

STANDARD SPECIFICATIONS

SEVENTH EDITION
2018



FOR THE CONSTRUCTION OF PUBLIC SANITARY SEWERS AND WATERMAIN

GENESEE COUNTY DRAIN COMMISSIONER'S OFFICE
DIVISION OF WATER & WASTE SERVICES
G-4610 BEECHER ROAD
FLINT, MI 48532
810-732-7870



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The Genesee County Drain Commissioner's Office-Division of Water and Waste Services is proud to present its Seventh Edition of Standard Specifications for the Construction of Public Sanitary Sewers and Watermain.

This document contains the general specifications, or boiler plate, used by the Division for construction projects. The general specifications are the 2007 EJCDC C-700 Standard General Conditions of the Construction Contract. We encourage the use of these documents for all water and wastewater utility construction projects that must be submitted for our review. Please note that portions of this document may not be reproduced without a license from EJCDC.

Also included is the Division's specifications necessary to design and build sanitary sewers and watermains for connection into the Genesee County Public Water and Wastewater System. To expedite reviews of plans and specifications by this office, we recommend this set of specifications be used in its entirety. It is understood that specific projects will require modifications to these specifications. In those instances, we recommend that supplementary specifications be added. Any part of the documents or the 2017 Standard Details may be reproduced insomuch that no alterations are made without the written consent of the Genesee County Drain Commissioner's Office-Division of Water and Waste Services.

Printed and electronic versions of the Standard Specifications and the 2018 Standard Details are available upon request. Inquiries for availability and the current reproduction cost can be made at (810) 732-7870.

These Standard Specifications, along with the 2017 Standard Details, will allow the Genesee County Drain Commissioner's Office-Division of Water and Waste Services to insure a safe and clean public water supply and a dependable sanitary sewer system that is consistent with our current system.

The Division is always improving this document. Comments and suggestions for improvements to this document are accepted and appreciated. We will endeavor to forward amendments to this document to all listed holders. Do not hesitate to contact this office to verify that you have the latest version.

PART 1
BIDDING REQUIREMENTS

Attention: PROSPECTIVE BIDDERS

Re: Genesee County Water Supply System
Insert Project Name

Dear Madam/Sir:

The Drain Commissioner's Office - Division of Water and Waste Services is soliciting proposals from qualified contractors for construction of **Insert Project Name** and related appurtenances in _____, Genesee County, Michigan. A copy of the Invitation to Bid is attached for your information. Interested bidders may obtain bid documents which include Documents for Bid Submittal (hard copy), Project Manual (PDF), and Drawings (PDF) for this project at the Division of Water & Waste Services, G-4610 Beecher Road, Flint, Michigan 48532. Bid documents will be available for review and purchase on or after _____. Each set of plans and bidding documents shall cost _____ if picked up and _____ if mailed. All documents that are mailed will be sent via UPS Ground. This cost does not include overnight shipping. These monies are non-refundable.

We look forward to hearing from you.

Sincerely,

Matthew T. Raysin, P.E.
Assistant Director of Engineering
Division of Water & Waste Services

MTR/JMW
Attachment

**INVITATION TO BID
FOR
(INSERT PROJECT NAME)**

SUBMISSION OF BIDS. Sealed Bids for construction of _____ and related appurtenances in _____, _____ County, Michigan, as noted herein and on the Drawings, are solicited by Genesee County, County Agency, the Genesee County Drain Commissioner's Office - Division of Water and Waste Services pursuant to Act 342 of the Michigan Public Acts of 1939, as amended, of G-4610 Beecher Road, Flint, Michigan, 48532 ("GCDC-WWS"). **All Bids shall be received by:**

**Genesee County Drain Commissioner's Office
Division of Water and Waste Services
G-4610 Beecher Road
Flint, Michigan 48532-2617
Attn.: Division Finance Officer**

The Bids shall be enclosed in an opaque sealed envelope marked with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder and shall be accompanied by the Bid security and all of the documents required by Section 14.01 of the Instructions to Bidders. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate envelope plainly marked on the outside with the notation "BID ENCLOSED" on the face of it.

On _____, 20____, at _____, local time, all Bids submitted with a sufficient Bid security and all of the required Bidding Documents set forth in Section 14.01 of the Instructions to Bidders shall be publicly opened and the total Bid prices read aloud.

GENERAL DESCRIPTION. Bids are solicited under a general construction contract for furnishing and installing the following items with related appurtenances in accordance with the Drawings and Specifications entitled "_____
_____".

OBTAINING BIDDING DOCUMENTS. Copies of all Bidding Documents are on file and available for review and pickup at GCDC-WWS at the above-mentioned address on _____. Bidding documents available for pickup or mailed will be available in PDF format only.

As a further condition to obtaining the Bidding Documents, Bidder shall submit _____ and no/100 Dollars (\$_____) on or before the date the Bidding Documents are picked up from the Issuing Office or _____ and no/100 Dollars (\$_____) before the Bidding Documents are mailed to Bidder.

All Bidding Documents mailed will be sent via UPS courier at Bidder's cost, which shall be prepaid. All monies paid for the Bidding Documents are non-refundable.

All checks shall be made out to the Genesee County Drain Commissioner's Office. All documents that are mailed will be sent via UPS Ground. This cost does not include overnight shipping.

BID SECURITY. Each Bid submitted to GCDC-WWS shall be accompanied by a certified check, cashier's check, money order payable to GCDC-WWS or a Bid bond in an amount not less than five percent (5%) of the total base Bid. Bids submitted without the aforementioned Bid security shall not be read and considered at the Bid opening.

If a Bidder is given a Notice of Award and fails to execute the Contract Documents as required by the Specifications within twenty (20) days after issuance of the Notice of Award, the Bidder shall forfeit all claims to the Contract and the amount of the Bid security (whether monies or a Bid bond) submitted with its Bid shall also be forfeited and kept by GCDC-WWS as its sole and separate property as liquidated damages and not as a penalty.

ACCEPTANCE OF BID. GCDC-WWS may accept any Bid or reject any Bid and waive any irregularities in Bids in its sole discretion.

WITHDRAWAL OF BID. A Bidder shall be permitted to withdraw its Bid unopened after it has been deposited if such request is received prior to the time specified for opening Bids, provided Bidder's identity is made known and it signs for the Bid. No Bid may be withdrawn after the opening of the Bids for a minimum of ninety (90) days from the scheduled time for submitting Bids without the written consent of GCDC-WWS. In such event, GCDC-WWS may keep the Bid bond or the money deposited by the Bidder as GCDC-WWS' sole and separate property.

MANDATORY PRE-BID MEETING. A mandatory pre-Bid meeting shall be held at the GCDC-WWS office, G-4610 Beecher Road, Flint, MI 48532 on _____, at _____, local time. Representatives of GCDC-WWS and Engineer shall be present to discuss the Project. **A representative or representatives of Bidders shall attend and participate in the pre-Bid meeting.** Engineer shall transmit to all prospective Bidders such Addenda as Engineer considers necessary in response to questions arising at the pre-Bid meeting. **Bids shall only be accepted from those prime or general contractors in attendance at the pre-Bid meeting.**

Jeffrey Wright
Genesee County Drain Commissioner
Genesee County, Michigan

INSTRUCTIONS TO BIDDERS

ARTICLE 1 - DEFINED TERMS

- 1.01** Defined terms used in these Instructions to Bidders have the meanings stated in the General Conditions and the Supplementary Conditions.

ARTICLE 2 - COPIES OF BIDDING DOCUMENTS

- 2.01** Complete sets of the Bidding Documents in the number and for the sum stated in the Advertisement or Invitation to Bid may be obtained from the Issuing Office. Monies paid for the Bidding Documents are non-refundable.
- 2.02** Complete sets of Bidding Documents shall be used in preparing Bids. Neither GCDC-WWS nor Engineer shall be responsible for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- 2.03** GCDC-WWS and Engineer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids, and do not confer a license or grant for any other purpose or use.
- 2.04** A complete set of the Bidding Documents, excluding the Drawings, shall be submitted by Contractor. Incomplete submissions shall not be considered or accepted.

ARTICLE 3 - QUALIFICATIONS OF BIDDERS

- 3.01** No Bid shall be considered from any Bidder unless such Bidder is known to be skilled and regularly engaged in work of a character similar to the Work. Accordingly, the Bidder shall furnish evidence satisfactory to GCDC-WWS of Bidder's experience and familiarity with the Work. The information when requested shall include the following:
- A.** Bidder's performance record with a listing of work of similar character and proportions which it has constructed including the name, address and contact information of the owner, the date built and the construction cost;
 - B.** An itemized list of other projects now under contract including the location, type, size, required date of completion and the percent of completion to date of each project;
 - C.** An itemized list of the Bidder's equipment available for use on the Project;

- D.** An itemized list of the parts of the Work which are proposed to be sub-contracted;
 - E.** Bidder's financial statements and all tax returns for the past three (3) years;
 - F.** Such additional information as shall satisfy the GCDC-WWS that Bidder is qualified to perform the Agreement; and
 - G.** The names of all other companies and persons for which work has been performed by Bidder;
 - H.** Completed Contractor Safety Questionnaire, and
 - I.** Iran Economic Sanctions Bidder Affidavit.
 - J.** Miss Dig 811 Gold Shovel Standard Certification Status – Bidders will be required to provide proof of participation in the Gold Shovel Standard, whose goals are to improve work force safety, public safety and the integrity of buried infrastructure. If Bidder or Bidder's subcontractors are not currently certified through said agency, Bidder and Bidder's subcontractors will have 60 days after contract award to complete and provide the Certification(s). Failure to obtain certifications in said timeframe may result in rejection of future bids.
- 3.02** Failure to submit the information in Paragraph 3.01 above when requested may be a basis for rejection of the Bid.

ARTICLE 4 - EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE

4.01 Subsurface and Physical Conditions

- A.** The Supplementary Conditions identify: (1) those reports of explorations and tests of subsurface conditions at or contiguous to the Site, which have been utilized by Engineer in preparation of the Contract Documents; and (2) those drawings of physical conditions, in or relating to, existing surface and subsurface structures, at or contiguous to the Site (except Underground Facilities) that Engineer has used in preparation of the Contract Documents.
- B.** Copies of reports and drawings referenced in Paragraph 4.02.A of the General Conditions shall be made available to any Bidder upon written request, provided that Bidder pays for the cost of copying of all such reports and drawings. Bidder is solely responsible and GCDC-WWS and

Engineer have no responsibility or liability for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretation, opinions or information contained in such reports or shown or indicated in the drawings.

- 4.02** If any portion of the Project is located on private property, Bidder shall use reasonable good faith efforts to obtain permission from the owner of the private property to conduct such examinations, investigations, explorations, tests and studies as each Bidder deems necessary for submission of a Bid.

If any portion of the Project is located on public property, Bidder shall use reasonable good faith efforts to obtain permission from the governmental agency with jurisdiction over the public property to conduct such examinations, investigations, explorations, tests and studies as each Bidder deems necessary for submission of a Bid.

Bidder shall fill all holes and clean up and restore such property to its former condition upon completion of any examinations, explorations, investigations, tests and studies.

Bidder shall defend, indemnify and hold harmless the above-mentioned property owner(s), the agency having authority over the roadways, Engineer and GCDC-WWS from and against all losses, costs, damages and liabilities in connection with such examinations, inspections, explorations, tests and studies undertaken by Bidder. In addition, prior to making such examinations, inspections, explorations, tests, and studies, Bidder shall deliver to GCDC-WWS an insurance policy naming GCDC-WWS and Engineer as co-insureds and which shall contain terms and conditions which adequately cover Bidder's indemnification obligations in connection therewith, as determined by GCDC-WWS.

