$0.00	\$0.00	\$47.34	\$61.14
CE-3 12,001-14,000 Hrs	\$23.11		\$4.62	\$0.69	\$0.76	\$0.00	\$0.69	\$0.00	\$0.00	\$0.10	\$29.97	\$41.52
CE-2 10,001-12,000 Hrs	\$18.16		\$4.62	\$0.54	\$0.76	\$0.00	\$0.54	\$0.00	\$0.00	\$0.10	\$24.72	\$33.80
CE-1 8,001-10,000 Hrs	\$16.51		\$4.62	\$0.50	\$0.76	\$0.00	\$0.50	\$0.00	\$0.00	\$0.10	\$22.99	\$31.25
CW-4 6,001-8,000 Hrs	\$14.85		\$4.62	\$0.45	\$0.76	\$0.00	\$0.45	\$0.00	\$0.00	\$0.10	\$21.23	\$28.66
CW-3 4,001-6,000 Hrs	\$13.20		\$4.62	\$0.40	\$0.76	\$0.00	\$0.40	\$0.00	\$0.00	\$0.10	\$19.48	\$26.08
CW-2 2,001-4,000 Hrs	\$11.55		\$4.62	\$0.35	\$0.76	\$0.00	\$0.35	\$0.00	\$0.00	\$0.10	\$17.73	\$23.51
CW-1 0-2,000 Hrs	\$11.55		\$4.62	\$0.35	\$0.76	\$0.00	\$0.35	\$0.00	\$0.00	\$0.10	\$17.73	\$23.51
<b>Apprentice</b>	<b>Percent</b>											
1st 1000 hrs	40.00	\$11.04	\$5.70	\$0.00	\$0.35	\$0.00	\$0.00	\$0.33	\$0.00	\$0.00	\$17.42	\$22.94
2nd 1000 hrs	45.00	\$12.42	\$5.70	\$0.00	\$0.38	\$0.00	\$0.00	\$0.37	\$0.00	\$0.00	\$18.87	\$25.08
3rd 1500 hrs	50.00	\$13.80	\$5.70	\$1.54	\$0.42	\$0.41	\$0.52	\$0.43	\$0.00	\$0.00	\$22.82	\$29.72

4th 1500 hrs	60.00	\$16.56	\$5.70	\$3.08	\$0.48	\$0.50	\$1.04	\$0.51	\$0.00	\$0.00	\$27.87	\$36.15
5th 1500 hrs	70.00	\$19.32	\$5.70	\$4.63	\$0.55	\$0.58	\$1.56	\$0.60	\$0.00	\$0.00	\$32.94	\$42.60
6th 1500 hrs	80.00	\$22.08	\$5.70	\$6.17	\$0.61	\$0.66	\$2.08	\$0.68	\$0.00	\$0.00	\$37.98	\$49.02

**Special Calculation Note :** OTHER = (NEBF) National Electrical Benefit Fund. Vacation contribution is equal to 7.5% of the gross weekly wages.

**Ratio :**

- 1 to 3 Journeymen to 2 Apprentices
- 4 to 6 Journeymen up to 4 Apprentices
- 7 to 9 Journeymen up to 6 Apprentices

**Jurisdiction ( \* denotes special jurisdictional note ) :**

- CARROLL\*, COLUMBIANA\*, HOLMES,
- MAHONING\*, STARK, TUSCARAWAS\*,
- WAYNE\*

**Construction Electrician and Construction Wireman Ratio**

There shall be a minimum ratio of one inside Journeyman Wireman to every (4) employees of different classifications per jobsite. An Inside Journeyman Wireman is required on the project as the fifth (5th) worker or when apprentices are used.

**Special Jurisdictional Note :** Carroll County: North half including; Fox, Harrison, Rose and Washington Townships.

Columbiana County: Knox Township only.

Mahoning County: Smith Township only.

Tuscarawas County: That portion North of Auburn, Clay, Rush and York Townships.

Wayne County: That portion south of Baughman, Chester, Green, Wayne and Wooster Townships.

The scope of work for the light commercial agreement shall apply to the following small medical clinics, stand-alone doctor and dentist offices with up to 600 amp service (not attached to a hospital), gas stations/convenience stores, fast food restaurants and franchised chain restaurants including independent bars and taverns, places of worship, funeral homes, nursing homes, assisted living facilities and day-care facilities under 15,000 sq ft, small office, retail/wholesale facilities under 15,000 sq ft with less than 10 units attached, storage units, car washes, express hotels and motels (4 stories or less) without conference or restaurants facilities, residential units (subject to Davis Bacon Rates) small stand-alone manufacturing facilities when free standing and not part of a larger facility (less than 15,000 sq ft) solar projects (500 panels or less) unless other wise covered under this agreement, lighting retrofits (when not associated with remodels involving branch re-circuiting) Lighting retrofits shall be defined as the changing of lamps and ballasts in existing



light fixtures and shall also include the one for one replacement of existing fixtures.

**Details :**

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Electrical Local 540 Inside**

**Change # : LCN01-2013fbLoc540in**

**Craft : Electrical Effective Date : 01/09/2013 Last Posted : 01/09/2013**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
<b>Classification</b>												
Electrician	\$28.35		\$5.70	\$7.71	\$0.87	\$2.13	\$2.60	\$0.91	\$0.00	\$0.00	\$48.27	\$62.45
<b>Apprentice</b>	<b>Percent</b>											
1st 1000 hrs	40.00	\$11.34	\$5.70	\$0.00	\$0.44	\$0.00	\$0.00	\$0.34	\$0.00	\$0.00	\$17.82	\$23.49
2nd 1000 hrs	45.00	\$12.76	\$5.70	\$0.00	\$0.47	\$0.00	\$0.00	\$0.38	\$0.00	\$0.00	\$19.31	\$25.69
3rd 1500 hrs	50.00	\$14.18	\$5.70	\$1.54	\$0.51	\$0.43	\$0.52	\$0.44	\$0.00	\$0.00	\$23.32	\$30.40
4th 1500 hrs	60.00	\$17.01	\$5.70	\$3.08	\$0.57	\$0.51	\$1.04	\$0.53	\$0.00	\$0.00	\$28.44	\$36.95
5th 1500 hrs	70.01	\$19.85	\$5.70	\$4.63	\$0.64	\$0.60	\$1.56	\$0.61	\$0.00	\$0.00	\$33.59	\$43.51
6th 1500 hrs	80.00	\$22.68	\$5.70	\$6.17	\$0.71	\$0.68	\$2.08	\$0.70	\$0.00	\$0.00	\$38.72	\$50.06

**Special Calculation Note :** OTHER = (NEBF) National Electrical Benefit Fund. Vacation contribution is equal to 7.5% of the gross weekly wages.

**Ratio :**

The first person assigned to any job site shall be a Journeyman Wireman. Ratio thereafter:

**Jurisdiction ( \* denotes special jurisdictional note ) :**

CARROLL\*, COLUMBIANA\*, HOLMES, MAHONING\*, STARK, TUSCARAWAS\*, WAYNE\*

1-3 Journeymen to 2 Apprentices  
4 to 6 Journeymen up to 4 Apprentices  
7 to 9 Journeymen up to 6 Apprentices

**Special Jurisdictional Note :** Carroll County: North half including; Fox, Harrison, Rose and Washington Townships.

Columbiana County: Knox Township only.

Mahoning County: Smith Township only.

Tuscarawas County: That portion North of Auburn, Clay, Rush and York Townships.

Wayne County: That portion south of Baughman, Chester, Green, Wayne and Wooster Townships.

**Details :**

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Electrical Local 540 Voice Data Video**

**Change # : LCN02-2013fbLoc540VDV**

**Craft : Voice Data Video Effective Date : 10/09/2013 Last Posted : 10/09/2013**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Electrical Installer Technician	\$19.65		\$5.70	\$3.69	\$0.47	\$1.30	\$0.81	\$0.63	\$0.00	\$0.00	\$32.25	\$42.07
Cable Puller	\$9.83		\$5.70	\$3.69	\$0.24	\$0.65	\$0.81	\$0.31	\$0.00	\$0.00	\$21.23	\$26.14
<b>Apprentice</b>	<b>Percent</b>											
1st period	55.00	\$10.81	\$5.70	\$0.00	\$0.26	\$0.71	\$0.00	\$0.35	\$0.00	\$0.00	\$17.83	\$23.23
2nd period	65.00	\$12.77	\$5.70	\$0.00	\$0.31	\$0.84	\$0.00	\$0.41	\$0.00	\$0.00	\$20.03	\$26.42
3rd period	75.00	\$14.74	\$5.70	\$3.69	\$0.35	\$0.97	\$0.81	\$0.47	\$0.00	\$0.00	\$26.73	\$34.10
4th period	80.00	\$15.72	\$5.70	\$3.69	\$0.38	\$1.04	\$0.81	\$0.50	\$0.00	\$0.00	\$27.84	\$35.70
5th period	85.00	\$16.70	\$5.70	\$3.69	\$0.40	\$1.10	\$0.81	\$0.53	\$0.00	\$0.00	\$28.93	\$37.28
6th period	90.03	\$17.69	\$5.70	\$3.69	\$0.42	\$1.17	\$0.81	\$0.57	\$0.00	\$0.00	\$30.05	\$38.90

**Special Calculation Note : OTHER = (NEBF) National Electrical Benefit Fund.**

VACATION PAY - Based on time worked within the industry. The employer agrees to contribute a sum equal to an additional 4.3% of the hourly rate during the first year of employment. After an employee works for a period of one year such employee shall be paid 6.4% of the hourly rate. After two or more years the employee shall be paid 6.6% of hourly rate.

**Ratio :** **Jurisdiction ( \* denotes special jurisdictional note ) :**

1-3 Journeyman to 2 Apprentice  
4-6 Journeyman to 4 Apprentice

CARROLL\*, COLUMBIANA\*, HOLMES,  
MAHONING\*, STARK, TUSCARAWAS\*,  
WAYNE\*

\*\* Exception - When fire alarm falls within the scope of this addendum, Cable Pullers can be used to aid in test and be the 2nd Teledata employee on the job

**Special Jurisdictional Note :** Carroll County includes the following townships: North half including Fox, Harrison, Rose and Washington. Tuscarawas County includes the following townships: The portion North of Auburn, Clay, Rush and York. Wayne County includes the following townships: The portion South of Baughman, Chester, Green, and Wayne. Columbiana County includes Knox township. Mahoning County includes Smith township.

**Details :**

CABLE PULLERS - are for the installation of cable from one termination point to another.

The following work is EXCLUDED from the Teledata Technician work scope:

- \* - Installation of computer systems in industrial applications such as assembly lines, robotics, computer controller manufacturing systems.
- \* - Installation of conduit and/ or raceways shall be installed by Inside Wireman . On sites where there is no Inside Wireman employed, the Teledata Technician may install raceway, or conduit not greater than 10 feet.
- \* - Fire Alarm work on all new construction sites or wherever the fire alarm system is installed in conduit.
- \* - All HVAC control work.



**Special Jurisdictional Note :**

**Details :**

Vacation 6%/under 5 years based on regular hourly rate for all hours worked. 8%/over 5 years based on regular hourly rate for all hours worked.

# Prevailing Wage Rate Skilled Crafts

Name of Union: **Glazier Local 1162**

**Change # : LCN01-2014fbLoc1162**

**Craft : Glazier Effective Date : 05/01/2014 Last Posted : 04/30/2014**

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Glazier	\$23.49		\$6.48	\$5.07	\$0.30	\$0.00	\$0.00	\$0.25	\$0.00	\$0.00	\$35.59	\$47.34
<b>Apprentice</b>	<b>Percent</b>											
1st 6 months	49.28	\$11.58	\$6.48	\$5.07	\$0.30	\$0.00	\$0.00	\$0.25	\$0.00	\$0.00	\$23.68	\$29.46
2nd 6 months	54.23	\$12.74	\$6.48	\$5.07	\$0.30	\$0.00	\$0.00	\$0.25	\$0.00	\$0.00	\$24.84	\$31.21
3rd 6 months	59.18	\$13.90	\$6.48	\$5.07	\$0.30	\$0.00	\$0.00	\$0.25	\$0.00	\$0.00	\$26.00	\$32.95
4th 6 months	64.05	\$15.05	\$6.48	\$5.07	\$0.30	\$0.00	\$0.00	\$0.25	\$0.00	\$0.00	\$27.15	\$34.67
5th 6 months	69.00	\$16.21	\$6.48	\$5.07	\$0.30	\$0.00	\$0.00	\$0.25	\$0.00	\$0.00	\$28.31	\$36.41
6th 6 months	73.95	\$17.37	\$6.48	\$5.07	\$0.30	\$0.00	\$0.00	\$0.25	\$0.00	\$0.00	\$29.47	\$38.16
7th 6 months	78.88	\$18.53	\$6.48	\$5.07	\$0.30	\$0.00	\$0.00	\$0.25	\$0.00	\$0.00	\$30.63	\$39.89
8th 6 months	88.73	\$20.84	\$6.48	\$5.07	\$0.30	\$0.00	\$0.00	\$0.25	\$0.00	\$0.00	\$32.94	\$43.36

**Special Calculation Note : OTHER IS : Supplemental Unemployment Benefits**

**Ratio :**

1 Journeyman to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

CARROLL, COSHOCTON, HOLMES,



3 Journeymen to 1 Apprentice Thereafter

MEDINA, PORTAGE, STARK, SUMMIT,  
TUSCARAWAS, WAYNE

**Special Jurisdictional Note :**

**Details :**

Add \$1.25 per hour for High Pay which is all work that requires the employee be supported by equipment which hangs or suspends from the roof of a building or structure including all repelling .