- 4.03** Bidder shall thoroughly review Article 7 of the General Conditions for the identification of the general nature of other work that is to be performed at the Site by GCDC-WWS or others (such as utilities and other prime contractors) that relates to the Work for which a Bid is to be submitted. On written request, GCDC-WWS shall provide to each Bidder for examination access to or copies of Bidding Documents (other than portions thereof related to price) for such other work.

- 4.04** It is the responsibility of each Bidder before submitting a Bid to:

- A.** Examine thoroughly the Bidding Documents and other related data identified in the Bidding Documents (including "technical data" referred to below);

- B.** Visit the Site to become familiar with and satisfy itself as to the general, local and Site conditions that may affect cost, progress, performance or furnishing of the Work;
- C.** Become familiar with and satisfy itself as to all Laws and Regulations that may affect cost, progress, performance or furnishing of the Work;
- D.** Carefully study all reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface at or contiguous to the Site (except Underground Facilities) which have been identified in Paragraph 4.02 of the General Conditions;
- E.** Obtain and carefully study all additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site which may affect cost, progress or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences and procedures of construction to be employed by Bidder, including any specific means, methods, techniques, sequences and procedures of construction expressly required by the Bidding Documents and safety precautions and programs incident thereto. Bidder shall comply with Section 4.02 of the Instructions to Bidders when conducting such examinations, investigations, explorations, tests, studies and similar type activities;
- F.** Agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies or data are necessary for the determination of its Bid for performance of the Work at the price Bid and within the times and in accordance with the other terms and conditions of the Bidding Documents;
- G.** Become aware of the general nature of the work to be performed by GCDC-WWS and others at the Site that relates to the Work indicated in the Bidding Documents;
- H.** Correlate the information known to Bidder, information and observations obtained from visits to the Site, reports and Drawings identified in the Bidding Documents and all additional examinations, investigations, explorations, tests, studies and data with respect to the Bidding Documents;
- I.** Promptly give GCDC-WWS and Engineer written notice of all conflicts, errors, ambiguities or discrepancies which Bidder discovers in the Bidding Documents and confirm in writing that the written resolution thereof by GCDC-WWS and Engineer is acceptable to Bidder and, in connection therewith, Bidder acknowledges that by submitting a Bid that if a conflict,

error, ambiguity or discrepancy exists in the Bidding Documents, such conflict, error, ambiguity or discrepancy between the higher and lower price will be resolved in favor of the higher price;

- J.** Determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work; and
 - K.** Carefully study and assume responsibility of construction sequencing and scheduling, controlling and maintaining traffic flow, maintaining natural gas services, water services, sanitary sewer services, storm water drainage and telecommunication services and other similar utilities at all times during the Work and complete the Project in an orderly and timely manner.
 - L.** Acknowledge and agree that to the extent that bidder previously has been awarded a contract and/or performed work for Owner that no provision of any prior contract nor any course of conduct engaged in during any prior contract will act to modify or amend any contract document (as identified in the Agreement).
- 4.05** The submission of a Bid shall constitute an incontrovertible representation, warranty and covenant by Bidder that:
- A.** Bidder has complied with every requirement of this Article 4;
 - B.** Without exception, the Bid is premised upon performing and furnishing the Work required by the Bidding Documents, and applying the specific means, methods, techniques, sequences or procedures of construction (if any) that may be shown or indicated or expressly required by the Bidding Documents;
 - C.** Bidder has given Engineer and GCDC-WWS written notice of all conflicts, errors, ambiguities and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by Engineer and GCDC-WWS are acceptable to Bidder; and
 - D.** The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.
- 4.06** Information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to Engineer by the owner of such Underground Facilities or others. GCDC-WWS and Engineer are not responsible for the

accuracy or completeness thereof, unless it is expressly provided otherwise in the Supplementary Conditions.

- 4.07** The provisions of Paragraphs 4.01 through 4.05 hereof, inclusive, do not apply to Asbestos, Polychlorinated biphenyls (PCBs), Petroleum, Hazardous Waste, or Radioactive Material which are covered by Paragraph 4.06 of the General Conditions.

ARTICLE 5 – SITE AND OTHER AREAS

- 5.01** The Site is identified in the Bidding Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment or storage of materials and equipment to be incorporated in the Work shall be obtained and paid for by Contractor, and all costs associated therewith shall be included in the Bid, including the cost of obtaining all necessary permits and licenses for the Work which shall be the sole obligation of Contractor.

ARTICLE 6 - INTERPRETATIONS AND ADDENDA

- 6.01** All questions about the meaning or intent of the Bidding Documents shall be in writing and received by GCDC-WWS and Engineer at least seven (7) days prior to the date for opening of Bids. Questions received in less than seven (7) days prior to the date for opening of Bids may not be answered. Interpretations or clarifications considered necessary by GCDC-WWS and Engineer in response to such questions shall be issued by Addenda mailed or delivered to all parties recorded by GCDC-WWS as having received the Bidding Documents. Addenda may only be issued by GCDC-WWS to clarify, correct or change the Bidding Documents. Only questions answered by formal written Addenda shall be binding. Oral and other interpretations or clarifications, including interpretations and clarifications issued by GCDC-WWS and/or Engineer, shall be without legal effect.

ARTICLE 7 - BID SECURITY

- 7.01** A Bid shall be accompanied by Bid security made payable to GCDC-WWS in an amount of five percent (5%) of Bidder's maximum Bid price in the form of a certified or bank cashier's check or a Bid Bond on the form attached and issued by a surety meeting the requirements of Paragraphs 5.01 and 5.02 of the General Conditions. Bids submitted without a Bid security shall not be read or considered at the Bid opening.
- 7.02** The Bid security of the Successful Bidder shall be retained until such Bidder has executed the Contract Documents, furnished the required Contract security and

met all other conditions of the Notice of Award whereupon the Bid security shall be returned. If the Successful Bidder fails to execute and deliver the Contract Documents and to furnish the required Contract security within twenty (20) days after the Notice of Award, GCDC-WWS may annul and cancel the Notice of Award, and the Bid security of that Bidder shall be forfeited and retained by GCDC-WWS as its sole and separate property. The Bid security of Bidders may be retained by GCDC-WWS until the earlier of the ninetieth (90th) day after the Bid opening or execution of the Contract Documents by the Successful Bidder, whereupon the Bid security furnished by such Bidders shall be returned upon written request.

- 7.03** Bid security of other Bidders whom GCDC-WWS believes do not have a reasonable chance of receiving the award of the Agreement shall be returned, upon written request to GCDC-WWS to do so, within seven (7) days after the Bid opening.

ARTICLE 8 - CONTRACT TIMES

- 8.01** The number of days within which or the dates by which the Work is to be Substantially Completed and also completed and ready for final payment are set forth in the Agreement. The term "Contract Times" is defined in Paragraph 2.03 of the General Conditions and as set forth in the Supplementary Conditions. The consecutive days shall be computed from and include the date of the official Notice to Proceed in a written order from GCDC-WWS.

ARTICLE 9 - LIQUIDATED DAMAGES

- 9.01** Provisions for liquidated damages, and not as penalty, if any, are set forth in the Agreement and Supplementary Conditions.

ARTICLE 10 - SUBSTITUTE AND APPROVED ALTERNATE ITEMS

- 10.01** Unless specifically noted otherwise, whenever in any of these Contract Documents the name of a manufacturer has been used, such reference shall be understood as indicating the type, function, design, efficiency and quality desired for the specified item and shall not be construed in any manner so as to exclude identical items of other manufacturers. Such items, however, shall be identical in all respects to the items named and specified in the Contract Drawings. Should Contractor propose to use identical items by manufacturer(s) other than those named in the Contract Documents, Contractor shall submit all of the following information to Engineer and GCDC-WWS within thirty (30) days of the date of the Notice to Proceed, unless granted a time extension in writing by GCDC-WWS:

- A.** Written application requesting approval of the substitute manufacturer's item;
 - B.** Sufficient documentation to demonstrate equivalency and conformance with the specified item and Project requirements;
 - C.** The extent, if any, to which changes to the Contract Documents shall be required to adapt the design to the proposed substitute items;
 - D.** Accredited testing laboratory certificate comparing substitute chemical composition/physical/performance attributes to those of the specified item;
 - E.** An itemized estimate of all costs and credits that will result from the use of the proposed substitute, including any redesign as provided from Paragraph 10.01 of the Instruction to Bidders; and
 - F.** Any additional information required pursuant to Paragraph 6.05 of the General Conditions.
- 10.02** Only substitute items approved in writing by GCDC-WWS and Engineer shall be allowed for use on the Project. Requests for review of substitute items of material and equipment shall not be accepted by GCDC-WWS and Engineer from anyone other than Contractor. GCDC-WWS may require Contractor to furnish, at Contractor's expense, a special performance guarantee or other surety with respect to any substitute item. Applications which do not contain sufficient information to document conformance shall be rejected. GCDC-WWS' decision, as to whether or not to accept or reject the proposed substitute item, is final and may be independent of Engineer's decision.

ARTICLE 11 - SUBCONTRACTORS, SUPPLIERS AND OTHERS

- 11.01** The Bidding Documents require the identity of Subcontractors, Suppliers, individuals and entities to be submitted to GCDC-WWS as part of the Bid. The apparent Successful Bidder and any other Bidder so requested shall, within forty-eight (48) hours after the Bid opening, submit to GCDC-WWS an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, individual and entity, if requested by GCDC-WWS. If GCDC-WWS or Engineer, after due investigation, has a reasonable objection to any proposed Subcontractor, Supplier, individual or entity, they may before the Notice of Award is given, request the apparent Successful Bidder to submit an acceptable substitute without an increase in the Bid price.

- 11.02** If the apparent Successful Bidder declines to make any such substitution as referred to in Paragraph 11.01 above, GCDC-WWS may award the Agreement to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, individuals and entities. If an apparent Successful Bidder declines to make the requested substitutions it shall not constitute grounds for forfeiture of the Bid security of any Bidder which, in such circumstances, shall be returned to Bidder upon its written request. Any Subcontractor, Supplier, individual or entity so listed and against which GCDC-WWS or Engineer makes no written objection prior to the giving of the Notice of Award shall be deemed acceptable to GCDC-WWS and Engineer, subject to revocation of such acceptance after the Effective Date of the Agreement as provided in Paragraph 6.06 of the General Conditions.
- 11.03** Contractor shall not be required to employ any Subcontractor, Supplier, individual or entity against whom Contractor has a reasonable objection.

ARTICLE 12 – PREPARATION OF BID

- 12.01** The Bid form is included with the Bidding Documents. All Bids shall be made only on the Bid form which shall be included with the Bidding Documents.
- 12.02** All blanks on the Bid form shall be completed by printing in blue ink or by typewriter and the Bid shall be duly executed. All signatures shall be in blue ink. A Bid price shall be indicated for each Bid item listed therein or the words “No Bid”, “No Change” or “Not Applicable” entered.
- 12.03** A Bid by a corporation shall be executed in the corporate name by an authorized corporate officer (whose name and title shall appear under the signature) accompanied by evidence of corporate authorization for the Bid. The registered address and state of incorporation of the corporation shall be shown below the signature.
- 12.04** A Bid by a partnership shall be executed in the partnership name and signed by an authorized partner (whose name and title shall appear under the signature) accompanied by evidence of partnership authorization for the Bid. The official address of the partnership shall be shown below the signature.
- 12.05** A Bid by a limited liability company shall be executed in the name of the limited liability company by the authorized member or manager (whose name and title shall appear under the signature) accompanied by evidence of limited liability company authorization for the Bid. The state of formation and the registered address of the limited liability company shall be shown below the signature.
- 12.06** A Bid by an individual or sole proprietor shall show Bidder’s name and official address and state that such individual has capacity to execute the Bid.