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Ironworker Local 550 Glass & Curtain Wall**

**Change # : LCN01-2014fbLoc550**

**Craft : Ironworker Effective Date : 07/01/2014 Last Posted : 06/25/2014**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Ironworker Glass & Curtain Wall	\$22.00		\$5.43	\$0.00	\$0.64	\$0.00	\$7.05	\$0.60	\$0.00	\$0.00	\$35.72	\$46.72
Apprentice	Percent											
1st 6 months	60.00	\$13.20	\$5.43	\$0.00	\$0.64	\$0.00	\$7.05	\$0.60	\$0.00	\$0.00	\$26.92	\$33.52
2nd 6 months	65.00	\$14.30	\$5.43	\$0.00	\$0.64	\$0.00	\$7.05	\$0.60	\$0.00	\$0.00	\$28.02	\$35.17
3rd 6 months	70.00	\$15.40	\$5.43	\$0.00	\$0.64	\$0.00	\$7.05	\$0.60	\$0.00	\$0.00	\$29.12	\$36.82
4th 6 months	75.00	\$16.50	\$5.43	\$0.00	\$0.64	\$0.00	\$7.05	\$0.60	\$0.00	\$0.00	\$30.22	\$38.47
5th 6 months	80.00	\$17.60	\$5.43	\$0.00	\$0.64	\$0.00	\$7.05	\$0.60	\$0.00	\$0.00	\$31.32	\$40.12
6th 6 months	85.00	\$18.70	\$5.43	\$0.00	\$0.64	\$0.00	\$7.05	\$0.60	\$0.00	\$0.00	\$32.42	\$41.77
7th 6 months	90.00	\$19.80	\$5.43	\$0.00	\$0.64	\$0.00	\$7.05	\$0.60	\$0.00	\$0.00	\$33.52	\$43.42
8th 6 months	95.00	\$20.90	\$5.43	\$0.00	\$0.64	\$0.00	\$7.05	\$0.60	\$0.00	\$0.00	\$34.62	\$45.07

**Special Calculation Note : OTHER IS: JOURNEYMAN UPGRADE AND WELLNESS FUND.**

**Ratio :**

1 Apprentice to 1 Journeymen

**Jurisdiction ( \* denotes special jurisdictional note ) :**

ASHLAND, CARROLL, COLUMBIANA\*,  
COSHOCOTON, HOLMES, HURON\*,  
MAHONING\*, MEDINA\*, PORTAGE\*,  
RICHLAND, STARK, SUMMIT\*,  
TUSCARAWAS, WAYNE

**Special Jurisdictional Note :** The jurisdictional line between Locals 17 and 550 is determined as follows: All territory North of Old Route 224 line is to be within the jurisdiction of Local 17.

All territory South of Old Route 224 line is to be the jurisdiction of Local 550, except for everything within the City limits of Barberton which shall be under the jurisdiction of Local 17.

**Details :**

# Prevailing Wage Rate Skilled Crafts

Name of Union: Ironworker Local 550

Change # : LCN01-2013fbLoc550

Craft : Ironworker Effective Date : 06/19/2013 Last Posted : 06/19/2013

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
<b>Classification</b>												
Ironworker	\$25.32		\$5.43	\$8.17	\$0.64	\$0.00	\$2.48	\$0.85	\$0.00	\$0.00	\$42.89	\$55.55
<b>Apprentice</b>	<b>Percent</b>											
1st 6 months	60.00	\$15.19	\$5.43	\$8.17	\$0.64	\$0.00	\$2.48	\$0.85	\$0.00	\$0.00	\$32.76	\$40.36
2nd 6 months	65.00	\$16.46	\$5.43	\$8.17	\$0.64	\$0.00	\$2.48	\$0.85	\$0.00	\$0.00	\$34.03	\$42.26
3rd 6 months	70.00	\$17.72	\$5.43	\$8.17	\$0.64	\$0.00	\$2.48	\$0.85	\$0.00	\$0.00	\$35.29	\$44.16
4th 6 months	75.00	\$18.99	\$5.43	\$8.17	\$0.64	\$0.00	\$2.48	\$0.85	\$0.00	\$0.00	\$36.56	\$46.06
5th 6 months	80.00	\$20.26	\$5.43	\$8.17	\$0.64	\$0.00	\$2.48	\$0.85	\$0.00	\$0.00	\$37.83	\$47.95
6th 6 months	85.00	\$21.52	\$5.43	\$8.17	\$0.64	\$0.00	\$2.48	\$0.85	\$0.00	\$0.00	\$39.09	\$49.85
7th 6 months	90.00	\$22.79	\$5.43	\$8.17	\$0.64	\$0.00	\$2.48	\$0.85	\$0.00	\$0.00	\$40.36	\$51.75
8th 6 months	95.00	\$24.05	\$5.43	\$8.17	\$0.64	\$0.00	\$2.48	\$0.85	\$0.00	\$0.00	\$41.62	\$53.65

**Special Calculation Note :** OTHER IS: JOURNEYMAN UPGRADE AND WELLNESS FUND.

**Ratio :** **Jurisdiction ( \* denotes special jurisdictional note ) :**

4 Journeymen to 1 Apprentice  
1 Journeymen to 1 Apprentice, spinning of cable  
for suspension bridge  
1 Journeymen to 1 Apprentice, ornamental work  
2 Journeymen to 1 Apprentice, reinforcing work  
\*\*\*the ratio of apprentices to journeymen may be  
adjusted higher on a job-to job basis with the  
approval of the business manager and/or business  
agent.

ASHLAND, CARROLL, COLUMBIANA\*,  
COSHOCTON, HOLMES\*, HURON,  
MAHONING\*, MEDINA\*, PORTAGE\*,  
RICHLAND, STARK, SUMMIT\*,  
TUSCARAWAS, WAYNE

**Special Jurisdictional Note :** The jurisdictional line between Local 17 and Local 550 is determined as follows: All territory North of Old Route 224 line to be within the jurisdiction of Local 17. All territory South of Old Route 224 line is to be the jurisdiction of Local 550, except for everything within the City limits of Barberton which shall be under the jurisdiction of Local 17.

**Details :**

# Prevailing Wage Rate Skilled Crafts

Name of Union: Labor HevHwy 2

**Change # : LCN01-2014fbLaborHevHwy2**

**Craft : Laborer Group 1 Effective Date : 05/01/2014 Last Posted : 04/30/2014**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
<b>Classification</b>												
Laborer Group 1	\$28.15		\$6.40	\$3.00	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$38.05	\$52.12
Group 2	\$28.32		\$6.40	\$3.00	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$38.22	\$52.38
Group 3	\$28.65		\$6.40	\$3.00	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$38.55	\$52.87
Group 4	\$29.10		\$6.40	\$3.00	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$39.00	\$53.55
Watch Person	\$20.45		\$6.40	\$3.00	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$30.35	\$40.57
<b>Apprentice</b>	<b>Percent</b>											
0-1000 hrs	60.00	\$16.89	\$6.40	\$3.00	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$26.79	\$35.23
1001-2000 hrs	70.02	\$19.71	\$6.40	\$3.00	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$29.61	\$39.47
2001-3000 hrs	80.00	\$22.52	\$6.40	\$3.00	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$32.42	\$43.68
3001-4000 hrs	90.00	\$25.33	\$6.40	\$3.00	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$35.24	\$47.90
More Than 4000 hrs	100.00	\$28.15	\$6.40	\$3.00	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$38.05	\$52.12

**Special Calculation Note :** Watchman has no Apprentices

**Ratio :**

- 1 Journeymen to 1 Apprentice
- 4 Journeymen to 1 Apprentice thereafter

**Jurisdiction ( \* denotes special jurisdictional note ) :**

- ASHTABULA, ERIE, HURON, LORAIN,
- LUCAS, MAHONING, MEDINA, OTTAWA,

PORTAGE, SANDUSKY, STARK, SUMMIT,  
TRUMBULL, WOOD

**Special Jurisdictional Note :** Hod Carriers and Common Laborers - Heavy, Highway, Sewer, Waterworks, Utility, Airport, Railroad, Industrial and Building Site, Sewer Plant, Waste Water Treatment Facilities Construction

**Details :**

## Group 1

Laborer (Construction); Plant Laborer or Yardman, Right-of-way Laborer, Landscape Laborer, Highway Lighting Worker, Signalization Worker, (Swimming) Pool Construction Laborer, Utility Man, Bridge Man, Handyman, Joint Setter, Flagperson, Carpenter Helper, Waterproofing Laborer, Slurry Seal, Seal Coating, Surface Treatment or Road Mix Laborer, Riprap Laborer & Grouter, Asphalt Laborer, Dump Man (batch trucks), Guardrail & Fence Installer, Mesh Handler & Placer, Concrete Curing Applicator, Scaffold Erector, Sign Installer, Hazardous Waste (level D), Diver Helper, Zone Person and Traffic Control.

## Group 2

Asphalt Raker, Screwman or Paver, Concrete Puddler, Kettle Man (pipeline), All Machine-Driven Tools (Gas, Electric, Air), Mason Tender, Brick Paver, Mortar Mixer, Skid Steer, Sheeting & Shoring Person, Surface Grinder Person, Screedperson, Water Blast, Hand Held Wand, Power Buggy or Power Wheelbarrow, Paint Striper, Plastic fusing Machine Operator, Rodding Machine Operator, Pug Mill Operator, Operator of All Vacuum Devices Wet or Dry, Handling of all Pumps 4 inches and under (gas, air or electric), Bottom Person, Welder Helper (pipeline), Concrete Saw Person, Cutting with Burning Torch, Pipe Layer, Hand Spiker (railroad), Underground Person (working in sewer and waterline, cleaning, repairing and reconditioning). Tunnel Laborer (without air), Caisson, Cofferdam (below 25 feet deep), Air Track and Wagon Drill, Sandblaster Nozzle Person, Hazardous Waste (level B), Lead Abatement, Hazardous Waste (level C)

## Group 3

Blast and Powder Person, Muckers (with miners), Wrencher (mechanical joints & utility pipeline), Yarnier, Top Lander, Hazardous Waste (level A), Concrete Specialist, Curb Setter and Cutter, Concrete Crew in Tunnels. Utility pipeline Tappers, Waterline, Caulker, Signal Person, Grade Checker

## Group 4

Miner, Welder, Gunitite Nozzle Person

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Labor Local 1015 Building**

**Change # : LCN01-2014jcLoc1015**

**Craft : Laborer Effective Date : 05/07/2014 Last Posted : 05/07/2014**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Laborer Group 1	\$23.67	\$6.40	\$3.00	\$0.35	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$33.52	\$45.36	
Group 2	\$24.07	\$6.40	\$3.00	\$0.35	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$33.92	\$45.96	
Group 3	\$24.42	\$6.40	\$3.00	\$0.35	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$34.27	\$46.48	
Group 4	\$24.37	\$6.40	\$3.00	\$0.35	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$34.22	\$46.41	
Group 5	\$16.71	\$6.40	\$3.00	\$0.35	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$26.56	\$34.92	
Apprentice	Percent											
0-1000 hrs	60.00	\$14.20	\$6.40	\$3.00	\$0.35	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$24.05	\$31.15
1001-2000 hrs	70.00	\$16.57	\$6.40	\$3.00	\$0.35	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$26.42	\$34.70
2001-3000 hrs	80.00	\$18.94	\$6.40	\$3.00	\$0.35	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$28.79	\$38.25
3001-4000 hrs	90.00	\$21.30	\$6.40	\$3.00	\$0.35	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$31.15	\$41.80
More than 4000 hrs	100.00	\$23.67	\$6.40	\$3.00	\$0.35	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$33.52	\$45.36