- 12.07** The names of all signatories shall be typed or printed in blue ink below the signature in the Bid.
- 12.08** The Bid shall contain an acknowledgement of receipt of all Addenda, the numbers of which shall be completed on the Bid form.
- 12.09** The address, telephone, fax number and e-mail address for communications regarding the Bid shall be listed on the Bid form. GCDC-WWS has sole discretion as to which form of notification shall be used.
- 12.10** The Bid shall contain evidence of Bidder's authority to submit the Bid. Bidder's Michigan contractor license number shall be shown on the Bid form.
- 12.11** Bid prices in the Bid shall be in numerical form only. The total base Bid shall be in written and numerical form. All errors shall be resolved in favor of words and not numbers. A Bid may be rejected if it does not contain a price for each and every item named in the Bid for Unit Price Work proposals or for items used for additions or deductions, if requested.
- 12.12** Each erasure or change to the Bid shall be initialed by the person signing the Bid. Any Bid which contains omissions, erasures, conditions, alterations or additions not so initialed may be rejected at the sole discretion of GCDC-WWS.
- 12.13** **Bids shall not be removed from the bound document.** Each Bid shall be submitted in a sealed envelope clearly identifying the Project and the name and address of the Bidder.

ARTICLE 13 – BASIS OF BID; EVALUATION OF BIDS

13.01 Unit Price Work

- A.** Each Bidder shall submit a Bid on a Unit Price Work basis as set forth in the Bid. The Unit Price Work included in the Bid shall be based on acceptable item manufacturers, if any, listed in the Contract Documents. Substitute or "approved alternate" items shall not be included in the Bid prices and may only be considered in accordance with Article 10 of the Instruction to Bidders.
- B.** The total of all estimated prices shall be determined as the sum of the products of the estimated quantity of each item and the Unit Price Work Bid for the item. The final quantities and Contract Price shall be determined in accordance with Paragraph 11.03 of the General Conditions and as set forth in the Supplementary Conditions.

- C. Discrepancies between the multiplication of Units Price Work and prices shall be resolved in favor of the Unit Price Work. Discrepancies between the indicated sum of any column of figures and the correct sum thereof shall be resolved in favor of the correct sum. Discrepancies between words and figures shall be resolved in favor of the words, unless it clearly appears in the Bid that the words rather than the figures are in error.
- 13.02** The Bid price shall include such amounts as Bidder deems proper for overhead and profit on account of cash allowances, if any, named in the Contract Documents as provided in Paragraph 11.02 of the General Conditions.
- 13.03** Each Bidder shall satisfy itself of the accuracy of the estimated quantities in the Bid by examination of the Site and a review of the Drawings and Specifications, including the Addenda. After Bids have been submitted, Bidder shall not assert that there was a misunderstanding concerning the quantities or nature of the Work.
- 13.04** GCDC-WWS shall make available to all Bidders the information which is pertinent to, delineates and describes the land owned and rights-of-way/easements acquired or to be acquired, if any, in connection with the Site.
- 13.05** The Contract Documents contain the provisions required for the construction of the Project. Information obtained from an officer, agent or employee of GCDC-WWS or Engineer or any other person, entity or other governmental agency shall not affect the risks or obligations assumed by Contractor or relieve Contractor from fulfilling any of the conditions of the Contract Documents.
- 13.06** GCDC-WWS may increase or decrease the contract quantities in the amount of not more than twenty-five percent (25%) of each item on a Unit Price Work contract or lump sum contract without an increase in unit price.
- 13.07** The OWNER shall evaluate the Contractor Safety Questionnaire as a portion of the evaluation used to determine the successful bidder. The CONTRACTOR shall provide additional documentation of his safety program upon request of the OWNER.

ARTICLE 14 - SUBMITTAL OF BID

- 14.01** Each Bidder shall be furnished with one (1) bound copy of the Bidding Documents. **Bids shall not be removed from the bound documents.** The bound copy of the Bid shall be completed and submitted with the following attachments:

- A. Legal Status of Bidder;
- B. Non-Collusion Affidavit of Prime Bidder;
- C. Designation of Subcontractors;
- D. Statement of Bidder's Qualifications (48 hours after request to do so);
- E. Bidder Certification;
- F. Bid Security;
- G. Certification Regarding Debarment, Suspension and Other Responsibility Matters;
- H. Contractor Safety Questionnaire (48 hours after request to do so); and,
- I. Iran Economic Sanctions Affidavit.

Bids missing any of the above fully completed attachments shall not be read or considered unless otherwise stated above.

- 14.02** A Bid shall be received by GCDC-WWS no later than the date and time prescribed and at the place indicated in the Invitation to Bid. The Bid shall be enclosed in an opaque sealed envelope marked with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted) and the name and address of Bidder and shall be accompanied by the Bid Security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate envelope plainly marked on the outside with the notation "BID ENCLOSED" on the face of it. A Bid shall be sent or delivered to:

Genesee County Drain Commissioner's Office
Division of Water and Waste Services
G-4610 Beecher Road
Flint, MI 48532-2617
Attn.: Division Finance Officer

ARTICLE 15 - MODIFICATION AND WITHDRAWAL OF BID

- 15.01** A Bid may be modified or withdrawn by an appropriate written document duly executed in the manner that Bids are required to be executed and shall be received by GCDC-WWS at the place where Bids are to be submitted prior to the date and time of the opening of Bids.

ARTICLE 16 - OPENING OF BIDS

16.01 Bids shall be opened on the date, time, and place indicated in the Invitation to Bid and read aloud publicly, unless obviously defective, non-conforming or non-responsive. An abstract of the amounts of the base Bids and major alternates, if any, shall be made available to Bidders by written request to GCDC-WWS after the opening of the Bids. Within ten (10) days after the date the Bids are opened, Engineer shall issue a list of certified Bids that shall be available to Bidders upon written request to the GCDC-WWS. The certified Bid list issued by the Engineer shall supersede, nullify and void the abstract of the amounts of the base Bids and major alternates.

ARTICLE 17 - BIDS TO REMAIN SUBJECT TO ACCEPTANCE

17.01 All Bids shall remain subject to acceptance for ninety (90) days after the date of the Bid opening, provided, however, that GCDC-WWS may, in its sole discretion, reject any Bid and return the Bid Security prior to that date. GCDC-WWS may hold the Bid longer than ninety (90) days with the written approval of Bidder.

ARTICLE 18 - AWARD OF CONTRACT

18.01 GCDC-WWS reserves the right to reject any or all Bids, including, without limitation, defective, non-conforming, non-responsive, unbalanced or conditional Bids. GCDC-WWS also reserves the right to reject the Bid of any Bidder if GCDC-WWS believes it would not be in the best interest of the Project to make an award to that Bidder. GCDC-WWS also reserves the right to reject or disqualify the Bid of any Bidder, if in the opinion of the GCDC-WWS Bidder has not satisfactorily completed a past project for GCDC-WWS. GCDC-WWS also reserves the right to waive all informalities not involving price, time or changes in the Work and negotiate contract terms with the Successful Bidder.

18.02 More than one Bid for the same Work from an individual or entity under the same or different names shall not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work shall be cause for disqualification of that Bidder and rejection of all Bids in which that Bidder has an interest.

18.03 In evaluating Bids, GCDC-WWS shall consider whether or not the Bids comply with the prescribed requirements, such alternates, unit prices and other data as may be requested in the Bid prior to Notice of Award.

18.04 In evaluating Bids, GCDC-WWS shall consider the qualifications of Bidder and may consider the qualifications and experience of Subcontractors, Suppliers and other individuals or entities proposed for those portions of the Work for which the

identity of Subcontractors, Suppliers and other individuals or entities is required to be submitted as provided in the Supplementary Conditions.

- 18.05** GCDC-WWS may conduct such investigations as GCDC-WWS deems necessary to assist in evaluation of any Bid to establish the responsibility, qualifications and financial ability of Bidders, proposed Subcontractors, Suppliers and other individuals or entities to perform the Work in accordance with the Bidding Documents.

ARTICLE 19 - CONTRACT SECURITY AND INSURANCE

- 19.01** Article 5 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth GCDC-WWS' requirements as to Performance Bond, Payment Bond, Maintenance and Guarantee Bond and insurances. When the Successful Bidder delivers the executed Agreement to GCDC-WWS, it shall be accompanied by such bonds, insurance policies and binders as required therein. In no case shall the first (1st) progress payment as set forth in Section 14.02 of the General Conditions, as amended by the Supplementary Conditions, be paid by GCDC-WWS until all required bonds and insurances are in full force and effect and have been received by the GCDC-WWS.

ARTICLE 20 - EXECUTION OF AGREEMENT

- 20.01** When GCDC-WWS gives a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents which are identified in the Agreement as attached thereto. Within twenty (20) days thereafter, the Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and Contract Documents to GCDC-WWS. GCDC-WWS shall deliver one fully executed counterpart to the Successful Bidder. Each counterpart shall be accompanied by a complete set of the Drawings with appropriate identification.

ARTICLE 21 - TAXES

- 21.01** The Bidder shall include in the Bid all federal, state, and local taxes that may be applicable to the Project, including, but not limited to, sales and use taxes.

ARTICLE 22 – SUBCONTRACTING OF WORK

- 22.01** GCDC-WWS prefers any Bidder who intends to subcontract a portion of the Work shall complete (through the use of its own employees) at least fifty-one percent (51%) of the Work (by dollar value). GCDC-WWS reserves the right to

reject any Bid where Bidder is performing less than fifty-one percent (51%) of the Work (by dollar value) as determined by GCDC-WWS. (*See SC 6.06(4)*).

ARTICLE 23 – PREVAILING WAGE RATES

NA

ARTICLE 24 – NON-ESCALATION CLAUSE

24.01 Contractor shall not be entitled to any additional compensation because of payment by Contractor of any wage rate in excess of the minimum wage rate set forth in Section 23.01 above or for any increase in material costs.

ARTICLE 25 – SOIL EROSION AND SEDIMENTATION CONTROL

25.01 Contractor shall make himself/herself thoroughly familiar with the requirements of the State of Michigan, Natural Resources and Environmental Protection Act 451 (Act 451), Part 91, concerning the prevention of soil erosion and sedimentation. Contractor is required to obtain the Soil Erosion and Sedimentation Control (SESC) Permit and pay the required fees.

25.02 Contractor shall make himself/herself thoroughly familiar with the requirements of the “Guidebook of Best Management Practices for Michigan Watersheds” and follow such practices in the conduct of his work.

25.03 The minimum soil erosion and sedimentation control plan has been shown on the drawings. Contractor shall provide the Genesee County Drain Commissioner’s Office – Division of Water & Waste Services with a detailed, specific soil erosion and sedimentation control plan as part of their permit application. This plan must be tailored to the Contractor’s schedule and construction means and methods. The plan must be approved, and the Contractor’s permit payment and bond received prior to a permit being issued. During the project, the plan must be effective, and additional measures may be required at no additional cost to the Owner in order to meet the intent of the plan.

25.04 Permitting Fill Sites – All fill sites must have all appropriate permits (federal, state, county, local, other) submitted to the Owner before construction may commence.

ARTICLE 26 – NPDES STORMWATER PERMIT

26.01 The Contractor shall provide a Certified Stormwater Operator (Operator) for the project and shall maintain the required site documentation per the requirements of Act 451. The Contractor shall provide and pay for the services of an Operator to conduct the required on-site soil erosion and sedimentation control inspections, recordkeeping, and reporting of construction activities. The Operator shall be trained and certified by the MDEQ.