**Special Calculation Note :** No special calculations for this skilled craft wage rate are required at this time.

**Ratio :**

1 Journeyman to 1 Apprentice  
4 Journeyman to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

CARROLL, STARK, WAYNE



**Special Jurisdictional Note :****Details :**

## Group 1

Building & Construction Laborer, Signalman, Flagman, Tool Cribman, Carpenter Tender, Finisher Tender, Concrete Handler, Utility Construction Laborer, Guard Rail Erectors, Hazardous Waste (Level D)

## Group 2

Bottom Man, Scaffold Builder, Tunnel laborer, Pipe Layer, Air and Power Driven Tools, Burner on Demolition Work, Swinging Scaffold, Mucker, Caisson Worker, Cofferdam Worker, Powder Men and Dynamite Blaster, Creosote Worker, Form Setter, Plasterer Tender, Hod Carrier Laser Beam Set-up Man, All confined space work, furnaces, pickel tubs, acid-pits, and Hazardous Waste Level (C)

## Group 3

Mason Tender, Mortar Mixer, Stonemason Tender, skid-loader, Hazardous Waste Level (B)

## Group 4

Gunnite Operator, Hazardous Waste Level (A)

## Group 5

Watchman

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Operating Engineers - Building Local 18 - Zone III**

**Change # : LCN01-2014jcLoc18zone3**

**Craft : Operating Engineer Effective Date : 05/07/2014 Last Posted : 05/07/2014**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Operator Class 1	\$32.24		\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$46.14	\$62.26
Class 2	\$32.12		\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$46.02	\$62.08
Class 3	\$31.08		\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$44.98	\$60.52
Class 4	\$29.90		\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$43.80	\$58.75
Class 5	\$24.44		\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$38.34	\$50.56
Class 6	\$32.49		\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$46.39	\$62.64
Class 7	\$32.74		\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$46.64	\$63.01
Class 8	\$33.24		\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$47.14	\$63.76
Class 9	\$33.49		\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$47.39	\$64.13
<b>Apprentice</b>	<b>Percent</b>											
1st Year	50.00	\$16.12	\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$30.02	\$38.08
2nd Year	60.00	\$19.34	\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$33.24	\$42.92
3rd Year	70.00	\$22.57	\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$36.47	\$47.75
4th Year	80.00	\$25.79	\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$39.69	\$52.59
Field Mechanic Trainee												
1st Year	50.00	\$16.12	\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$30.02	\$38.08
2nd Year	60.00	\$19.34	\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$33.24	\$42.92
3rd Year	70.00	\$22.57	\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$36.47	\$47.75
4th Year	80.00	\$25.79	\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$39.69	\$52.59

**Special Calculation Note :** Other: Education & Safety Fund is \$0.04 per hour.

**Ratio :**

For every (3) Operating Engineer Journeymen employed by the company ,there may be employed (1) Registered Apprentice. An apprenice, while employed as part of a crew per Article VIII, paragraph 77, will not be subject to the apprenticeship ratios in this collective bargaining agreement. On jobs where maintenance engineers are to be employed, for every (2) Class 2 Mechanics there may be (1) Mechanic Trainee & so fourth.

**Jurisdiction ( \* denotes special jurisdictional note ) :**

ADAMS, ALLEN, ASHLAND, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COSHOCTON, CRAWFORD, DARKE, DEFIANCE, DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN, FULTON, GALLIA, GREENE, GUERNSEY, HAMILTON, HANCOCK, HARDIN, HARRISON, HENRY, HIGHLAND, HOCKING, HOLMES, JACKSON, JEFFERSON, KNOX, LAWRENCE, LICKING, LOGAN, MADISON, MARION, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, OTTAWA, PAULDING, PERRY, PICKAWAY, PIKE, PREBLE, PUTNAM, RICHLAND, ROSS, SANDUSKY, SCIOTO, SENECA, SHELBY, STARK, TUSCARAWAS, UNION, VAN WERT, VINTON, WARREN, WASHINGTON, WAYNE, WILLIAMS, WYANDOT

**Special Jurisdictional Note :****Details :**

\*\*Apprentices will receive a 10% increase on top of the percentages listed above provided they are operating mobile equipment. Mechanic Trainees will receive 10% increase if required to have CDL

Class 1 - Barrier Moving Machine; Boiler Operators or Compressor Operators, when compressor or boiler is mounted on crane (Piggyback Operation); Boom Trucks (all types); Cableways Cherry Pickers; Combination - Concrete Mixers & Towers; All Concrete Pumps with Booms; Cranes (all types) Derricks (all types); Draglines Dredges (dipper, clam or suction) 3-man crew; Elevating Graders or Euclid Loaders; Floating Equipment; Gradalls; Helicopter Operators; hoisting building materials; Helicopter Winch Operators, Hoisting building materials; Hoes (All types); Hoists (with two or more drums in use); Hydraulic Gantry (lift system); Laser Finishing Machines; Lift Slab or Panel Jack Operators; Locomotives (all types); Maintenance Engineers (Mechanic and/or Welder); Mixers, paving (multiple drum); Mobile Concrete Pumps, with booms, Panelboards, (all types on site); Pile Drivers; Power Shovels; Prentice Loader; Rail Tamper (with automatic lifting and aligning device); Rotary Drills (all) used on caissons for foundations and sub-structure work; Side Booms; Slip Form Pavers; Straddle Carriers (Building Construction on site); Tug Boats. Horizontal Directional Drill, Rough Terrain Fork-lift with Winch/Hoist, Laser Screed, and Like equipment; Compact Cranes, track or rubber over 4,000 pound capacity, self-erecting cranes: stationary, track or truck (all configurations) bucket trench machines (over 24 " wide).

Class 2 - Asphalt Pavers; Bobcat-type and/or skid steer loader with hoe attachment greater than 7000

lbs. Bulldozers; CMI type Equipment; Endloaders; Hydro Milling Machine; Kolman-type Loaders (Dirt Loading); Lead Greasemen; Mucking Machines; Pettibone-Rail Equipment; Power Graders; Power Scoops; Power Scrapers; Push Cats; Vermeer Type Concrete Saw; All rotomills, grinders & planers of all types. Articulating/end dumps (minus \$4.00/hour from Class 2 rate)

Class 3 - A Frames; Air Compressors, Pressurizing Shafts or Tunnels; All Asphalt Rollers; Bobcat-type and/or skid steer loader with or without attachments; Boilers (15 lbs pressure and over); All concrete Pumps (without booms with 5 inch system); Fork Lifts (except masonry); Highway Drillers - all types (with integral power); Hoists (with one drum); House Elevators (except those automatic call button controlled); Man lifts; Mud Jacks; Pressure Grouting; Pump Operators (installing or operating Well Points or other types of Dewatering Systems); Pumps (4 inches and over discharge); Railroad Tie Inserter/Remover; Rotator (Lime-Soil Stabilizer); Submersible Pumps (4 inches and over discharge); Switch & Tie Tampers (without lifting and aligning device); Trench Machines (24 inches and under); Utility Operators; Material hoist/elevators.

Class 4 - Ballast Re-locator; Backfillers and Tampers; Batch Plant Operators; Bar and Joint Installing Machines; Bull Floats; Burlap and Curing Machines; Clefplanes; Compressors, on building construction; Concrete Spreader; Conveyors, used for handling building materials; Concrete Mixers, one bag capacity (side loader); Concrete Mixers, capacity more than one bag; Crushers; Deck Hands; Drum Fireman (in Asphalt Plant); Farm type tractors pulling attachments; Finishing Machines; Form Trenchers; Generators; Guniting Machines; Hydro-Seeders; Pavement Breakers (hydraulic or cable); Post Drivers; Post Hole Diggers; Pressure Pumps (over 1/2 inch discharge); Road Widening Trenchers; Rollers (except asphalt); All Concrete pumps (without Boom with 4 inch or smaller systems); Self-Propelled Power Spreaders; Concrete Spreaders; Self-Propelled Sub-graders; Shotcrete Machines; Tire Repairmen; Tractors, pulling sheepfoot rollers or graders; VAC/ALLS; Vibratory Compactors, with integral power; Welder Operators.

Class 5 - Boilers (less than 15 lbs. pressure); Inboard/outboard Motor Boat Launches; Light Plant Operators; Masonry Fork Lifts; Oilers/Helpers; Power Driven Heaters (oil fired); Power Scrubbers; Power Sweepers; Pumps (under 4 inch discharge); Signalmen, Submersible Pumps (under 4 inch discharge). Directional Drill Locator and Allen Screed Concrete Paver. Fueling and greasing (plus \$3.00), compact cranes; track or rubber under 4,000 pounds.

Class 6 - Master Mechanic

Class 7 - Boom & Jib 150 - 180 feet

Class 8 - Boom & Jib 180 - 249 feet

Class 9 - Boom & Jib 250 - or over

# Prevailing Wage Rate Skilled Crafts

Name of Union: Operating Engineers - HevHwy II

Change # : LCN01-2014fbLoc18hevhwyl

Craft : Operating Engineer Effective Date : 05/21/2014 Last Posted : 05/21/2014

	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
<b>Classification</b>											
Operator Class 1	\$32.44	\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$46.34	\$62.56
Class 2	\$32.32	\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$46.22	\$62.38
Class 3	\$31.28	\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$45.18	\$60.82
Class 4	\$30.10	\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$44.00	\$59.05
Class 5	\$24.64	\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$38.54	\$50.86
Class 6	\$32.69	\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$46.59	\$62.93
Class 7	\$32.69	\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$46.59	\$62.93
Class 8	\$32.94	\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$46.84	\$63.31
Great Lakes Floating Agreement											
Class 1	\$39.70	\$6.91	\$6.00	\$0.60	\$0.00	\$0.00	\$0.04	\$0.00	\$0.00	\$53.25	\$73.10
Class 2A	\$38.20	\$6.91	\$6.00	\$0.60	\$0.00	\$0.00	\$0.04	\$0.00	\$0.00	\$51.75	\$70.85
Class 2B	\$38.20	\$6.91	\$6.00	\$0.60	\$0.00	\$0.00	\$0.04	\$0.00	\$0.00	\$51.75	\$70.85
Class 3	\$34.00	\$6.91	\$6.00	\$0.60	\$0.00	\$0.00	\$0.04	\$0.00	\$0.00	\$47.55	\$64.55
Class 4	\$28.30	\$6.91	\$6.00	\$0.60	\$0.00	\$0.00	\$0.04	\$0.00	\$0.00	\$41.85	\$56.00
<b>Apprentice</b>											
	<b>Percent</b>										
1st Year	50.00	\$16.22	\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$30.12	\$38.23
2nd Year	60.00	\$19.46	\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$33.36	\$43.10
3rd Year	70.00	\$22.71	\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$36.61	\$47.96
4th Year	80.00	\$25.95	\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$39.85	\$52.83
Field Mech Trainee Class 2											
1st year	49.80	\$16.16	\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$30.06	\$38.13

2nd year	59.78	\$19.39	\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$33.29	\$42.99
3rd year	69.73	\$22.62	\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$36.52	\$47.83
4th year	79.73	\$25.86	\$7.16	\$6.00	\$0.67	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$39.76	\$52.70

**Special Calculation Note :** Other: Education & Safety Fund is \$0.04 per hour.

**Ratio :**

For every (3) Operating Engineer Journeymen employed by the company , there may be employed (1) Registered Apprentice. An apprentice, while employed as part of a crew per Article VIII paragraph 65, will not be subject the apprenticeship ratios in this collective bargaining agreement. On jobs where maintenance engineers are to be employed, for every (2) Class 2 Mechanics there may be (1) Mechanic Trainee & so fourth. Mechanic Trainee rate is a percentage of Class 2 rate.