REQUIRED BID SUBMITTAL DOCUMENTS

**Please note that all of the following information shall be provided with the Bid.
Failure to do so will result in the Bid being considered non-responsive
and the Bid will not be read.**

- The proposed bid shall be prepared and submitted in the bound bidding document provided.
- Bid signed by a proper official (blue ink).
- The name of the Bidder and his official address (home office and telephone and e-mail address) shall be indicated on the last page of the bid.
- Acknowledge receipt of all Addenda.
- All blanks on the bid form filled out completely by printing in ink or typewritten; including numbers and words as indicated (NO BIDS COMPLETED IN PENCIL WILL BE READ).
- Legal Status of Bidder (Attachment A) filled out completely with the address and telephone number filled in for the appropriate business (i.e., individual, partnership, or corporation). If the Bidder is a corporation, the authorization of corporation for a contract shall be submitted.
- Non-collusion Affidavit of the Prime Bidder (Attachment B) filled out completely.
- Designation of Subcontractors (Attachment C) filled out completely.
- Statement of Bidder's Qualifications (Attachment D) filled out completely (48 hours after request to do so).
- Bidder Certification (Attachment E) filled out completely.
- A bid security in an amount of five percent (5%) of the Bidder's maximum bid price and in the form of a certified check, bank check, or a bid bond (Attachment F or equivalent). Fax copies will not be accepted and will result in the bid being rejected. Bond rates shall also be provided at the time of bid.
- Certification Regarding Debarment, Suspension, and Other Responsibility Matters (Attachment G) filled out completely.
- Contractor Safety Questionnaire (Attachment H) filled out completely (48 hours after request to do so).
- Iran Economic Sanctions Affidavit (Attachment I) filled out completely.

(INSERT PROJECT NAME)

BID FORM

GENESEE COUNTY DRAIN COMMISSIONER'S OFFICE
DIVISION OF WATER AND WASTE SERVICES
G-4610 BEECHER ROAD
FLINT, MICHIGAN 48532-2617

DATE: _____, 20____

This Bid is submitted by _____,
("Bidder") to Genesee County, County Agency, the Genesee County Drain Commissioner's
Office – Division of Water and Waste Services pursuant to Public Act 342 of the Michigan
Public Acts of 1939, as amended ("GCDC-WWS").

The Bidder proposes and agrees to enter into an Agreement (including executing the
Contract Documents) with GCDC-WWS in the form included in the Bidding Documents,
to perform and furnish all Work as specified or indicated in the Contract Documents for the
Bid price and within the times indicated in this Bid and in accordance with the other terms
and conditions in the Contract Documents.

Bidder accepts all of the terms and conditions of the Invitation to Bid and
Instructions to Bidders including, but not limited to, those dealing with the disposition of
Bid security. This Bid shall remain subject to acceptance for ninety (90) days after the day
of the Bid opening or for such longer period of time that Bidder may agree to in writing.
Bidder shall sign and deliver the required number of counterparts of the Agreement with the
bonds and other documents required by the Bidding Documents within twenty (20) days
after the issuance date of the Notice of Award.

In submitting this Bid, Bidder represents and warrants to GCDC-WWS, as more
fully set forth in the Agreement and Contract Documents, that:

1. Bidder has examined and carefully studied the Bidding Documents, the
other related data identified in the Bidding Documents and the following
Addenda, and receipt of all such documents is hereby acknowledged by
Bidder.

Addendum No.		Addendum Date

2. Bidder has visited the Site and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, performance and furnishing of the Work.
3. Bidder is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress and performance of the Work.
4. Bidder has carefully studied all: (A) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in Paragraph 4.02 of the General Conditions; and (B) reports and drawings of a Hazardous Environmental Conditions, if any, which have been identified in the Supplementary Conditions as provided in Paragraph 4.06 of the General Conditions.
5. Bidder has obtained and carefully studied all such additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site which may affect cost, progress or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences and procedures of construction expressly required by the Agreement and Contract Documents to be employed by Bidder and the safety precautions and programs incident thereto.
6. Bidder does not consider that any further examinations, investigations, explorations, tests, studies or data are necessary for the determination of this Bid for performance of the Work at the price(s), within the times and in accordance with other terms and conditions in the Agreement and Contract Documents.
7. Bidder is aware of the general nature of work to be performed by GCDC-WWS and others at the Site that relates to Work for which this Bid is submitted as indicated in the Agreement and Contract Documents.
8. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents and all additional examinations, investigations, explorations, tests, studies and data with the Contract Documents.

9. Bidder has given GCDC-WWS and Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Agreement and Contract Documents, and the written resolution thereof by GCDC-WWS is acceptable to Bidder. Bidder acknowledges by submitting a Bid that if a conflict, error, ambiguity or discrepancy exists in the Bidding Documents, such conflict, error, ambiguity or discrepancy between the higher and lower price will be resolved in favor of the lower price.
10. The Agreement and Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work for which the Bid is submitted.
11. Bidder further affirms this Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization, person or entity. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid. Bidder has not solicited or induced any individual or entity to refrain from bidding. Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over GCDC-WWS.

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

(INSERT BID ITEMS)

Example

<u>Item #</u>	<u>Item of Work</u>	<u>Qty</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Subtotal</u>
1.	Top Mounted Handrail	3,775	LF	\$_____	\$_____
2.	Side Mounted Handrail	280	LF	\$_____	\$_____
3.	Handrail Gates	10	LF	\$_____	\$_____
Total Base Bid Price (Items 1-3)					\$_____

2.01 BID CONDITIONS. Bidder has carefully checked the Bid against the Agreement and Contract Documents before preparing the Bid and accepts the items listed in the Bid as substantially correct, both as to classification and amount and as correctly listing the complete Work to be done in accordance with the Agreement and Contract Documents.

3.01 MAJOR EQUIPMENT ITEMS. In connection with the item of Major Equipment to be furnished and installed under the Agreement and Contract Documents, the Bidder expressly agrees to the following provisions:

- A.** The base bid lump sum or total base bid price stated hereinbefore includes the furnishing and installation of all items of Major Equipment of the manufacturers or suppliers listed in the following tabulation;
- B.** GCDC-WWS may select items of any manufacturer or supplier as listed in the following tabulation, that the undersigned Bidder agrees to furnish and install such items as selected and for a contract price equal to the base bid lump sum or total base bid price stated above, adjusted by the difference between the sum of the installed prices for the items selected by GCDC-WWS as stated in the following tabulation;
- C.** The installed price stated in the following tabulation on **all** sub-items includes the preparation and submission to the Engineer by the Bidder of detailed Drawings showing all modifications, if any, of the Drawings necessary to accommodate the Major Equipment;
- D.** The installed cost stated in the following tabulation on **all** sub-items includes a complete operating installation, including the furnishing and installation of any and all changes or additions in structures, piping, buildings, mechanical and electrical work, accessories and controls necessary to accommodate the Major Equipment; and
- E.** All items offered in the following tabulation, if any, fully comply with the Specifications.

TABULATION OF MAJOR EQUIPMENT ITEMS

Section No.	Item No.	Description	Manufacturer or Supplier	Installed Price
	1			
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			

3.02 Bidder agrees that the Work shall be Substantially Completed and finally completed and ready for final payment on or before the dates or within the number of days indicated in Section 4.02 of the Agreement.

3.03 Bidder agrees to the provisions of the Agreement as to liquidated damages (as set forth in Section 4.03 of the Agreement) in the event of failure to complete the Work within the times specified in Section 4.02 of the Agreement.

4.01 The following documents and/or requirements are attached to and made a part or condition of this Bid:

- A.** Legal status of Bidder shall be included (Attachment A). If Bidder is an entity, the authorization of appropriate officers, managers, members or partners as the case may be, authorizing the person signing the Bid to obligate the entity for a contract shall be submitted;
- B.** Non-collusion Affidavit of prime Bidder (Attachment B);
- C.** A tabulation of Subcontractors, Suppliers and other individuals and entities required to be identified in this Bid (Attachment C);
- D.** Statement of Bidder's Qualifications with supporting data (Attachment D; 48 hours after request to do so);
- E.** Bidder Certification (Attachment E);
- F.** Required Bid security in the form of a certified check or cashier's check or Bid bond (Attachment F);
- G.** Certification of Debarment (Attachment G);
- H.** Safety Questionnaire (Attachment H; 48 hours after request to do so);
- I.** Iran Economic Sanctions Affidavit (Attachment I);
- J.** Bidder shall acknowledge receipt of any Addenda by noting the Addenda on the first page of the Bid and by return of the signed Addenda;
- K.** The name of Bidder and its official or registered address, telephone number, fax number and e-mail address shall be set forth on the last sheet of the Bid;
- L.** All items in the Bid shall be completed as noted in writing; and,
- M.** All signatures shall be in BLUE ink.

5.01 The capitalized words used in this Bid, shall have the meaning indicated in the General Conditions and the Supplementary Conditions.

6.01 Communications concerning this Bid shall be addressed to the following person or such other person as who may subsequently be identified by GCDC-WWS:

NAME	_____ (INSERT NAME)
PHONE	(810) 732-7870
ADDRESS	Genesee County Drain Commissioner's Office Division of Water & Waste Services G-4610 Beecher Road Flint, Michigan 48532
FAX	(810) 732-9773
E-MAIL	_____ (INSERT E-MAIL)

Submitted on _____, 20_____

Michigan Contractor License No. _____

If Bidder is:

Individual/Sole Proprietorship

Name (typed or printed): _____

By: _____
(Individual's signature)

Doing business as (d/b/a): _____

Business Address: _____

Telephone No.: _____ FAX No.: _____

E-Mail Address: _____

Partnership

Partnership Name: _____

By: _____
(Signature of partner – attach evidence of authority to sign)

Name (typed or printed): _____

Business Address: _____

Telephone No.: _____ FAX No.: _____

E-Mail Address: _____

Corporation

Corporation Name: _____

State of Incorporation: _____

By: _____
(Signature of officer – attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Business Address: _____

Telephone No.: _____ FAX No.: _____

E-Mail Address: _____

A Limited Liability Company

Limited Liability Company Name: _____

State of Formation: _____

By: _____
(Signature of manager or member – attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Business Address: _____

Telephone No.: _____ FAX No.: _____

E-Mail Address: _____

ATTACHMENT A

LEGAL STATUS OF BIDDER

(The Bidder shall check the appropriate box and complete the information requested therein)

☐ A corporation, duly authorized and doing business under the laws of the State of Michigan, for whom _____, whose signature is affixed to this Bid, is duly authorized to execute contracts.

☐ A limited liability company, duly authorized and doing business under the laws of the State of Michigan, for whom _____, whose signature is affixed to this Bid, is duly authorized to execute contracts.

☐ A partnership, all partners with their addresses are:

_____	_____
_____	_____
_____	_____
_____	_____

☐ An individual, whose signature is affixed to this Bid.

_____	_____
-------	-------

State of _____)
County of _____) ss:

1. He/She is the _____ of _____, the Bidder that has
(position) (firm)
submitted the attached Bid;

3. Such Bid is genuine and is not a collusive or sham bid;

5. The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees or parties having interest, including this affiant.

Signed By: _____

(Name and Title)

the _____ day of _____, 20____
_____, Notary Public
_____ County, Michigan

NON-COLLUSION AFFIDAVIT
2018

ATTACHMENT C
DESIGNATION OF SUBCONTRACTORS

Each Bidder shall set forth below: (i) the name and address of each Subcontractor who shall perform Work or labor or render service to Bidder in or about the Work in an amount in excess of two percent (2%) of Bidder's total base Bid; and (ii) the portion of the Work which shall be done by each Subcontractor.