**Jurisdiction ( \* denotes special jurisdictional note ) :**

ADAMS, ALLEN, ASHLAND, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COSHOCTON, CRAWFORD, DARKE, DEFIANCE, DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN, FULTON, GALLIA, GREENE, GUERNSEY, HAMILTON, HANCOCK, HARDIN, HARRISON, HENRY, HIGHLAND, HOCKING, HOLMES, HURON, JACKSON, JEFFERSON, KNOX, LAWRENCE, LICKING, LOGAN, LUCAS, MADISON, MARION, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, OTTAWA, PAULDING, PERRY, PICKAWAY, PIKE, PREBLE, PUTNAM, RICHLAND, ROSS, SANDUSKY, SCIOTO, SENECA, SHELBY, STARK, TUSCARAWAS, UNION, VAN WERT, VINTON, WARREN, WASHINGTON, WAYNE, WILLIAMS, WOOD, WYANDOT

**Special Jurisdictional Note :**

**Details :**

\*\*Apprentices will receive a 10% increase on top of the percentages listed above provided they are operating mobile equipment. Mechanic Trainees will receive 10% increase if they are required to have CDL.

Class 1 - Air Compressors on Steel Erection; Barrier Moving Machine; Boiler Operators, on Compressors or Generators, when mounted on a rig; Cableways, Combination Concrete mixers & Towers; Concrete Pumps; Concrete Plants ( over 4 yd capacity); Cranes (all types, including Boom Trucks, Cherry Pickers); Derricks; Draglines, Dredgers (dipper, clam or suction); Elevating Graders or Euclid Loaders; Floating Equipment (all types); Gradalls, Helicopter Crew (Operator- hoist or winch); Hoes (all types); Hoisting Engines, on shaft or tunnel work; Hydraulic Gantry (lifting system); Industrial - Type Tractors; Jet Engine Dryers (D8 or D9), Diesel Tractors; Locomotives (standard gage); Maintenance Operators (class A); Mixers, paving (single or double drum); Mucking Machines; Multiple Scrapers; Piledriving Machines (all types); Power Shovels, Prentice Loader;

Quad 9 (double pusher); Rail Tamper (with automatic lifting and aligning device); Refrigerating Machines (freezer operation); Side Booms; Slip Form Pavers; Tower Dericks; Tree Shredders; Truck Mounted Concrete Pumps; Tug Boats; Tunnel Machines and /or Mining Machines; Wheel Excavators. Rough Terrain Fork-lift with Winch/Hoist; Compact Cranes, track rubber over 4,000 pound capacity, self-erecting cranes; stationary, track or truck (all configurations) Bucket trench machines (over 24 inches wide).

Class 2 - Asphalt Pavers; Automatic Subgrade Machines, self-propelled (CMI-type); Bobcat-type and /or skid steer loader with hoe attachment greater than 7000 lbs.; Boring Machine Operators (more than 48 inches); Bulldozers; Endloaders; Hydro Milling Machine; Kolman-type Loaders (production type-dirt); Lead Greasemen; Maintenance Operators, Class B (Portage and Summit Counties only); Pettibone-Rail Equipment; Power Graders; Power Scrapers; Push Cats; Lighting and Traffic Signal Installation Equipment includes all groups or classifications; Trench Machines (24inch wide and under); Vermeer Type Concrete saw. Material Transfer Equipment (Shuttle buggy) Asphalt; All rotomills,grinders and planers of all types. Horizontal Directional Drill (Over 50,000 ft.lbs.thrust and over)

Class 3 - A-Frames; Air Compressors, on tunnel work (low Pressure); Asphalt Plant Engineers; Bobcat-type and/or skid steer loader with or without attachments; Power Boilers (15 lbs pressure and over); Highway Drills (all types); Rollers, asphalt; Pump Operators (installing or operating well Points); Pumps (4 inch and over discharge); Railroad Tie Inserter/Remover; Rotator (lime-soil Stabilizer), Switch & Tie Tampers (without lifting and aligning device); Locomotives (narrow gage); Mixers, concrete (more than one bag capacity); Mixers, one bag capacity (side loader); Utilities Operators, (small equipment); Welding Machines; Material hoist/elevators. Articulating/straight bed end dumps if assigned (minus \$4.00 per hour).

Class 4 -Ballast Re-locator; Backfillers, Batch Plants; Bar and Joint Installing Machines; Boring Machine Operators (48 inch or less); Bull Floats; Burlap and Curing Machines; Concrete Plants (capacity 4 yd and under); Conveyors (highway); Concrete Saws (multiple); Crushers; Deckhands; Farm type tractors, with attachments (highway), except masonry; Finishing Machines; Firemen, Floating Equipment (all types); Fork Lifts (highway); Form Trenchers; Hydro Hammers; Hydro Seeders; Pavement Breakers; Plant Mixers; Post Drivers; Post Hole Diggers (power auger); Power Brush Burners; Power Form Handling Equipment; Road Widening Trenchers; Rollers (brick, grade, macadam); Self-Propelled Power Spreaders; Self-Propelled Sub-Graders; Tractors, pulling sheepsfoot rollers or graders; Steam Firemen; Vibratory Compactors, with integral power.

Class 5 - Compressors (portable, Sewer, Heavy and Highway); Generators; Inboard-Outboard Motor Boat Launches; Masonry Fork Lifts; Oilers/Helpers; Power Driven Heaters; Power Scrubbers; Power Sweepers; Pumps (under 4 inch discharge); Signalmen; Drum Fireman (in Asphalt Plant); Oil Heaters (Asphalt Plant); Tire Repairmen; VAC/ALLS; Fueling and greasing (plus \$3.00), compact cranes: track or rubber under 4,000 pounds.

Class 6 - Master Mechanic

Class 7 - Crane Boom 150 ft - 180 ft

Class 8 - Crane Boom over 180 ft .

**GREAT LAKES FLOATING AGREEMENT:**

Class 1 - Diver, Wet Tender, Engineer, (Hyd. Dredge), Craft Foreman ( Master Mechanic)

Class 2A - Crane Backhoe Operator, Mechanic/Welder, Assistant Engineer (Hyd. Dredge), Leverman (Hyd Dredge) Diver Tender, Tug Operator ( Tug 70T and over)

Class 2B - Friction Crane, Lattice Boom or any Crane Certification.

Class 3 - Deck Equipment Operator, (Machineryman), Maint. of Crane, Tug/Launch Operator, Loader/Dozer on Barge, Deck Machinery, Maintenance of Crane ( over 50T capacity), or Backhoe (115,000lbs or more) Loaders/Dozer and like equipment on Barge, Breakwater Wall, Slip/Dock Scow.

Class 4 - Deck Equipment Operator, (Machineryman/Fireman)(4 equipment Units or more), Deck Hand, Tug Engineer, Crane Maintenance, 50T and under/Backhoe 115,000lbs or less, Assistant Tug Operator, add off Road Truck.





**Ratio :**

1 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

CARROLL, COSHOCTON, HOLMES, STARK, TUSCARAWAS, WAYNE

**Special Jurisdictional Note :****Details :**

Journeymen and apprentices using coal tar, vinyl's, epoxies or any product using hot or special thinner, shall be paid an additional \$0.50 per hour for (class 3) and an additional \$.50 for (class 4) of each classification. This does not apply to water based epoxies.

When concrete block is filled by spray application, Roller men shall be paid \$0.25 per hour in addition to the Brush and Roll rate.

Drywall Finisher: both wipe down man and finisher (\$20.95) when using Journeyman's own stilts or automatic tools (\$21.45). Drywall Finisher w/Machines both wipe down man and finisher (\$21.30) when using Journeyman's own stilts or automatic tools (\$21.80) Apprentice pay based on percentage of above appropriate classification.



**Special Jurisdictional Note :****Details :**

Journeyman and apprentices using coal tar, vinyl's, epoxies or any product using hot or special thinner, shall be paid an additional \$0.50 per hour for (class 3) and an additional \$.50 for (class 4) of each classification. This does not apply to water based epoxies.

When concrete block is filled by spray application, Roller men shall be paid \$0.25 per hour in addition to the Brush and Roll rate.

Drywall Finisher: both wipe down man and finisher (\$20.95) when using Journeyman's own stilts or automatic tools (\$21.45). Drywall Finisher w/Machines both wipe down man and finisher (\$21.30) when using Journeyman's own stilts or automatic tools (\$21.80) Apprentice pay based on percentage of above appropriate classification.

# Prevailing Wage Rate Skilled Crafts

Name of Union: Painter Local 603

Change # : LCN01-2012fbLoc603Com.

Craft : Drywall Finisher Effective Date : 06/06/2012 Last Posted : 06/06/2012

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Painter Drywall Finisher	\$20.10		\$4.96	\$5.40	\$0.19	\$0.00	\$0.45	\$0.00	\$0.00	\$0.00	\$31.10	\$41.15
Drywall Taping	\$20.10		\$4.96	\$5.40	\$0.19	\$0.00	\$0.45	\$0.00	\$0.00	\$0.00	\$31.10	\$41.15
Taping and Finishing with Automatic Tools	\$20.45		\$4.96	\$5.40	\$0.19	\$0.00	\$0.45	\$0.00	\$0.00	\$0.00	\$31.45	\$41.67
<b>Apprentice</b>	<b>Percent</b>											
1st 6 months	40.00	\$8.04	\$4.96	\$5.40	\$0.19	\$0.00	\$0.45	\$0.00	\$0.00	\$0.00	\$19.04	\$23.06
2nd 6 months	50.00	\$10.05	\$4.96	\$5.40	\$0.19	\$0.00	\$0.45	\$0.00	\$0.00	\$0.00	\$21.05	\$26.08
3rd 6 months	60.00	\$12.06	\$4.96	\$5.40	\$0.19	\$0.00	\$0.45	\$0.00	\$0.00	\$0.00	\$23.06	\$29.09
4rd 6 months	70.00	\$14.07	\$4.96	\$5.40	\$0.19	\$0.00	\$0.45	\$0.00	\$0.00	\$0.00	\$25.07	\$32.11
5th 6 months	80.00	\$16.08	\$4.96	\$5.40	\$0.19	\$0.00	\$0.45	\$0.00	\$0.00	\$0.00	\$27.08	\$35.12
6th 6 months	90.00	\$18.09	\$4.96	\$5.40	\$0.19	\$0.00	\$0.45	\$0.00	\$0.00	\$0.00	\$29.09	\$38.14

Special Calculation Note : Apprentice pay based on percentage of above appropriate

classification.

**Ratio :**

1 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

CARROLL, COSHOCTON, HOLMES, STARK,  
TUSCARAWAS, WAYNE

**Special Jurisdictional Note :**

**Details :**

Journeymen and apprentices using coal tar, vinyl's, epoxies or any product using hot or special thinner, shall be paid an additional \$0.50 per hour for (class 3) and an additional \$.50 for (class 4) of each classification. This does not apply to water based epoxies.

When concrete block is filled by spray application, Roller men shall be paid \$0.25 per hour in addition to the Brush and Roll rate.

Drywall Finisher: both wipe down man and finisher, when using Journeyman's own stilts or automatic tools add .80 per hour worked to the classification above. Drywall Finishers: both wipe down man and taper/finisher, swing stage, ladder jack, or window jack add \$.30 per hour worked to the above classification.