If Bidder fails to specify a Subcontractor for any portion of the Work as above stated, Bidder shall perform that Work itself.

Bidder shall not, without written consent of GCDC-WWS, make any substitution, alterations, or additions to the following list of Subcontractors, which is incorporated into and made a part of this Bid.

<u>Name of Subcontractor</u>	<u>Address of Subcontractor</u>	<u>Portion of Work To Be Performed</u>

Signed : _____

ATTACHMENT D

STATEMENT OF BIDDER'S QUALIFICATIONS

Name of Bidder: _____

Address of Bidder: _____

Number of years Bidder has been engaged in the construction business under the present company name, as stated above: _____

Names of other companies under which work has been performed by Bidder: _____

Describe the general character of work performed by Bidder: _____

A. SIMILAR PROJECTS. List five (5) major projects of a similar nature which have been completed by Bidder within the last ten (10) years, the proportion of the project which Bidder completed, the name of the person or entity for whom the project was performed, the principal contact person at the entity for whom such project was performed and that person's contact information (including the telephone number), and the date built and the gross dollar amount of each project:

1. _____

_____ \$ _____

2. _____

_____ \$ _____

3. _____

_____ \$ _____

4. _____

_____ \$ _____

5. _____
_____ \$ _____

B. REFERENCES. List three (3) references for projects completed by Bidder, including the name and contact information (including the telephone number) of the reference person.

1. _____

2. _____

3. _____

C. CURRENT PROJECTS UNDER CONTRACT. List other current projects under contract, including location, type, size, required date of completion, and percent of the project completed to date:

_____ %

_____ %

_____ %

_____ %

_____ %

D. MAJOR EQUIPMENT. List five (5) items of Major Equipment which are anticipated to be used on the Project by Bidder. State which items of Major Equipment are owned by Bidder and which are to be leased or rented from others:

1. _____
2. _____
3. _____
4. _____
5. _____

E. BANK REFERENCES. List two (2) bank references:

1. _____
2. _____

F. PROPOSED SUBCONTRACTED WORK. List the parts of the Work which are proposed to be subcontracted by Bidder:

G. SUPERINTENDENTS. How many general superintendents or other responsible employees in a supervisory position does Bidder currently have, and how long have they been with Bidder? _____

H. BONDING. Has Bidder changed bonding companies within the last three (3) years? _____

If so, why? _____

- I. ADVERSARY PROCEEDINGS.** Has Bidder or an affiliate of Bidder ever been sued by or involved in adversary proceedings (e.g., litigation, arbitration, mediation, or a facilitation) with a client, or has Bidder or an affiliate of Bidder ever sued or been involved in adversary proceedings with a client on any public works contract for a special district, municipal, county, or state government during the last ten (10) years?

Who was the Plaintiff/Claimant? _____

Who was the Defendant/Respondent? _____

In what state and county was the adversary proceeding brought or held? _____

What was the case number, if applicable? _____

Why was the adversary proceeding brought? _____

Describe the disposition of the adversary proceeding: _____

- J. FINANCIAL STATEMENTS AND TAX RETURNS.** Please attach the past three (3) years financial statements and tax returns per Instructions to Bidders.

(Bidder)

By: _____

(Title)

ATTACHMENT E

**BIDDER CERTIFICATION
IN COMPLIANCE WITH CHAPTER XXIV OF ACT 328 OF THE MICHIGAN
PUBLIC ACTS OF 1931**

I, _____, do hereby certify that:
Name

1. I am _____ of the _____
Position Contractor
and have authority to execute this Certification on behalf of the Contractor;

2. The Contractor is not barred from bidding on the Contract Documents as a result of a violation of Chapter XXIV of Act 328 of the Michigan Public Acts of 1931.

Name of Contractor _____

Signature _____

Title _____

Date _____

On this _____ day of _____ 20 _____, before me appeared (Name) _____, to me personally known, who, being duly sworn, did execute the foregoing affidavit, and did state that he or she was properly authorized by (Name of Contractor) _____ to execute the affidavit and did so as his or her free act and deed.

Notary Public

County, Michigan

Commission expires: _____

Notary Seal

ATTACHMENT F

BID BOND

KNOW ALL MEN BY THESE PRESENTS that we, the undersigned, _____ (“Contractor”) and _____ (“Surety”) are held and firmly bound unto the Genesee County Drain Commissioner’s Office (“GCDC-WWS”), in the penal sum of _____ Dollars (\$_____) in immediately available funds in lawful money of the United States of America for the payment of which sum well and truly to be made, Contractor and Surety bind themselves and their successors and assigns, jointly and severally, firmly by these presents.

Signed this _____ day of _____, 20 _____.

THE CONDITION OF THIS OBLIGATION is such that whereas, Contractor has submitted a certain Bid, attached hereto and hereby made a part hereof, to enter into the Contract Documents in writing for the construction of: _____.

NOW, THEREFORE:

- (a) If the Bid is rejected; or,
- (b) If the Bid is accepted and Contractor shall execute and deliver the Contract Documents attached hereto (completed in accordance with the Bid) and shall furnish a Bid Guarantee for its faithful performance of the Contract Documents and for the payment of all persons performing labor or furnishing materials in connection therewith, and for the maintenance and guarantee of all Work to be completed under the Contract Documents, and shall in all other respects perform the Contract Documents created by the acceptance of the Bid,

then this obligation shall be void, otherwise it shall remain in full force and effect; it being expressly understood and agreed to that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of Surety and its Bond shall be in no way impaired or affected by any extension of the time within which GCDC-WWS may accept such Bid; and Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Contractor and Surety have executed this Bid Bond by their duly authorized officers, members, or managers, as the case may be, on the date set forth above.

_____(L.S.)
Contractor

Surety

By: _____

IMPORTANT: Surety companies executing Bonds shall appear on the Michigan Treasury Department's most current list (Circular 570 as amended) and be duly authorized to transact business in Michigan.

ATTACHMENT G

Certification Regarding Debarment, Suspension, and Other Responsibility Matters

The undersigned certifies, to the best of his/her knowledge and belief, that Contractor and its principals:

- (1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in transactions under federal nonprocurement programs by any federal department or agency;
- (2) Have not, within the three (3) year period preceding the Bid, had one or more public transactions (federal, state, or local) terminated for cause or default; and
- (3) Are not presently indicted or otherwise criminally or civilly charged by a government entity (federal, state, or local) and have not, within the three (3) year period preceding the proposal, been convicted of or had a civil judgment rendered against it:
 - (a) For the commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public transaction (federal, state, or local) or a procurement contract under such a public transaction;
 - (b) For the violation of federal or state antitrust statutes, including those proscribing price fixing between competitors, the allocation of customers between competitors, or bid rigging; or
 - (c) For the commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property.

I understand that a false statement on this certification may be grounds for the rejection of the Bid or the termination of the award of the Bid. In addition, under 18 U.S.C. §1001, a false statement may result in a fine or imprisonment for up to five (5) years, or both.

Name and Title of Authorized Representative of Contractor

Name of Contractor

Signature of Authorized Representative of Contractor

Date

☐ I am unable to certify to the above statement. Attached is my explanation.

ATTACHMENT H
PRE-BID CONTRACTOR SAFETY QUESTIONNAIRE

Contractor: _____

Address: _____

Phone: _____ Fax: _____

Contractor Contact for Safety Information: _____

Phone: _____ E-mail: _____

1. List Contractor's Worker's Compensation Insurance Experience Modification Rate for the three (3) most recent years as evidenced in Contractor's Worker's Compensation Insurance premiums. If Contractor is not Interstate rated, provide Contractor's Intrastate EMR.

1. Year: _____ EMR: _____

2. Year: _____ EMR: _____

3. Year: _____ EMR: _____

2. Existing Safety Program

	<u>Yes</u>	<u>No</u>
Does Contractor have a written safety program?	_____	_____
If yes, does it include the following:		
Employee Safety Manual?	_____	_____
Incentive for safe hours worked?	_____	_____
Inclusion of subcontractors in safety program?	_____	_____
Lock out/ tag out procedures?	_____	_____
Confined Space procedures?	_____	_____
Personal protective equipment program?	_____	_____
Hazard recognition procedures?	_____	_____
Respiratory protection program?	_____	_____
Fall protection program?	_____	_____
First aid program?	_____	_____
Blood borne pathogen control procedures?	_____	_____
Hazard communication program?	_____	_____

ATTACHMENT H
PRE-BID CONTRACTOR SAFETY QUESTIONNAIRE

	<u>Yes</u>	<u>No</u>
Heavy equipment operation procedures?	_____	_____
Housekeeping guidelines?	_____	_____
Lead handling procedures?	_____	_____
Asbestos handling procedures?	_____	_____
Arsenic handling procedures?	_____	_____
Electrical safety procedures?	_____	_____
Accident/incident investigation procedures?	_____	_____
Emergency procedures?	_____	_____
Traffic control guidelines?	_____	_____
Trenching and excavation procedures?	_____	_____
Fire protection procedures?	_____	_____
Alcohol and controlled substance program?	_____	_____
Self-inspection provisions?	_____	_____
Employee discipline procedures?	_____	_____
Worksite security procedures?	_____	_____
Employee training requirements?	_____	_____
Injury/incident reporting procedures?	_____	_____
GCDC-WWS' safety requirements provision?	_____	_____

3. How often are employee safety meetings held? _____

4. How often are supervisor safety meetings held? _____

5. Does Contractor hold safety orientations for new employees? _____

If yes, are there any topics listed above that this orientation does not include? If so, list here: _____

ATTACHMENT H
PRE-BID CONTRACTOR SAFETY QUESTIONNAIRE

6. Does Contractor conduct safety self-inspection on a regular basis? _____
If so, how often? _____
Who conducts the inspection? _____
Are the findings written? _____
7. Does Contractor have daily pre-work meetings? _____
8. Does Contractor have an orientation program for newly awarded projects? _____
9. Does Contractor have a dedicated safety officer? _____
If yes, provide the safety officer's name and title: _____
If no, who handles safety responsibilities? (name and title): _____

What other responsibilities does this person have? _____

10. Will this Project have a dedicated safety officer? _____
11. Does Contractor acknowledge and accept the findings as disclosed in GCDC-WWS' safety audit(s) of Contractor's operation? _____

As the authorized representative of Contractor, I hereby certify that all entries are true and complete. Furthermore, I understand this questionnaire is subject to verification by GCDC-WWS. All information contained herein shall be considered true and complete by Contractor and GCDC-WWS.

Signature of Contractor: _____

Printed Name: _____ Date: _____

ATTACHMENT I
IRAN ECONOMIC SANCTIONS

BIDDER AFFIDAVIT

Bidder, after being first duly sworn, deposes and states as follows:

Bidder understands that on December 28, 2012, State of Michigan Governor Rick Snyder signed Act 517 of the Michigan Public Acts of 2012, commonly known as the “Iran Economic Sanctions Act”.

Bidder understands that the Iran Economic Sanctions Act has an effective date of April 1, 2013.

Bidder understands that the term “person” is defined by Section 2(f) of the Iran Economic Sanctions Act as an individual, corporation, company, limited liability company, business association, partnership, society, trust, or any other nongovernmental entity, organization or group, or any government entity or instrumentality of a government, including a multilateral development institution, as defined in Section 1701(c)(3) of the International Financial Institutional Act, 22 USC 262r(c)(3).

Bidder can affirm and attest that it is a person as defined by Section 2(f) of the Iran Economic Sanctions Act.