# Prevailing Wage Rate Skilled Crafts

Name of Union: Painter Local 639 (A) Sign

Change # : CN01-2009Loc639A

Craft : Painter Effective Date : 03/06/2009 Last Posted : 03/06/2009

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtim Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
<b>Classification</b>												
Painter Sign Erector	\$19.98		\$4.46	\$1.00	\$0.25	\$1.68	\$0.00	\$0.00			\$27.37	\$37.36
Serviceman	\$19.98		\$4.46	\$1.00	\$0.25	\$1.68	\$0.00	\$0.00			\$27.37	\$37.36
Metal Sign Fabricator	\$19.98		\$4.46	\$1.00	\$0.25	\$1.68	\$0.00	\$0.00			\$27.37	\$37.36
Neon Bender Pattern Maker	\$19.98		\$4.46	\$1.00	\$0.25	\$1.68	\$0.00	\$0.00			\$27.37	\$37.36
Computer Operator	\$18.98		\$4.46	\$1.00	\$0.25	\$1.61	\$0.00	\$0.00			\$26.30	\$35.79
Router	\$18.98		\$4.46	\$1.00	\$0.25	\$1.61	\$0.00	\$0.00			\$26.30	\$35.79
Plastic Wood Fabricator	\$18.98		\$4.46	\$1.00	\$0.25	\$1.61	\$0.00	\$0.00			\$26.30	\$35.79
Vinyl Applicator	\$18.98		\$4.46	\$1.00	\$0.25	\$1.61	\$0.00	\$0.00			\$26.30	\$35.79
<b>Apprentice For Sign Service, Metal, Neon, Pattern</b>	<b>Percent</b>											
1000 hrs	50.00	\$9.99	\$4.46	\$1.00	\$0.25	\$1.03	\$0.00	\$0.00			\$16.73	\$21.73
2000 hrs	55.00	\$10.99	\$4.46	\$1.00	\$0.25	\$0.37	\$0.00	\$0.00			\$17.07	\$22.56
3000 hrs	60.00	\$11.99	\$4.46	\$1.00	\$0.25	\$0.37	\$0.00	\$0.00			\$18.07	\$24.06
4000 hrs	65.00	\$12.99	\$4.46	\$1.00	\$0.25	\$0.37	\$0.00	\$0.00			\$19.07	\$25.56
5000 hrs	70.00	\$13.99	\$4.46	\$1.00	\$0.25	\$0.37	\$0.00	\$0.00			\$20.07	\$27.06
6000 hrs	85.00	\$16.98	\$4.46	\$1.00	\$0.25	\$0.37	\$0.00	\$0.00			\$23.06	\$31.55
7000 hrs	90.00	\$17.98	\$4.46	\$1.00	\$0.25	\$0.37	\$0.00	\$0.00			\$24.06	\$33.05

**Special Calculation Note :** Apprentice Rates For: Computer Operator, Router, Plastic-Wood Fabricator Vinyl Application  
 1000 hrs 50% plus (\$4.46 h&w)+(\$1.00 pension)+(\$0.25 apprentice training) + vacation \$0.99

2000 hrs 55% plus (\$4.46 h&w)+(\$1.00 pension)+(\$0.25 apprentice training) + vacation \$0.37  
 3000 hrs 65% plus (\$4.46 h&w)+(\$1.00 pension)+(\$0.25 apprentice training) + vacation \$0.37  
 4000 hrs 50% plus (\$4.46 h&w)+(\$1.00 pension)+(\$0.25 apprentice training) + vacation \$0.37  
 5000 hrs 70% plus (\$4.46 h&w)+(\$1.00 pension)+(\$0.25 apprentice training) + vacation \$0.37  
 6000 hrs 85% plus (\$4.46 h&w)+(\$1.00 pension)+(\$0.25 apprentice training) + vacation \$0.37  
 7000 hrs 90% plus (\$4.46 h&w)+(\$1.00 pension)+(\$0.25 apprentice training) + vacation \$0.37

**Ratio :****Jurisdiction ( \* denotes special jurisdictional note ) :**

ASHLAND, ASHTABULA, CUYAHOGA,  
 ERIE, GEAUGA, LAKE, LORAIN, MEDINA,  
 PORTAGE, RICHLAND, STARK, SUMMIT

**Special Jurisdictional Note :****Details :**

Sign and display work shall include but not limited: to the making and installation of all signs and servicing of the same, lettering and pictorial work of any kind, including vinyl signs and vinyl substrates and the preparing for the finishing of same, be it by hand, brush, roller, spray, mechanical or computer aided and by any other method or process pertaining to same: they shall have control of all branches, methods and processes of screen process work: tube bending and display work such as creating, building and finishing of all display matter and its related operations used for advertising purposes, including all lettering whether it be done by hand, mechanical or computer aided or by any other method or process pertaining to same: the construction, erection and maintenance of all billboards and all communication advertising.





HURON, JEFFERSON, KNOX, LAKE, LOGAN,  
LORAIN, LUCAS, MAHONING, MARION,  
MEDINA, MERCER, MONROE, MORROW,  
NOBLE, OTTAWA, PAULDING, PIKE,  
PORTAGE, PUTNAM, RICHLAND,  
SANDUSKY, SENECA, SHELBY, STARK,  
SUMMIT, TRUMBULL, TUSCARAWAS, VAN  
WERT, WASHINGTON, WAYNE, WILLIAMS,  
WOOD, WYANDOT

**Special Jurisdictional Note :**

**Details :**



**Ratio :**

3 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

CARROLL, COSHOCTON, HOLMES, KNOX, STARK, TUSCARAWAS, WAYNE

**Special Jurisdictional Note :**

**Details :**

# Prevailing Wage Rate Skilled Crafts

Name of Union: **Plumber Pipefitter Local 94**

**Change # : LCN01-2013fbLoc94**

**Craft : Plumber/Pipefitter Effective Date : 05/01/2013 Last Posted : 04/10/2013**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
<b>Classification</b>												
Plumber Pipefitter	\$32.08		\$6.78	\$4.64	\$0.62	\$0.00	\$3.90	\$0.00	\$0.00	\$0.00	\$48.02	\$64.06
<b>Apprentice</b>	<b>Percent</b>											
1st 6 months	40.00	\$12.83	\$6.78	\$0.00	\$0.62	\$0.00	\$1.60	\$0.00	\$0.00	\$0.00	\$21.83	\$28.25
2nd 6 months	45.00	\$14.44	\$6.78	\$0.00	\$0.62	\$0.00	\$1.60	\$0.00	\$0.00	\$0.00	\$23.44	\$30.65
3rd 6 months	50.00	\$16.04	\$6.78	\$0.50	\$0.62	\$0.00	\$1.60	\$0.00	\$0.00	\$0.00	\$25.54	\$33.56
4th 6 months	55.00	\$17.64	\$6.78	\$0.50	\$0.62	\$0.00	\$1.60	\$0.00	\$0.00	\$0.00	\$27.14	\$35.97
5th 6 months	60.00	\$19.25	\$6.78	\$0.50	\$0.62	\$0.00	\$1.60	\$0.00	\$0.00	\$0.00	\$28.75	\$38.37
6th 6 months	65.00	\$20.85	\$6.78	\$0.50	\$0.62	\$0.00	\$1.60	\$0.00	\$0.00	\$0.00	\$30.35	\$40.78
7th 6 months	75.00	\$24.06	\$6.78	\$0.50	\$0.62	\$0.00	\$1.60	\$0.00	\$0.00	\$0.00	\$33.56	\$45.59
8th 6 months	80.00	\$25.66	\$6.78	\$0.50	\$0.62	\$0.00	\$1.60	\$0.00	\$0.00	\$0.00	\$35.16	\$48.00
9th 6 months	85.00	\$27.27	\$6.78	\$0.50	\$0.62	\$0.00	\$1.60	\$0.00	\$0.00	\$0.00	\$36.77	\$50.40
10th 6 months	90.00	\$28.87	\$6.78	\$0.50	\$0.62	\$0.00	\$1.60	\$0.00	\$0.00	\$0.00	\$38.37	\$52.81

**Special Calculation Note :** No special calculations for this skilled craft wage rate are

required at this time.

**Ratio :**

3 Journeymen to 1 Apprentice thereafter

**Jurisdiction ( \* denotes special jurisdictional note ) :**

CARROLL\*, STARK, WAYNE

**Special Jurisdictional Note :** In Carroll County the following townships are included: Brown, Augusta, East, Harrison, Washington, Center and Fox.

**Details :**

# Prevailing Wage Rate Skilled Crafts

Name of Union: **Roofer Local 88**

**Change # : LCN01-2014fbLoc88**

**Craft : Roofer Effective Date : 06/04/2014 Last Posted : 06/04/2014**

	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification											
Roofer	\$24.30	\$8.10	\$6.07	\$0.12	\$0.00	\$0.00	\$0.12	\$0.00	\$0.00	\$38.71	\$50.86
<b>HELPERS</b>											
1st year Helper - 500 1st 6 months	\$10.00	\$2.25	\$0.00	\$0.12	\$0.00	\$0.00	\$0.12	\$0.00	\$0.00	\$12.49	\$17.49
1st year Helper - 500 w/12 months	\$12.15	\$8.10	\$6.07	\$0.12	\$0.00	\$0.00	\$0.12	\$0.00	\$0.00	\$26.56	\$32.64
2nd year Helper - w/12 months	\$13.61	\$8.10	\$6.07	\$0.12	\$0.00	\$0.00	\$0.12	\$0.00	\$0.00	\$28.02	\$34.82
3rd year Helper - w/12 months	\$15.07	\$8.10	\$6.07	\$0.12	\$0.00	\$0.00	\$0.12	\$0.00	\$0.00	\$29.48	\$37.01
4th year Helper - w/12 months	\$16.52	\$8.10	\$6.07	\$0.12	\$0.00	\$0.00	\$0.12	\$0.00	\$0.00	\$30.93	\$39.19
5th year Helper - w/12 months	\$17.88	\$8.10	\$6.07	\$0.12	\$0.00	\$0.00	\$0.12	\$0.00	\$0.00	\$32.29	\$41.23
6th year Helper	\$19.44	\$8.10	\$6.07	\$0.12	\$0.00	\$0.00	\$0.12	\$0.00	\$0.00	\$33.85	\$43.57
<b>Apprentice</b>	<b>Percent</b>										

1st 6 months w/500 hrs	50.00	\$12.15	\$8.10	\$6.07	\$0.12	\$0.00	\$0.00	\$0.12	\$0.00	\$0.00	\$26.56	\$32.64
2nd 6 months w/500 hrs	56.00	\$13.61	\$8.10	\$6.07	\$0.12	\$0.00	\$0.00	\$0.12	\$0.00	\$0.00	\$28.02	\$34.82
3rd 6 months w/500 hrs	62.00	\$15.07	\$8.10	\$6.07	\$0.12	\$0.00	\$0.00	\$0.12	\$0.00	\$0.00	\$29.48	\$37.01
4th 6 months w/500 hrs	68.00	\$16.52	\$8.10	\$6.07	\$0.12	\$0.00	\$0.00	\$0.12	\$0.00	\$0.00	\$30.93	\$39.20
5th 6 months w/500 hrs	74.00	\$17.98	\$8.10	\$6.07	\$0.12	\$0.00	\$0.00	\$0.12	\$0.00	\$0.00	\$32.39	\$41.38
6th 6 months w/500 hrs	80.00	\$19.44	\$8.10	\$6.07	\$0.12	\$0.00	\$0.00	\$0.12	\$0.00	\$0.00	\$33.85	\$43.57
7th 6 months w/500 hrs	86.00	\$20.90	\$8.10	\$6.07	\$0.12	\$0.00	\$0.00	\$0.12	\$0.00	\$0.00	\$35.31	\$45.76
8th 6 months w/500 hrs	92.00	\$22.36	\$8.10	\$6.07	\$0.12	\$0.00	\$0.00	\$0.12	\$0.00	\$0.00	\$36.77	\$47.94

**Special Calculation Note :** Roofers working in any form of coal tar pitch, whether hot or cold, installing and/or removing will be paid \$.25 more per hour. Other \$0.12 is for C.I.D.B.

**Ratio :**

No helper shall be used on any one job unless 1 Journeymen, and 1 Apprentices are working on said job .One (1) Journeymen to One (1) Apprentice to One (1) Helper

**Jurisdiction ( \* denotes special jurisdictional note ) :**

ASHLAND, CARROLL, COSHOCTON, CRAWFORD, HOLMES, HURON, LORAIN\*, MEDINA, PORTAGE, RICHLAND, SENECA, STARK, SUMMIT, TUSCARAWAS, WAYNE

**Special Jurisdictional Note :** In Lorain County (South of the Turnpike)

**Details :**





5-7 Journeymen to 3 Apprentice  
8-10 Journeymen to 4 Apprentice  
11-13 Journeymen to 5 Apprentice  
14, 15 Journeymen to 6 Apprentice  
and maintaining a three to one apprentice ratio  
thereafter.

### **Special Jurisdictional Note :**

#### **Details :**

Scope of Work: This Agreement covers the rates of pay and conditions of employment of all employees of the Employer engaged in, but not limited to, the a) manufacture, fabrication, assembling, handling, erection, installation, dismantling, conditioning, adjustment, alteration, repairing and servicing of all ferrous or non-ferrous metal work and all other materials used in lieu thereof and of all HVAC systems, air-veyor systems, exhaust systems, and air handling systems regardless of material used, including the setting of all equipment and all reinforcements in connection therewith; (b) all lagging over insulation and all duct-lining; (c) testing, servicing, and balancing of all air-handling equipment and duct work; (d) the preparation of all shop and field sketches, whether manually drawn or computer assisted, used in fabrication and erection, including those taken from original architectural and engineering drawings or sketches, and (e) metal roofing; and (f) all other work included in the jurisdictional claims of Sheet Metal Worker's International Association.