Bidder understands and agrees that the stated purpose of the Iran Economic Sanctions Act is to prohibit persons who have certain economic relationships with Iran from submitting bids on requests for proposals with the State of Michigan, political subdivisions of the State of Michigan, and other public entities; to require bidders for certain contracts to submit certification of eligibility with the bid; to require reports; and to provide for sanctions for false certification.

I can affirm and attest that _____ certifies that _____ is not an Iran-linked business, as defined by Section 2(e) of the Iran Economic Sanctions Act.

If it is determined that this Affidavit contains a false certification, the Attorney General for the State of Michigan may bring a civil action against Bidder pursuant to Section 4 of Act 517 of the Michigan Public Acts of 2012. If it is determined that the Applicant submitted a false certification, the person is responsible for a civil penalty of not more than \$250,000.00 or two times the amount of the contract or proposed contract for which the false certification was made, whichever is greater; the cost of the public entity’s investigation, and reasonable attorney fees, in addition to the fine.

In addition, a person who submits a false certification shall be ineligible to bid on a request for proposal for three (3) years from the date the public entity determines that the person has submitted the false certification.

The Bidder's Affidavit is freely and voluntarily given with full knowledge of the facts, on this _____ day of _____, 20_____.

Bidder

By:

Title: _____

Subscribed and sworn to before me this the

_____ day of _____, 20____.

Notary Public
_____ County, Michigan

My commission expires: _____

PART 2
CONTRACT FORMS

AGREEMENT

THIS AGREEMENT ("Agreement"), by and between the COUNTY OF GENESEE, a Michigan Municipal Corporation (hereinafter referred to as the "County"), through its designate the "County Agency" (hereinafter referred to as the "County Agency") represented by the Genesee County Drain Commissioner, Division of Water & Waste Services ("GCDC-WWS"), G-4610, Beecher Road, Flint, Michigan 48532-2617 and _____, a _____ of _____ ("Contractor").

Contract No.: _____

NOW, THEREFORE, the parties, in consideration of the mutual agreements and covenants hereinafter set forth, agree as follows:

ARTICLE 1 – WORK. Contractor shall complete the Work as specified in the Contract Documents. The Work is generally described as follows:

INSERT NATURE OF WORK

ARTICLE 2 – PROJECT. The name of the Project is as follows:

INSERT PROJECT NAME

ARTICLE 3 – ENGINEER. The Project has been designed by **INSERT ENGINEER NAME** ("Engineer").

ARTICLE 4 - CONTRACT TIMES

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

4.02. Dates to Achieve Substantial Completion and Final Payment. The Work shall be Substantially Completed in accordance with Paragraph 14.04 of the General Conditions within _____ calendar days after the date of issuance of the Notice to Proceed. The Work shall be completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions within _____ calendar days after the date when the Contract times commence to run.

4.03. Liquidated Damages. CONTRACTOR and OWNER recognize that time is of the essence of this Agreement and that OWNER will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in providing in a legal proceeding the actual loss suffered by OWNER if the Work is not completed on time. Accordingly, instead of requiring any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) CONTRACTOR shall pay OWNER One Thousand Dollars (\$1,000) for each day that expires after the time specified in Paragraph 4.02 for Substantial Completion until the Work is substantially complete. After Substantial Completion, if CONTRACTOR neglects, refuses, or fails to complete the remaining Work within the Contract Time or any proper extension thereof granted by OWNER, CONTRACTOR shall pay OWNER Five Hundred Dollars (\$500) for each day that expires after the time specified in Paragraph 4.02 for completion and readiness for final payment.

ARTICLE 5 - CONTRACT PRICE. GCDC-WWS shall pay Contractor for completion of the Work in accordance with the Contract Documents, the following amounts:

A. INSERT BID ITEMS

ARTICLE 6 - MAJOR EQUIPMENT SELECTION. Contractor shall furnish and install, in full compliance with the Contract Documents, the following items of Major Equipment which shall be manufactured or supplied by the following listed manufacturers or suppliers:

A. INSERT MAJOR EQUIPMENT ITEMS

ARTICLE 7 - PAYMENT PROCEDURES

7.01 Applications for Payment. Contractor shall submit Applications for Payment in accordance with Article 14 of the General Conditions.

7.02 Progress Payments; Retainage; Withholding. GCDC-WWS shall make progress payments in accordance with Act 524 of the Michigan Public Acts of 1980 ("Act 524") and on account of the Contract Price on the basis of Contractor's Applications for Payment as certified by Engineer. All such payments shall be measured by the Schedule of Values established in Paragraph 2.07.A of the General Conditions (and in the case of Unit Price Work, based on the number of units completed).

- (a) Prior to Substantial Completion, progress payments shall be made as provided below, but, in each case, less the aggregate of payments previously made and less such amounts as Engineer shall determine or GCDC-WWS may withhold in accordance with Paragraph 14.02 of the General Conditions.
- (i) **Retainage.** GCDC-WWS may retain ten percent (10%) of the dollar value of all Work until the Work is fifty percent (50%) in place as determined by GCDC-WWS and Engineer. After the Work is fifty percent (50%) in place, additional monies for Retainage shall not be withheld unless GCDC-WWS and Engineer determine that Contractor is not making satisfactory progress or as otherwise allowed under the Contract Documents in which case up to ten percent (10%) of the dollar value of the Work may be withheld as Retainage by GCDC-WWS (collectively, the "Retainage").
- (ii) The Retainage shall not exceed the pro-rata share of GCDC-WWS' matching requirement under the Contract, shall not be commingled with other funds of GCDC-WWS and shall be deposited in an interest bearing account in the regulated financial institution in Michigan wherein all Retainage is kept by GCDC-WWS which shall account for both Retainage and interest on the Contract separately. GCDC-WWS is not required a deposit Retainage in an interest bearing account if Retainage is to be provided under a state or federal grant and the Retainage has not been paid to GCDC-WWS.
- (iii) Except as provided in MCL § 125.1564(7) and (8), at the request of Contractor, Retainage and interest earned thereon shall be released to Contractor together with the final progress payment at any time after ninety-four percent (94%) of the dollar value of the Work is in place as determined by GCDC-WWS and Engineer, provided, however, that GCDC-WWS shall only release the Retainage plus interest thereon to Contractor if Contractor provides GCDC-WWS with an irrevocable letter of credit in the amount of the Retainage plus interest issued by a bank authorized to do business in Michigan containing terms mutually acceptable to Contractor and GCDC-WWS.
- (b) **Withholding.** In addition to the Retainage as provided in Paragraph 7.02(a)(i) above, GCDC-WWS may, at its option, withhold (not as Retainage) up to ten percent (10%) of the dollar

value of the Work to cover the cost of associated incidental Work not yet completed. Such withholding as is provided in this Paragraph 7.02(b) is not governed by or subject to Act 524.

- (c) **Progress Payment Requests.** Progress payment requests shall include the submittal of a progress schedule. If the Contractor is behind schedule, a detailed corrective action plan will be necessary to bring the schedule back into compliance with the Engineer/GCDC-WWS approved schedule. Failure to submit the required schedule, including the corrective action plan, shall be cause for withholding payment, provided that such withholding is not in violation of Act 524.

7.03 Final Payment. Upon final completion and acceptance of the Work in accordance with Paragraph 14.07 of the General Conditions, GCDC-WWS shall pay to Contractor the remainder of the Contract Price, as recommended by Engineer and as provided in Paragraph 14.07 of the General Conditions as amended by the Supplementary Conditions.

ARTICLE 8 - CONTRACTOR'S REPRESENTATIONS AND WARRANTIES. In order to induce GCDC-WWS to enter into this Agreement, Contractor makes the following representations and warranties to GCDC-WWS which shall survive the completion of the Work.

- (a) Contractor has examined and carefully studied the Contract Documents (including, but not limited to, Addenda listed in the Bid Form) and the other related data identified in the Bidding Documents including "Technical Data".
- (b) Contractor has visited the Site and become familiar with and is satisfied with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
- (c) Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.
- (d) Contractor has carefully studied all reports of explorations and test of subsurface conditions at or contiguous to the Site, and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in Paragraph 4.02 of the General Conditions.

- (e) Contractor has carefully studied (and assumes responsibility for having done so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site or otherwise which may affect cost, progress, and performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction, if any, required by the Contract Documents to be employed by Contractor and safety precautions and programs incident thereto.
- (f) No further examinations, investigations, explorations, tests, studies, or data are necessary for the performance and furnishing of the Work at the Contract Price, within the Contract Times and in accordance with the other terms and conditions of the Contract Documents.
- (g) Contractor is aware of the general nature of work to be performed for GCDC-WWS and by others at the Site that relates to the Work as indicated in the Contract Documents.
- (h) Contractor has correlated the information known to Contractor, information and observations obtained from visits to the Site, reports and Drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.
- (i) Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
- (j) The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance of the Work.
- (k) Acknowledge and agree that to the extent that bidder previously has been awarded a contract and/or performed work for Owner, that no provision of any prior contract nor any course of conduct engaged in during any prior contract will act to modify or amend any contract document (as identified in the Agreement).

ARTICLE 9 - CONTRACT DOCUMENTS

9.01 Contents. The Contract Documents consist of the following:

- (a) This Agreement;

- (b) Performance Bonds;
- (c) Payment Bonds;
- (d) Other Bonds: (i) Bid Bond; and (ii) Maintenance and Guarantee Bond;
- (e) General Conditions;
- (f) Supplementary Conditions;
- (g) Specifications;
- (h) Drawings consisting of a cover sheet and sheets numbered 1 through _____, each sheet bearing the following title: **(INSERT PROJECT NAME)**;
- (i) Addenda numbers _____ to _____, inclusive;
- (j) Exhibits to this Agreement: (i) Notice to Proceed; (ii) Notice of Award; (iii) Contractor's Bid; (iv) Documents submitted by Contractor prior to Notice of Award; (v) Contractor's Certificate of Insurance; (vi) Waivers of Lien; (vii) Affidavits; and (viii) Contractor's Declaration; and
- (k) The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto: (i) Written Amendments; (ii) Work Change Directives; (iii) Change Order(s); and (iv) Field Orders.

The documents listed in Article 9 above are attached to this Agreement (except as expressly noted otherwise above). There are no Contract Documents other than those listed above in this Article 9. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 3.05 of the General Conditions.

ARTICLE 10 - MISCELLANEOUS

10.01 Defined Terms. Capitalized words used in this Agreement and Contract Documents shall have the meanings set forth in the General Conditions and Supplementary Conditions.

10.02 Assignment. No assignment by a party hereto, of any rights under or interests in the Contract Documents, will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically, but without limitation, moneys that may become due, and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary, in any written consent to an assignment, no

assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

10.03 Successors and Assigns. The Contract Documents shall be binding upon and inure to the benefit of the parties and their respective and permitted successors and assigns.

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

10.05 Amendment; Integration. This Agreement and the Contract Documents may only be amended by written agreement of all parties hereto. This Agreement and the Contract Documents set forth the entire agreement and understanding of the parties as to the subject matter hereof. Notwithstanding anything herein to the contrary: (i) no verbal agreement of the parties including, but not limited to, verbal agreements of any of their employees or representatives; (ii) course of conduct of the parties; or (iii) unilateral written agreements or documents entered into subsequent to the date of the this Agreement shall constitute an amendment to this Agreement.

10.06 Patriot Act. Contractor shall comply with the Patriot Act, as applicable.

10.07 Incorporation by Reference. All documents and agreements which are defined as the Contract in the General Conditions are incorporated by reference with each other as though fully set forth therein.

IN WITNESS WHEREOF, the parties have signed this Agreement in duplicate. One original counterpart each has been delivered to each of the parties. All portions of the Contract Documents have been signed or identified by the parties.

This Agreement shall be effective on this _____ day of _____,
20 ____ (which is the Effective Date of the Agreement).

OWNER:
County Agency for Genesee County

CONTRACTOR:

By: _____
Genesee County Drain Commissioner
Jeff Wright

By: _____

Attest: _____

Attest: _____

Address for giving Notices:

**G-4610 Beecher Road
Flint, MI 48532-2617
(810) 732-7870
Fax (810) 732-9773**

Address for giving Notices:

License No.: _____
(Where applicable)

Agent for Services of Process:

(If Contractor is an entity, attach evidence of authority to sign).

Owner's Designated Representative:

Name: _____

Title: _____

Address: **GCDC-WWS
G-4610 Beecher Road
Flint, Michigan 48532
(810) 732-7870
Fax (810) 732-9773**

Contractor's Designated Representative:

Name: _____

Title: _____

Address: _____

Phone: _____

Facsimile: _____

PERFORMANCE BOND

CONTRACTOR *(name and address):*

SURETY *(name and address of principal place of business):*

OWNER: Genesee County Drain Commissioner's Office – Division of Water and Waste Services
G-4610 Beecher Road, Flint, Michigan 48532-2617

CONSTRUCTION CONTRACT

Effective Date of the Agreement:

Amount:

Description *(name and location):*

BOND

Bond Number:

Date *(not earlier than the Effective Date of the Agreement of the Construction Contract):*

Amount:

Modifications to this Bond Form: ☐ None ☒ See Paragraph 16

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

CONTRACTOR AS PRINCIPAL

SURETY

(seal)

Contractor's Name and Corporate Seal

(seal)

Surety's Name and Corporate Seal

By: _____
Signature

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

Print Name

Print Name

Title

Title

Attest: _____
Signature

Attest: _____
Signature

Title

Title

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

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.
2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after:
 - 3.1 The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;
 - 3.2 The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
 - 3.3 The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.
4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.
5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:
 - 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;
 - 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;
 - 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or
 - 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:
 - 5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
 - 5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.
6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.
7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:
 - 7.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
 - 7.2 additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and
 - 7.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.
8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.
9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.
10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

11. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit shall be applicable.
12. Notice to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.
13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.
14. Definitions
 - 14.1 **Balance of the Contract Price:** The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.
 - 14.2 **Construction Contract:** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.
 - 14.3 **Contractor Default:** Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.
 - 14.4 **Owner Default:** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.
 - 14.5 **Contract Documents:** All the documents that comprise the agreement between the Owner and Contractor.
15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.
16. Modifications to this Bond are as follows:
 - 16.1 Add the following definition to Section 14.
 - 14.6 **Owner:** Genesee County Drain Commissioner's Office –Division of Water and Waste Services.
 - 16.2 Condition #15. above is not applicable.
 - 16.3 Additional Conditions to this Bond are as follows:
 - 16.3.1 This bond is in effect for a one (1) year guarantee period after final payment is issued to Contractor. Contractor shall perform all of its duties, undertakings, covenants, terms, conditions and agreements of the Contract Documents, with or without notice to the Surety, during the one (1) year guarantee period.
 - 16.3.2 Contractor shall satisfy all claims and demands incurred under the Contract Documents and fully defend, indemnify and hold harmless GCDC-WWS from and against any and all costs, losses, liabilities and damages which it may suffer by reason of Contractor's failure to do so.
 - 16.3.3 Contractor shall reimburse and repay GCDC-WWS all expenses which GCDC-WWS incurs in making good any breach or default, then this obligation shall be void; otherwise it shall remain in full force and effect.
 - 16.3.4 No final settlement between GCDC-WWS and Contractor shall abridge the right of any beneficiary hereunder whose claim may be unsatisfied.
 - 16.3.5 The Effective Date of the bond cannot be earlier than the Effective Date of the Agreement of the Construction Contract.

PAYMENT BOND

CONTRACTOR *(name and address):*

SURETY *(name and address of principal place of business):*

OWNER: Genesee County Drain Commissioner's Office – Division of Water and Waste Services
G-4610 Beecher Road, Flint, Michigan 48532-2617

CONSTRUCTION CONTRACT

Effective Date of the Agreement:

Amount:

Description *(name and location):*

BOND

Bond Number:

Date *(not earlier than the Effective Date of the Agreement of the Construction Contract):*

Amount:

Modifications to this Bond Form: ☐ None ☒ See Paragraph 18

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

CONTRACTOR AS PRINCIPAL

SURETY

Contractor's Name and Corporate Seal

Surety's Name and Corporate Seal

By: _____
Signature

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

Print Name

Print Name

Title

Title

Attest: _____
Signature

Attest: _____
Signature

Title

Title

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

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.
2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.
4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.
5. The Surety's obligations to a Claimant under this Bond shall arise after the following:
 - 5.1 Claimants who do not have a direct contract with the Contractor,
 - 5.1.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
 - 5.1.2 have sent a Claim to the Surety (at the address described in Paragraph 13).
 - 5.2 Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).
6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.
7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:
 - 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and
 - 7.2 Pay or arrange for payment of any undisputed amounts.
 - 7.3 The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.
8. The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.
9. Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.
10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.
11. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.
12. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or

(2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

13. Notice and Claims to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

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

15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

16. Definitions

16.1 **Claim:** A written statement by the Claimant including at a minimum:

1. The name of the Claimant;
2. The name of the person for whom the labor was done, or materials or equipment furnished;
3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
4. A brief description of the labor, materials, or equipment furnished;
5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
7. The total amount of previous payments received by the Claimant; and
8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.

16.2 **Claimant:** An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond

shall be to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

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

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

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

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

18. Modifications to this Bond are as follows:

18.1 Add the following definition to Section 16.

16.6 **Owner:** Genesee County Drain Commissioner's Office – Division of Water and Waste Services.

18.2 Condition #17. above is not applicable.

18.3 Additional Conditions to this Bond are as follows:

18.3.1 Contractor shall promptly make payments for all insurance premiums in connection with the Work.

18.3.2 Contractor shall promptly make payments for all labor performed in connection with the Work, whether by Subcontractor, or otherwise, then this obligation shall be void; otherwise it shall remain in full force and effect.

18.3.3 No final settlement between GCDC-WWS and Contractor shall abridge the right of any beneficiary hereunder whose claim may be unsatisfied.

18.3.4 The Effective Date of the bond cannot be earlier than the Effective Date of the Agreement of the Construction Contract.

MAINTENANCE AND GUARANTEE BOND

KNOW ALL MEN BY THESE PRESENTS, that _____
_____ (“Contractor”) and _____
_____ (“Surety”) are held and firmly bound unto
the Genesee County Drain Commissioner’s Office (“GCDC-WWS”), of G-4610 Beecher Road,
Flint, MI 48532, in the sum of _____
_____ Dollars (\$ _____) in good and lawful
money of the United States of America to be paid to GCDC-WWS, its successors and assigns, for
which payment well and truly made, Contractor and Surety bind themselves and their successors
and assigns, jointly and severally, firmly by these presents.

Sealed with our seals and dated this _____ day of _____, 20____.

WHEREAS, the Contractor has entered into certain Contract Documents with GCDC-WWS,
dated _____, 20____, copies of which are attached and made a part hereof,
wherein Contractor covenanted and agreed as follows, to wit: _____

_____.

NOW THEREFORE, the condition of this obligation is that under the Contract Documents,
Contractor has agreed with GCDC-WWS that for a period of two (2) years from the date of
payment of the Final Estimate, Contractor shall keep in good order and repair any defect in the
Work, either by Contractor or its Subcontractors that may develop or be discovered during said two
(2) year period due to improper materials, defective equipment, workmanship, or arrangements and
any other work affected in making good such imperfections. Contractor also agreed to promptly
make such repairs as directed by GCDC-WWS for replacement of the Work, without cost to
GCDC-WWS, except for such parts of the Work as may have been disturbed without the consent of
Contractor after the final acceptance of the Work, whenever directed so to do by notice from
GCDC-WWS. If contractor fails to make such repair within one (1) week from the date of receipt
of such notice, then GCDC-WWS shall have the right to purchase such materials and employ such
labor and equipment as may be necessary for the purpose and to undertake, to and make such
repairs and charge the cost thereof to Contractor and receive payment for the same promptly from
the Contractor or Surety.

If any repair is necessary to be immediately made to protect persons or property then, and in such
event, GCDC-WWS may, but shall not be required to, take immediate steps to repair such defects
without notice to Contractor. In such event, GCDC-WWS shall not be required to obtain the lowest
bid for the performance of the Work or any part thereof, and all sums actually paid therefore shall
be charged to the Contractor or Surety. In this regard, the judgment of GCDC-WWS shall be final
and conclusive. Contractor shall, for a period of two (2) years from the date of payment of the Final
Estimate, keep the Work in good order and repair, except for such parts of the Work which may
have been disturbed without the consent of Contractor after the final acceptance of the Work.
Contractor shall further, whenever notice is given as hereinbefore specified, promptly proceed to

make the repair as in said notice directed or reimburse GCDC-WWS for any cost incurred by GCDC-WWS in making such repairs. If Contractor or Surety shall fail to do as hereinbefore specified, they shall jointly and severally indemnify, defend, and hold harmless GCDC-WWS from and against all and any losses, costs, suits, and actions for damages of every kind and description brought or claimed against GCDC-WWS for or on account of any injury or damage to persons or property received or sustained by any party or parties by or from any of the acts of omissions or through the negligence of Contractor, its Subcontractors, Suppliers, servants, agents, or employees in connection with the Work and then from any and all claims arising under the Workmen's Compensation Act of the State of Michigan

IN WITNESS WHEREOF, the parties hereto have caused this Maintenance and Guarantee Bond to be executed by their respective authorized officers this _____ day of _____, 20 ____.

Signed, Sealed and Delivered in the presence of:

_____	_____ (L.S.)
_____	_____ (L.S.)
_____	_____ (L.S.)
_____	_____ (L.S.)

NOTE: The Bond shall show complete name and address of local agent and home company.

AFFIDAVIT
(To Be Attached To All Bonds)

STATE OF MICHIGAN)
) ss:
COUNTY OF)

being first duly sworn on oath deposes and say that he/she is

(Attorney-in-fact or Agent)

of _____

(Bonding Company)

Surety on the attached Contract Documents _____

executed by _____

(Contractor)

Affiant further deposes and says that no officer, official or employee of Genesee County Drain Commissioner has any interest directly or indirectly, or is receiving any premium, commission, fee or other things of value on account of the same or furnishing of the bond, undertaking or contract of indemnity, guaranty or surety ship in connection with the above-mentioned Contract Documents.

Signed: _____

Subscribed and sworn to before me this

the _____ day of _____, 20 ____.