5-7 Journeymen to 3 Apprentice  
8-10 Journeymen to 4 Apprentice  
11-13 Journeymen to 5 Apprentice  
14, 15 Journeymen to 6 Apprentice  
and maintaining a three to one apprentice ratio  
thereafter.

### **Special Jurisdictional Note :**

#### **Details :**

Scope of Work: This Agreement covers the rates of pay and conditions of employment of all employees of the Employer engaged in, but not limited to, the a) manufacture, fabrication, assembling, handling, erection, installation, dismantling, conditioning, adjustment, alteration, repairing and servicing of all ferrous or non-ferrous metal work and all other materials used in lieu thereof and of all HVAC systems, air-veyor systems, exhaust systems, and air handling systems regardless of material used, including the setting of all equipment and all reinforcements in connection therewith; (b) all lagging over insulation and all duct-lining; (c) testing, servicing, and balancing of all air-handling equipment and duct work; (d) the preparation of all shop and field sketches, whether manually drawn or computer assisted, used in fabrication and erection, including those taken from original architectural and engineering drawings or sketches, and (e) metal roofing; and (f) all other work included in the jurisdictional claims of Sheet Metal Worker's International Association.

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Sprinkler Fitter Local 669**

**Change # : LCN01-2013fbLoc669**

**Craft : Sprinkler Fitter Effective Date : 08/21/2013 Last Posted : 08/21/2013**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Sprinkler Fitter	\$32.52		\$8.42	\$5.50	\$0.45	\$0.00	\$4.72	\$0.50	\$0.00	\$0.00	\$52.11	\$68.37
Indentured prior to April 2010												
50%	\$16.26		\$7.45	\$0.00	\$0.45	\$0.00	\$0.25	\$0.00	\$0.00	\$0.00	\$24.41	\$32.54
50%	\$16.26		\$7.45	\$0.00	\$0.45	\$0.00	\$0.25	\$0.00	\$0.00	\$0.00	\$24.41	\$32.54
55%	\$17.89		\$8.42	\$5.50	\$0.45	\$0.00	\$0.25	\$0.00	\$0.00	\$0.00	\$32.51	\$41.46
60%	\$19.51		\$8.42	\$5.50	\$0.45	\$0.00	\$0.25	\$0.00	\$0.00	\$0.00	\$34.13	\$43.89
65%	\$21.14		\$8.42	\$5.50	\$0.45	\$0.00	\$4.72	\$0.00	\$0.00	\$0.00	\$40.23	\$50.80
70%	\$22.76		\$8.42	\$5.50	\$0.45	\$0.00	\$4.72	\$0.00	\$0.00	\$0.00	\$41.85	\$53.23
75%	\$24.39		\$8.42	\$5.50	\$0.45	\$0.00	\$4.72	\$0.00	\$0.00	\$0.00	\$43.48	\$55.68
80%	\$26.02		\$8.42	\$5.50	\$0.45	\$0.00	\$4.72	\$0.00	\$0.00	\$0.00	\$45.11	\$58.12
85%	\$27.64		\$8.42	\$5.50	\$0.45	\$0.00	\$4.72	\$0.00	\$0.00	\$0.00	\$46.73	\$60.55
90%	\$29.27		\$8.42	\$5.50	\$0.45	\$0.00	\$4.72	\$0.00	\$0.00	\$0.00	\$48.36	\$63.00
<b>Apprentice</b>	<b>Percent</b>											
Indentured on or after April 2010	45.00	\$14.63	\$7.45	\$0.00	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$22.53	\$29.85
CLASS 2	50.00	\$16.26	\$7.45	\$0.00	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$24.16	\$32.29
CLASS 3	55.00	\$17.89	\$8.42	\$5.50	\$0.45	\$0.00	\$0.25	\$0.00	\$0.00	\$0.00	\$32.51	\$41.45
CLASS 4	60.00	\$19.51	\$8.42	\$5.50	\$0.45	\$0.00	\$0.25	\$0.00	\$0.00	\$0.00	\$34.13	\$43.89
CLASS 5	65.00	\$21.14	\$8.42	\$5.50	\$0.45	\$0.00	\$0.50	\$0.00	\$0.00	\$0.00	\$36.01	\$46.58
CLASS 6	70.00	\$22.76	\$8.42	\$5.50	\$0.45	\$0.00	\$0.50	\$0.00	\$0.00	\$0.00	\$37.63	\$49.02
CLASS 7	75.00	\$24.39	\$8.42	\$5.50	\$0.45	\$0.00	\$0.50	\$0.00	\$0.00	\$0.00	\$39.26	\$51.46
CLASS 8	80.00	\$26.02	\$8.42	\$5.50	\$0.45	\$0.00	\$0.50	\$0.00	\$0.00	\$0.00	\$40.89	\$53.89

CLASS 9	85.00	\$27.64	\$8.42	\$5.50	\$0.45	\$0.00	\$0.50	\$0.00	\$0.00	\$0.00	\$42.51	\$56.33
CLASS 10	90.00	\$29.27	\$8.42	\$5.50	\$0.45	\$0.00	\$0.50	\$0.00	\$0.00	\$0.00	\$44.14	\$58.77

**Special Calculation Note :** Other \$0.50 is for Industry Advancement. No special calculations for this skilled craft wage rate are required at this time.

**Ratio :**

1 Journeyman to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

ADAMS, ALLEN, ASHLAND, ASHTABULA, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, DARKE, DEFIANCE, DELAWARE, ERIE, FAIRFIELD, FAYETTE, FRANKLIN, FULTON, GALLIA, GREENE, GUERNSEY, HAMILTON, HANCOCK, HARDIN, HARRISON, HENRY, HIGHLAND, HOCKING, HOLMES, HURON, JACKSON, JEFFERSON, KNOX, LAWRENCE, LICKING, LOGAN, LUCAS, MADISON, MAHONING, MARION, MEDINA, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, OTTAWA, PAULDING, PERRY, PICKAWAY, PIKE, PORTAGE, PREBLE, PUTNAM, RICHLAND, ROSS, SANDUSKY, SCIOTO, SENECA, SHELBY, STARK, SUMMIT, TRUMBULL, TUSCARAWAS, UNION, VAN WERT, VINTON, WARREN, WASHINGTON, WAYNE, WILLIAMS, WOOD, WYANDOT

**Special Jurisdictional Note :**

**Details :**

Sprinkler Fitter work shall consist of the installation, dismantling, maintenance, repairs, adjustments, and corrections of all fire protection and fire control systems including the unloading, handling by hand, power equipment and installation of all piping or tubing, appurtenances and equipment pertaining thereto, including both overhead and underground water mains, fire hydrants and hydrant mains, standpipes and hose connections to sprinkler systems used in connection with sprinkler and alarm systems. Also all tanks and pumps connected thereto, also included shall be CO-2 and Cardox Systems, Dry Chemical Systems, Foam Systems and all other fire protection systems.

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Truck Driver Bldg & HevHwy Class 1  
Locals 20,40,92,92b,100,175,284,438,377,505,637,908,957

**Change # :** CN1-2011jcBldgHevHwy

**Craft :** Truck Driver Effective Date : 06/29/2011 Last Posted : 06/29/2011

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Truck Driver CLASS 1 4 wheel service, dump, and batch trucks, Oil Distributor - Asphalt Distributor-Tandems	\$22.78		\$6.81	\$5.70	\$0.10	\$0.00	\$0.00	\$0.00			\$35.39	\$46.78
Apprentice	Percent											
First 6 months	80.00	\$18.22	\$6.11	\$4.90	\$0.50	\$0.00	\$0.00	\$0.00			\$29.73	\$38.85
7-12 months	85.00	\$19.36	\$6.11	\$4.90	\$0.50	\$0.00	\$0.00	\$0.00			\$30.87	\$40.55
13-18 months	90.00	\$20.50	\$6.11	\$4.90	\$0.50	\$0.00	\$0.00	\$0.00			\$32.01	\$42.26
19-24 months	95.00	\$21.64	\$6.11	\$4.90	\$0.50	\$0.00	\$0.00	\$0.00			\$33.15	\$43.97
25-30 months	100.00	\$22.78	\$6.11	\$4.90	\$0.50	\$0.00	\$0.00	\$0.00			\$34.29	\$45.68

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**Special Calculation Note :** No special calculations for this skilled craft wage rate are required at this time.

**Ratio :**

3 Journeymen to 1 Apprentice  
per company/project

**Jurisdiction ( \* denotes special jurisdictional note ) :**

ADAMS, ALLEN, ASHLAND, ASHTABULA, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, DARKE, DEFIANCE, DELAWARE, ERIE, FAIRFIELD, FAYETTE, FRANKLIN, FULTON, GALLIA, GREENE, GUERNSEY, HAMILTON, HANCOCK, HARDIN, HARRISON, HENRY, HIGHLAND, HOCKING, HOLMES, HURON, JACKSON, JEFFERSON, KNOX, LAWRENCE, LICKING, LOGAN, LORAIN, LUCAS, MADISON, MAHONING, MARION, MEDINA, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, OTTAWA, PAULDING, PERRY, PICKAWAY, PIKE, PORTAGE, PREBLE, PUTNAM, RICHLAND, ROSS, SANDUSKY, SCIOTO, SENECA, SHELBY, STARK, SUMMIT, TRUMBULL, TUSCARAWAS, UNION, VAN WERT, VINTON, WARREN, WASHINGTON, WAYNE, WILLIAMS, WOOD, WYANDOT

**Special Jurisdictional Note :****Details :**

\*\* Asphalt - Oil spray bar man when operating from cab shall receive \$0.20 cents per hour above their Basic Hourly Rate.



# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Truck Driver Bldg & HevHwy Class 2  
**Locals 20,40,92,92b,100,175,284,438,377,505,637,908,957**

**Change # :** CN1-2011BldgHevHwy

**Craft :** Truck Driver **Effective Date :** 06/29/2011 **Last Posted :** 06/29/2011

	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification											
Truck Driver CLASS 2	\$23.20	\$6.81	\$5.70	\$0.10	\$0.00	\$0.00	\$0.00			\$35.81	\$47.41
Tractor											
Trailer-Semi											
Tractor											
Trucks-Pole											
Trailers-Ready Mix											
Trucks-Fuel											
Trucks-Asphalt-Oil											
Spray bar											
men- 5 Axle & Over -Belly											
Dumps-End											
Dumps-Articulated											
Dump Trucks-Low boys-											
Heavy duty											
Equipment (irrespective of load carried) when used exclusively for transportation-											
Truck Mechanics (when needed)											

Apprentice	Percent										
First 6 months	80.00	\$18.56	\$6.81	\$5.70	\$0.10	\$0.00	\$0.00	\$0.00			\$31.17 \$40.45
7-12 months	85.00	\$19.72	\$6.81	\$5.70	\$0.10	\$0.00	\$0.00	\$0.00			\$32.33 \$42.19
13-18 months	90.00	\$20.88	\$6.81	\$5.70	\$0.10	\$0.00	\$0.00	\$0.00			\$33.49 \$43.93
19-24 months	95.00	\$22.04	\$6.81	\$5.70	\$0.10	\$0.00	\$0.00	\$0.00			\$34.65 \$45.67
25-30 months	100.00	\$23.20	\$6.81	\$5.70	\$0.10	\$0.00	\$0.00	\$0.00			\$35.81 \$47.41

**Special Calculation Note :** No special calculations for this skilled craft wage rate are required at this time.

**Ratio :**

3 Journeymen to 1 Apprentice per company/project

**Jurisdiction ( \* denotes special jurisdictional note ) :**

- ADAMS, ALLEN, ASHLAND, ASHTABULA, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, DARKE, DEFIANCE, DELAWARE, ERIE, FAIRFIELD, FAYETTE, FRANKLIN, FULTON, GALLIA, GREENE, GUERNSEY, HAMILTON, HANCOCK, HARDIN, HARRISON, HENRY, HIGHLAND, HOCKING, HOLMES, HURON, JACKSON, JEFFERSON, KNOX, LAWRENCE, LICKING, LOGAN, LORAIN, LUCAS, MADISON, MAHONING, MARION, MEDINA, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, OTTAWA, PAULDING, PERRY, PICKAWAY, PIKE, PORTAGE, PREBLE, PUTNAM, RICHLAND, ROSS, SANDUSKY, SCIOTO, SENECA, SHELBY, STARK, SUMMIT, TRUMBULL, TUSCARAWAS, UNION, VAN WERT, VINTON, WARREN, WASHINGTON, WAYNE, WILLIAMS, WOOD, WYANDOT

**Special Jurisdictional Note :**

**Details :**

\*\* Asphalt - Oil spray bar man when operating from cab shall receive \$0.20 cents per hour above

their Basic Hourly Rate.



**GP 1142 – Faircrest Sanitary Sewer Project  
The City of Canton Engineering Department**

**Section XIII: Ohio EPA Permit**

SEE FOLLOWING PAGES

**GP 1142 – Faircrest Sanitary Sewer Project**  
**The City of Canton Engineering Department**

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John R. Kasich, Governor  
Mary Taylor, Lt. Governor  
Craig W. Butler, Interim Director

February 25, 2014

Re: Canton  
Stark County  
Application No. 969331  
Application for City of Canton Faircrest Street Southwest Lift  
Station and Sanitary Sewer Extension G.P. #1142  
Plans Received on January 07, 2014  
From: CTI Engineers, Inc.  
**CERTIFIED MAIL**

Mayor and Council  
City of Canton  
2436 30th Street NE  
Canton, OH 44705

Attn: Daniel Moeglin, P.E., City Engineer

Ladies and Gentlemen:

Enclosed is an approved Ohio EPA Permit to Install. This permit contains several conditions and restrictions, I urge you to read it carefully. A general condition of your permit states that issuance of the permit does not relieve you of the duty of complying with all applicable federal, state, and local laws, ordinances, and regulations. You are hereby notified that this action of the Director is final and may be appealed to the Environmental Review Appeals Commission pursuant to Section 3745.04 of the Ohio Revised Code. The appeal must be in writing and set forth the action complained of and the grounds upon which the appeal is based. The appeal must be filed with the Commission within thirty (30) days after notice of the Director's action. The appeal must be accompanied by a filing fee of \$70.00, made payable to "Ohio Treasurer Josh Mandel", which the Commission, in its discretion, may reduce if by affidavit you demonstrate that payment of the full amount of the fee would cause extreme hardship. Notice of the filing of the appeal shall be filed with the Director within three (3) days of filing with the Commission. Ohio EPA requests that a copy of the appeal be served upon the Ohio Attorney General's Office, Environmental Enforcement Section. An appeal may be filed with the Environmental Review Appeals Commission at the following address: Environmental Review Appeals Commission, 77 South High Street, 17th Floor, Columbus, OH 43215. If you have any questions, please contact the Ohio EPA District Office.

Ohio EPA has developed a customer service survey to get feedback from regulated entities that have contacted Ohio EPA for regulatory assistance, or worked with the Agency to obtain a permit, license or other authorization. Ohio EPA's goal is to provide our customers with the best possible customer service, and your feedback is important to us in meeting this goal. Please take a few minutes to complete this survey and share your experience with us at <http://www.surveymonkey.com/s/ohioepacustomersurvey>. If you have any questions, please contact the Ohio EPA district office to which you submitted your application.

Sincerely,

A handwritten signature in black ink that reads "Ed Swindall".

Ed Swindall, Supervisor  
Permit Processing Unit, Division of Surface Water

ES/sg  
Enclosure

cc: Northeast District Office  
CTI Engineers, Inc.

50 West Town Street • Suite 700 • P.O. Box 1049 • Columbus, OH 43216-1049  
[www.epa.ohio.gov](http://www.epa.ohio.gov) • (614) 644-3020 • (614) 644-3184 (fax)

# Ohio Environmental Protection Agency

## Permit to Install

Application No: 969331

Applicant Name: City of Canton  
Address: 2436 30th Street NE  
City: Canton  
State Zip: OH 44705

Person to Contact: Daniel Moeglin, P.E.  
Telephone: 330-438-6903

Description of Proposed Source: City of Canton Faircrest Street Southwest Lift Station and Sanitary Sewer Extension G.P. #1142, Canton, Stark County

Issuance Date: February 25, 2014  
Effective Date: February 25, 2014

The above named entity is hereby granted a permit to install for the above described source pursuant to Chapter 3745-42 of the Ohio Administrative Code. Issuance of this permit does not constitute expressed or implied approval or agreement that, if constructed or modified in accordance with the plans included in the application, the above described source of environmental pollutants will operate in compliance with applicable state and federal laws and regulations. Issuance of this permit does not constitute expressed or implied assurance that, if constructed or modified in accordance with those plans and specifications, the above described source of pollutants will be granted the necessary operating permits. This permit is granted subject to the following conditions attached hereto.

Ohio Environmental Protection Agency



Craig W. Butler  
Director  
P.O. Box 1049  
50 West Town Street, Suite 700  
Columbus, OH 43216-1049



This permit shall expire if construction has not been initiated by the applicant within eighteen months of the effective date of this permit. By accepting this permit, the applicant acknowledges that this eighteen month period shall not be considered or construed as extending or having any effect whatsoever on any compliance schedule or deadline set forth in any administrative or court order issued to or binding upon the permit applicant, and the applicant shall abide by such compliance schedules or deadlines to avoid the initiation of additional legal action by the Ohio EPA.

The director of the Ohio Environmental Protection Agency, or his authorized representatives, may enter upon the premises of the above named applicant during construction and operation at any reasonable time for the purpose of making inspections, conducting tests, examining records, or reports pertaining to the construction, modification, or installation of the above described source of environmental pollutants.

Issuance of this permit does not relieve you of the duty of complying with all applicable federal, state, and local laws, ordinances, and regulations.

Any well, well point, pit, or other device installed for the purpose of lowering the ground water level to facilitate construction of this project shall be properly abandoned in accordance with the provisions of this plan or as directed by the director or his representative.

Any person installing any well, well point, pit or other device used for the purpose of removing ground water from an aquifer shall complete and file a Well Log and Drilling Report form with the Ohio Department of Natural Resources, Division of Water, within 30 days of the well completion in accordance with the Ohio Revised code Section 1521.01 and 1521.05. In addition, any such facility that has a capacity to withdraw waters of the state in an amount greater than 100,000 gallons per day from all sources shall be registered by the owner with the chief of the Division of Water, Ohio Department of Natural Resources, within three months after the facility is completed in accordance with Section 1521.16 of the Ohio Revised Code. For copies of the necessary well log, drilling report, or registration forms, please contact:

Ohio Department of Natural Resources  
2045 Morse Road Bldg. E  
Columbus, OH 43229-6693  
(614) 265-6717

The proposed wastewater disposal system shall be constructed in strict accordance with the plans and application approved by the director of the Ohio Environmental Protection Agency. There shall be no deviation from these plans without the prior express, written approval of the agency. Any deviations from these plans or the above conditions may lead to such sanctions and penalties as provided for under Ohio law. Approval of these plans and issuance of this permit does not constitute an assurance by the Ohio Environmental Protection Agency that the proposed facilities will operate in compliance with all Ohio laws and regulations. Additional facilities shall be installed upon orders of the Ohio Environmental Protection Agency if the proposed sources are inadequate or cannot meet applicable standards.

If the construction area for this project is one acre or more, or is part of a larger development that is one acre or more, the applicant must submit a Notice of Intent (NOI) for coverage under the general construction stormwater permit to Ohio EPA at least 21 days prior to the start of construction of this project.

For projects involving construction or placement of fill in a stream or wetland, the applicant shall contact the appropriate district of the U.S. Army Corps of Engineers for a determination regarding potential impacts to water of the state as well as the requirements for obtaining, if necessary,

water-tightness. Adequate structural support such as compacted soil, manholes on both sides of the crossing, or another Ohio EPA approved method shall be provided for the gravity sewers to prevent excessive deflection of joints and settling on and breaking of the water lines. The length of gravity sewer pipe shall be centered at the point of crossing so that the joints will be equidistant and as far as possible from the water line. The gravity sewer pipe shall be the longest standard length available from the manufacturer.

For parallel installation, a minimum horizontal separation of 10 feet between pressure sewers and any existing or proposed potable water mains shall be maintained. The distance shall be measured edge to edge. Where pressure sewer lines cross existing or proposed water mains, the pressure sewer lines shall be laid below the water mains to provide a separation of at least 18 inches between the invert of the water main and the crown of the pressure sewer.

The operation of the sewerage system shall be under the responsible charge of a certified operator having the proper certificate issued under Chapter 3745-7-05 of the Ohio Administrative Code.

This permit to install applies only to the wastewater disposal system listed above. The installation of drinking water supplies, air contaminant sources, or solid waste disposal facilities will require the submittal of a separate application to the director.

Provisions shall be made for proper operation of the wastewater pumping facilities.

Roof drains, foundation drains, and other clean water connections to the sanitary sewer shall be prohibited by enforcement of legally adopted rules by the authority regulating the use of sanitary sewers.

Sewer and manhole construction joints shall conform to standards of the Ohio Environmental Protection Agency.

When flexible pipe (PVC, ABS, HDPE, etc.) is used it must be tested for maximum deflection of 5 percent after the final backfill has been in place no less than 30 days to permit stabilization of the soil-pipe system. Pipe with a stiffness of 200 p.s.i. or greater need not be tested for deflection if all pipe between manholes is less than 12 feet below final grade.

The rigid ball or mandrel used for the deflection test shall have a diameter not less than 95 percent of the base inside diameter or average inside diameter of the pipe depending on which is specified in the ASTM specification, including the appendix, to which the pipe is manufactured. The test shall be performed without mechanical pulling devices.

All pipe, flexible and rigid, shall be subject to a leakage test. The leakage exfiltration/infiltration test shall be a hydrostatic or air test. The hydrostatic leakage test shall not exceed 100 gallons per inch of pipe diameter per mile per day for any section of the system. If an air test is used, the test shall conform to the test procedure outlined in the ASTM standards for the material of pipe used.

The leakage and deflection test shall be conducted under the supervision of a professional engineer. A representative of the professional engineer may supervise the deflection and leakage tests, but the professional engineer must sign off on the results of the deflection and leakage tests. Results of the deflection and leakage tests shall be kept on file at least 180 days by the entity responsible for the sewerage system, and shall be available upon request by the Ohio Environmental Protection Agency. Any lines which fail the deflection or leakage test must be repaired and retested until they meet the requirements which have been set forth within this condition.

**REPORT ON DETAIL PLANS OF FAIRCREST ST. SW. LIFT STATION AND  
SANITARY SEWER EXTENSION G.P. #1142 (PTI APP #969331), LOCATED IN THE  
CITY OF CANTON, STARK COUNTY**

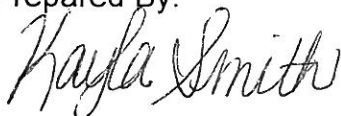
On January 7<sup>th</sup>, 2014, detail plans of the above referenced project were received by the Northeast District Office of the Ohio Environmental Protection Agency. The plans were prepared by CTI Engineers, Inc.

The project consists of installing gravity sewers to serve future residents of Faircrest Street. The project includes a proposal to install approximately 1840 linear feet of 8-inch PVC ASTM D3034 gravity sewer at a minimum slope of 0.40%. The maximum manhole spacing for the gravity sewer is 350 feet. 278 linear feet of 8-inch HDPE ASTM F3350 is also to be installed, at a minimum slope of 1.0% and a maximum manhole spacing of 278 feet. The gravity sanitary sewer will discharge to a lift station. The lift station will pump wastewater to a nearby manhole. The 6-inch force main will be 3100 linear feet long. The estimated project cost is \$840,000.

**Summary**

Detail plans of the above referenced project appear satisfactory and it is recommended they be approved subject to the usual conditions.

Prepared By:



Kayla E. Smith  
Assistant to the District Engineer  
Division of Surface Water

Reviewed By:



Virginia L. Wilson, P.E.  
Supervisor  
Division of Surface Water

KES/MLW/cs  
January 28, 2014

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**GP 1142 – Faircrest Sanitary Sewer Project  
The City of Canton Engineering Department**

**Section XIV: Ohio Department of Transportation Permit**

SEE FOLLOWING PAGES

**GP 1142 – Faircrest Sanitary Sewer Project  
The City of Canton Engineering Department**

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MR 509

Permit No. STA 627-14

State of Ohio  
Department of Transportation  
Permit

Office Use Only	
County or Jurisdiction	<u>Stark</u>
Rte	<u>627</u> Log Pt <u>3.78</u>
AccCat	<u>N/A</u>

[1] Subject to all terms, conditions, and restrictions printed, written below and on the reverse side hereof, or attached,

Name City of Canton Engineer's Office  
Address 2436 30<sup>th</sup> ST. NE Canton OH 44705  
Phone (330) 438-6569 is hereby granted a permit under Section 5515.01 and 5515.02 of Ohio Revised Code, and permission to perform work necessary in the manner described and at the location indicated in the following or as attached to this permit.

To install approximately 545 ft. of 6 inch diameter HDPE force main and 175 ft. of 8 inch diameter PVC sanitary gravity sanitary main line along SR 627 in Stark County at location, offsets and depth as shown on plans. All the requirements of ODOT Supplemental Specifications shall be complied with (see attached).

This permit shall be in the possession of employees on site at all times who are in charge of the work and shall be shown, upon request, to any employee of the Department of Transportation.

[3] No work authorized by this permit shall begin until the permittee has contacted and received instructions from  
Tim Guth, County Manager Phone (330) 452-0365  
(Authorized ODOT Employee)

NOTE: Any work performed by the permittee may be stopped if the above requirements are not met.

[4] To the extent applicable, this permit shall be void if the work described herein does not comply with the conditions, terms, and requirements applicable to this permit, and if the work is not completed by 12-31-2014

[5] All work requiring persons or vehicles within ODOT right of way shall comply with all applicable requirements of the Ohio Manual of Uniform Traffic Control Devices and Item 614 (Maintaining Traffic) of the Construction and Material Specifications, latest editions. Failure to comply with these requirements will be cause for immediate revocation or suspension of the permit until the proper traffic control devices have been provided.

[6] The permittee accepts the conditions, terms, and requirements printed, written on, or attached to this permit and understands that failure to comply fully with those conditions, terms, and requirements or any change in the use of this permit inconsistent with its terms and conditions will be considered a violation and cause for suspension, revocation, or annulment of the permit thereby rendering the permit illegal and subject to appropriate Department action, up to an including removal of the installation, if applicable, at the permittee's expense.

[7] Performance Bond Required? Yes \_\_\_ No X

Surety Company \_\_\_\_\_

Effective Date \_\_\_\_\_ Expiration Date \_\_\_\_\_ Amount \$ \_\_\_\_\_

Permittee: *Dan Hoyle*  
Date: 3/3/14

Director: *[Signature]*  
Date: 02-26-2014

(See Other Side)



## General Provisions Applicable to All Permits

(Sections 5515.01 and 5515.02 of O.R.C.)

- [1] This permit is not a substitute for satisfying the rights or obligations of any other party who may have an interest in the underlying fee interest.
- [2] The granting of this permit does not convey to the permittee or to the property served any rights, title, or interest in state highway rights of way or in the design or operation of the state highway; or in any way abridge the right of the Director of the Department of Transportation in his jurisdiction over state highways. If, in the process of any future work or for the benefit of the traveling public, it becomes necessary, in the opinion of the Director of Transportation to order the removal, reconstruction, relocation, or repair of any of the fixtures, or work performed under this permit, said removal, reconstruction, relocation, or repair shall be wholly at the expense of the owners thereof or the permittee and be made as directed by the Director of Transportation. Such changes in the state highway design or operation, necessary for improved safety and operation or for the benefit of the traveling public, shall not require a permit modification since the permit confers no private rights to the permittee over the control of the state highway.
- [3] The District Deputy Director acts for and on behalf of the Director in issuing and carrying out the provisions of all permits. The District Deputy Director has full authority to ensure that all provisions of the permit are met and to reject any materials, design, and workmanship that do not meet applicable Department standards. The District Deputy Director, at his/her discretion, may require a performance bond or certified check as a prerequisite to the issuance of a permit.
- [4] Failure on the part of the permittee to comply fully with the provisions and conditions of the permit will be cause for suspension, revocation, or annulment of the permit thereby rendering the permit illegal and subject to appropriate Departmental action. By accepting the permit, the permittee agrees to comply with all conditions, terms, and restrictions printed or written on or attached to the permit. If the permittee performs any work contrary to the conditions of the permit or to the instructions of the District Deputy Director and, after due notice, fails to correct the problem, the Department of Transportation may, with or without notice, correct such work and the permittee shall reimburse the Department for the costs.
- [5] The permittee shall indemnify and hold harmless the State of Ohio, Department of Transportation, its officers, representatives and assigns, from any and all loss, liability, damages, litigation costs, and claims for injury or death to any person, property, or business caused by or resulting from any act, omission, event, consequence, or occurrence, negligent or otherwise of the permittee, his employees, or assigns as a result of the issuance of this permit.
- [6] All work authorized under the permit shall be performed to the Department's satisfaction, and the entire expense shall be borne by the permittee. No work shall be performed until the permittee has contacted the Department's appointed representative named on the permit and received instructions. The Department's representative may inspect all work covered by the permit, or the Department reserves the right, during the time any or all of the work is being performed, to appoint an inspector over the work who shall represent the interest of the State on the work and any compensation arranged for shall be paid wholly by the permit holder. Work not in compliance shall be halted and the District Deputy Director shall be notified of the cause. The permittee shall be notified of the Department's action and its causes, and given an opportunity to correct the problem.
- [7] Failure to complete all work within the time specified on the permit shall void the permit, thereby making the permit illegal and subject to appropriate Departmental action. The permittee may request an extension in writing from the District Office, explaining why the extension is necessary and when the work is expected to be completed.
- [8] All work infringing on the pavement or shoulders shall comply with applicable standards and requirements regarding traffic control devices. Failure to comply will be cause for revocation or suspension of the permit. Any closure of lanes or shoulders shall be described in terms of location, duration, time of day, etc. Such work shall not begin until all traffic control devices are in place.
- [9] If any grading, sidewalk, or other work allowed by a permit interferes with the drainage of the highway in any way, such catch basins and outlets as necessary shall be constructed to take proper care of said drainage.
- [10] Upon completion of the work, the permittee shall leave the highway clean of all rubbish, excess materials, temporary structures and equipment, and all parts of the highway shall be left in a condition acceptable to the Department. Upon satisfactory completion of the work authorized by the permit, the Department's appointed representative shall complete the Permit Inspection Certificate, Form No. MR 678 certifying that the permittee has complied with the terms of the permit.
- [11] Except as herein authorized, no excavation shall be made or obstacle placed within the limits of the highway so as to interfere with the travel over the road.
- [12] All pole lines are to be built in accordance with Rule 4901:3-1-08 of Ohio Administrative Code promulgated and enforced by the Public Utilities Commission of Ohio.
- [13] The permittee shall comply with the Air Pollution requirements of Rule 3745-17-08 of the Ohio Administrative Code promulgated and enforced by the Ohio Environmental Protection Agency.
- [14] The permittee certifies that he or she is fully authorized to sign this permit. This permit shall apply to and be binding upon the permittee and his/her successors in interest. No change in ownership of the underlying property or of the facility owned by permittee shall in any way alter the permittee's obligations under this permit.



[15] The permittee(s) for herself/himself/themselves/itself, her/his/their/its personal representatives, and her/his/their/its successors in interest and assigns, as a part of the consideration hereof, do/does hereby covenant and agree that:

- (1) No person on the grounds of race, color, national origin, sex, age, or disability shall be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination in the use of the above described property.
- (2) In the construction of any improvements on, over, or under the above described property and the furnishing of services thereon, no person on the grounds of race, color, national origin, sex, age, or disability shall be excluded from the participation in, be denied the benefits of, or be otherwise subjected to discrimination.
- (3) The above described property shall be used in a manner that at all times is in compliance with all other requirements imposed by or pursuant to Title 49, Code of Federal Regulations, U.S. DOT, Subtitle A, Office of the Secretary, Part 21, Nondiscrimination in Federally-assisted programs of the U.S. DOT – Effectuation of Title VI of the Civil Rights Act of 1964, and as said Regulations may be amended.
- (4) In the event that this instrument grants a lease, license, or permit and any of the above nondiscrimination covenants is breached, then the State of Ohio, Department of Transportation, shall have the unfettered right to terminate the lease, license or permit and to re-enter and repossess the above-described property and hold the same as if said lease, license or permit had never been made or issued.
- (5) In the event that this instrument grants a fee or easement interest and any of the above nondiscrimination covenants is breached, the State of Ohio, Department of Transportation, shall have the unfettered right to re-enter the above described property, and said property will thereupon revert to and vest in and become the absolute property of the State of Ohio and its successors and assigns for the use and benefit of the Department of Transportation.
- (6) In the event that this instrument grants a lease, fee or easement interest, all of the foregoing nondiscrimination covenants shall be and are covenants running with the land.

**STATE OF OHIO**  
**DEPARTMENT OF TRANSPORTATION**  
**Supplemental Specifications**

**ODOT Permit #STA 627-14**

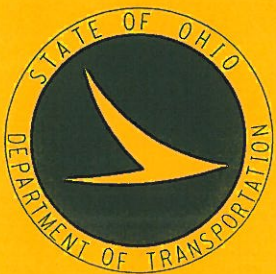
1. If the depth of any excavation is deeper than the distance from edge of the SR 627 pavement to the roadside face of excavation, sheeting shall be driven into place and bracing used, unless strong box or equivalent is used as per ODOT specifications.
2. If sheeting is used, sheeting shall be left in place and shall be cut off at least 2 foot below the proposed finished surface or subgrade in paved areas.
3. If strong box is used, the following conditions shall apply:
  - a. All excavations must be made from within the walls of the strong box.
  - b. At no time shall trench remain open without support of strong box.
  - c. Strong box must be installed as per driving method.
4. Excavations in the ODOT pavement shall be backfilled with low strength mortar as per ODOT Specification Item #613 to within 3 1/4 inches of the surface and coated with 2" of #448 Type II asphalt and with a finish coat of 1 1/4" of #448 Type I asphalt rolled into place as per ODOT specifications.
5. The maximum work length that shall be permitted to be under active construction at any one time shall not exceed 300 ft.
6. Care must be taken not to disturb other utilities.
7. Any reconstruction of ODOT facilities shall meet the requirements of the current ODOT Construction and Material Specifications Manual and Standard Drawings.
8. Trenches are not to remain open overnight, other than what is needed to start the next days work.
9. All excavations within the ODOT right of way shall be backfilled with suitable material and compacted to ODOT specifications.
10. Concrete barrier with flares and end treatments shall comply with ODOT Standard Drawing MT 95.41 and be used to protect all excavations.
11. Mounding of dirt over trenches will not be permitted. Preliminary clean up will be required while working and unsuitable material hauled away.
12. In case work must be suspended because of inclement weather or other reason, the trench shall be backfilled to within 3 inches of the surrounding surfaces.
13. If any problems occur during the installation of this facility all work must stop and ODOT notified immediately at (330) 786-3150.
14. Maintain positive drainage.
15. No field changes permitted without prior ODOT approval.
16. ODOT shall have jurisdiction over any work in the ODOT right of way and has the authority to suspend any work for noncompliance of permit.
17. All trenched drive approaches shall be backfilled with granular material compacted to ODOT specifications. Surface shall be replaced in kind.

18. Provisions shall be made to allow for ingress and egress for all adjoining property owners.
19. Provisions shall also be made for pedestrian access through the work areas, e.g. Temporary Aggregate Walks, etc. Also, temporary fencing to keep pedestrians out of the areas of excavation shall be provided.
20. After each days work the pavement shall be cleaned and scraped with equipment and broomed with tractor broom.
21. Traffic shall be maintained at all times. Work zones shall be limited as not to impede the traveling public, road closures shall not be permitted.
22. No storage of equipment or materials within the ODOT right of way shall be permitted at anytime.
23. No stringing of pipe within the ODOT right of way shall be permitted.
24. No surface discharge of any liquids within the ODOT right of way shall be permitted.
25. All disturbed right of way shall be restored to it's original condition or better and seed and mulched as per Item #659., ODOT specifications.

The provisions and conditions as outlined on Page 2 of 5 of this permit shall be applicable to the work to be done under this permit, including maintaining traffic and the use of barricades with lights for the safety of the traveling public, according to the requirements set forth in the Ohio Manual of Uniform Traffic Control Devices, unless otherwise herein stipulated. This work to be performed at no cost to the State of Ohio. This permit is not a substitute for satisfying the rights of any other party that may have an interest in the underlying fee.

\*Stark County along SR 627, 560 ft. east of Sherman Church Rd.





**WARNING** 

*UNDERGROUND CABLE  
MAY BE IN THIS VICINITY*

IF DIGGING WITHIN 600' OF  
SIGNALIZED INTERSECTION  
OR HIGHWAY LIGHTING

CALL TWO WORKING  
DAYS BEFORE YOU DIG :  
O.D.O.T. TRAFFIC OFFICE  
(330) 786 - 3145