Notary Public

_____ County, Michigan

My commission expires: _____

SAMPLE CERTIFICATE OF LIABILITY INSURANCE

DATE(MM/DD/YYYY)

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME:	
	PHONE (A/C, No. ext):	FAX (A/C, No):
	E-MAIL ADDRESS:	
	PRODUCER CUSTOMER ID #:	
	INSURER(S) AFFORDING COVERAGE)	NAIC #
INSURED	INSURER A:	
	INSURER B:	
	INSURER C:	
	INSURER D:	
	INSURER E:	
	INSURER F:	

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
	GENERAL LIABILITY <input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input type="checkbox"/> OCCUR X,C, U Included GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input type="checkbox"/> PROJECT <input type="checkbox"/> LOC	X					EACH OCCURRENCE	\$1,000,000
							DAMAGE TO RENTED PREMISES (Ea occurrence)	\$
							MED EXP (Any one person)	\$
							PERSONAL & ADV INJURY	\$1,000,000
							GENERAL AGGREGATE	\$2,000,000
							PRODUCTS - COMP/OP AGG	\$
								\$
	AUTOMOBILE LIABILITY <input type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> HIRED AUTOS <input type="checkbox"/> NON-OWNED AUTOS	X					COMBINED SINGLE LIMIT (Ea accident)	\$1,000,000
							BODILY INJURY (Per person)	\$
							BODILY INJURY (Per accident)	\$
							PROPERTY DAMAGE (Per accident)	\$
								\$
	UMBRELLA LIAB <input type="checkbox"/> OCCUR EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE DEDUCTIBLE <input checked="" type="checkbox"/> RETENTION \$ 0.00	X					EACH OCCURRENCE	\$4,000,000
							AGGREGATE	\$4,000,000
								\$
								\$
								\$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/ EXECUTIVE/OFFICER/MEMBER EXCLUDED? Y/N (Mandatory in NH) If yes, describe hereunder DESCRIPTIONS OF OPERATIONS below						WC STATUTORY LIMITS	
							E.L. EACH ACCIDENT	\$100,000
							E.L. DISEASE - EA EMPLOYEE	\$100,000
							E.L. DISEASE - POLICY LIMIT	\$100,000

	OWNER'S/CONTRACTOR'S PROTECTIVE LIABILITY						EACH PERSON	\$1,000,000
							EACH OCCURRENCE	\$1,000,000
							AGGREGATE	\$2,000,000
	PROPERTY INSURANCE	X					EACH PERSON	\$1,000,000
							EACH OCCURRENCE	\$1,000,000
							AGGREGATE	\$2,000,000
	BUILDER'S RISK	X					AGGREGATE	CONTRACT PRICE

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

CERTIFICATE HOLDER

Genesee County Drain Commissioner's Office
Division of Water and Waste Services
G-4610 Beecher Road
Flint, MI 48532

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION
 DATE THERE OF, THE ISSUING INSURER WILL MAIL 30 DAYS WRITTEN NOTICE TO THE
 CERTIFICATE HOLDER NAMED TO THE LEFT.

AUTHORIZED REPRESENTATIVE

**GENERAL CONSTRUCTION
PARTIAL WAIVER OF LIEN**

To Whom It May Concern:

Whereas the undersigned has been contracted by _____ (“Contractor”) to furnish _____ for the Project known as _____ to GCDC-WWS in connection with the premises which is legally described as follows:

_____.

NOW, THEREFORE, Contractor and GCDC-WWS acknowledge and agree that Contractor has been paid \$_____ for labor/materials provided through _____, 20____, and that there remains an outstanding balance due to Contractor in the amount of \$_____ for labor/materials provided through such date, and in consideration thereof Contractor does hereby waive its construction lien to the amount of \$_____ for labor/materials provided through _____, 20____. This Partial Waiver of Lien does not cover the outstanding balance of \$_____ due to Contractor for labor/materials supplied in connection with the above-mentioned premises provided through the date shown above.

Witness the hand and seal given this _____ day of _____, 20_____.

Witness by:

Title

Company Name - Contractor

By: _____

Title

**GENERAL CONSTRUCTION
FINAL WAIVER OF LIEN**

To Whom It May Concern:

Whereas the undersigned has been contracted by _____
("Contractor") to furnish _____
for the Project known as _____ to GCDC-WWS in
connection with the premises which is legally described as follows: _____

NOW THEREFORE, in consideration of _____
(\$ _____) Dollars and other good and valuable consideration, the receipt of
which is acknowledged, the undersigned does hereby waive and release any and all liens or
claims or right to lien or claim on the above-described premises and improvements thereon
and on the monies or other consideration due or to become due from GCDC-WWS on
account of labor or services, material, fixtures, or apparatus to be furnished by the
undersigned for the above described premises.

Witness the hand and seal given this _____ day of _____,
20_____.

Witness by:

Contractor

Title By: _____

Title

(Date)

Re: _____

Dear _____ (*Insert full legal name of Contractor*) (“Contractor”):

GCDC-WWS has received a proposal for (*amount*) dollars for the construction of _____ (“Project”). GCDC-WWS is offering Contractor the award of the contract for the construction of the Project (“Contract”). Capitalized words used herein correspond to defined terms in the Contract. The following itemized agreements and documents are required to be executed by Contractor and delivered to GCDC-WWS in connection with the Contract.

1. Notice of Award. Sign, date, and return one (1) copy of the Notice of Award with an original signature. The Notice to Proceed will be issued after all signed agreements and documents are executed by GCDC-WWS and returned to Contractor.
2. Agreement. Sign, date, and return four (4) copies of the Agreement with original signatures witnessed on each of the four (4) copies of the Agreement. The paying agent, GCDC-WWS will sign and distribute the Agreements and documents after review.
3. Provide Performance, Payment, and 2-year Maintenance Bonds in conformance with Genesee County Standard Specifications. Four (4) original signed and sealed copies of each of the foregoing bonds are required to be submitted.
4. Provide insurance coverage documentation as set forth in the Project Specifications. Contractor’s insurance agent **“MUST” use the Certificate of Insurance forms provided within the Project Specification or ACORD form.** The insurance coverage documentation shall be forwarded to Contractor’s insurance agent, as the applicable insurance carrier is required to certify that the insurance provided is in compliance with the Project Specifications. GCDC-WWS’ protective liability policy shall also be included. Four (4) signed and sealed Certificates of Insurance are required to be submitted.
5. Provide the names and addresses of all proposed material Suppliers and Subcontractors for the Project.
6. Provide Shop Drawings for review and approval by (_____) prior to ordering materials for the Project. Certificates of Compliance for the materials shall be collected during the work and submitted to GCDC-WWS.

(Insert Addressee's Name)

(Insert Date)

Page 2

7. A pre-construction meeting shall be scheduled and held prior to the start of the Work. The pre-construction meeting will take place after the issuance of the Notice to Proceed, but before the start of any Work. Contractor shall submit the following items to the Engineer and GCDC-WWS for review prior to the pre-construction meeting:
 - a. A construction scheduled;
 - b. A Shop Drawing submittal schedule;
 - c. 24-hour emergency phone numbers, including those of all Subcontractors;
 - d. A schedule of values for pay estimates;
 - e. A pre-construction video; and,
 - f. Draw Schedule.

At the pre-construction meeting, Contractor shall be prepared to discuss the progress schedule in detail, use of the site for storage and office trailers, traffic requirements, and Shop Drawing submittals, for example. The attendance of representatives of all Subcontractors is required at the pre-construction meeting.

8. Contractor shall assign a qualified resident superintendent to be present on site throughout the course of the Project. No replacement or substitutions will be allowed without written approval by GCDC-WWS.

If you have any questions or require further clarification regarding these requirements, please do not hesitate to contact me.

Sincerely,

Matthew T. Raysin, P.E.,
Assistant Director of Engineering
Division of Water & Waste Services

NOTICE OF AWARD

To: _____

PROJECT:

GCDC-WWS has considered the Bidding Documents submitted by you for the above-described Project in response to its Invitation for the Bid dated **(INSERT DATE)**.

You are hereby notified that your Bid has been accepted for items in the amount of **(INSERT AMOUNT)**

You are required by the Instruction to Bidders to execute the Agreement and Contract Documents and furnish the required Contractor's Performance Bond, Payment Bond, Maintenance and Guarantee Bond (collectively, the "Bonds"), and Certificates of Insurance within twenty (20) days of the date of this Notice of Award.

If you fail to execute said Agreement and Contract Documents and to furnish the Bonds within twenty (20) days of the date of this Notice of Award, GCDC-WWS shall be entitled to consider all of your rights arising out of GCDC-WWS' acceptance of your Bid as abandoned and as a forfeiture of your Bid Bonds. GCDC-WWS shall further be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy (fully executed copy) of this Notice of Award to GCDC-WWS.

Dated this _____ day of _____, 20_____.

GENESEE COUNTY DRAIN COMMISSIONER

By: _____
Jeffrey Wright

ACKNOWLEDGEMENT AND ACCEPTANCE

Receipt of the above Notice of Award is hereby acknowledged and accepted

By: _____
(Name Individual, Partnership, Limited Liability Company or Corporation)

By: _____

Title: _____

Date: _____, 20_____.

(Date)

Re: _____

Dear _____ (*Insert full legal name of Contractor*) (“Contractor”):

Enclosed please find an executed copy of the contract documents, contract drawings, and the Notice of Proceed. Please sign and return the Notice to Proceed at your earliest convenience.

Should you have any questions, please contact me directly.

Sincerely,

Matthew T. Raysin, PE
Assistant Director of Engineering
Division of Water & Waste Services

cc: John F. O’Brien, P.E., BCEE, Director *enclosed just NTP*
Finance Department *enclose Agreement only*
Engineering Firm *enclose Complete Contract Document*
WWS Engineer *enclose Complete Contract Document*

NOTICE TO PROCEED

TO: _____

DATE OF
ISSUANCE: _____

PROJECT: _____

You are hereby notified to commence work in accordance with the Agreement dated _____, on or before _____ and you are to substantially complete the Work by _____, 20____, with final completion by _____, 20_____.

GENESEE COUNTY DRAIN COMMISSIONER

By: _____
Jeffrey Wright

Receipt of the above Notice to Proceed is hereby acknowledged by:

(Individual, Partnership, Limited Liability Company, or Corporation)

this the _____ day of _____, 20 _____.

By: _____

Title: _____

CONTRACTOR'S FINAL COMPLETION AFFIDAVIT

STATE OF MICHIGAN)
) ss:
COUNTY OF GENESEE)

The undersigned _____ ("Contractor") hereby represents and warrants that on _____, 20____, it was awarded the Project by the Division of Water and Waste Services of the Genesee County Drain Commissioner's Office ("GCDC-WWS") to _____

_____ in accordance with the terms and conditions of Contract Documents. Contractor further represents and warrants that all of the Work has now been finally completed and that all of the requirements of the Contract Documents have been fully met. Contractor represents, warrants, and certifies that all of its indebtedness arising by reason of the Contract Documents have been fully paid or satisfactorily secured and that all claims from Subcontractors, Suppliers, and others for labor and material used in completing the Project, as well as all other claims arising from the performance of the Work, have been fully paid or satisfactorily settled. Contractor further covenants and agrees that if any such indebtedness or claim should hereafter arise, Contractor shall assume full responsibility for such indebtedness or claim and shall defend, indemnify, and hold harmless GCDC-WWS from and against any and all losses, costs, damages, and liabilities due to Contractor's failure to pay such indebtedness or to resolve such claim.

Contractor, for valuable consideration the receipt of which is hereby acknowledged, does further hereby waive, release, and relinquish any and all claims or rights of lien which the Contractor now has, or may hereafter acquire, upon the subject premises for labor and material used in completing the Project.

This Contractor's Affidavit is freely and voluntarily given with full knowledge of the facts, on this _____ day of _____, 20_____.

Contractor

By:
Title: _____

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

Notary Public

County, Michigan
My commission expires: _____

CERTIFICATE OF THE CONTRACTOR OR ITS DULY AUTHORIZED REPRESENTATIVE
PERIODICAL ESTIMATE # _____

To the best of my knowledge and belief, I certify that all items, units, quantities, and prices of labor and material shown on the face of Sheet(s) 1 and 2 of this Periodical Estimate are correct and complete, and all labor has been performed and materials supplied in full accordance with the terms and conditions of the Agreement and Contract Documents, and all authorized amendments thereto; that the following is a true, correct and complete statement of the Contract Price up to and including the last day of the period covered by this Periodical Estimate, and that no part of the "Total Amount Due" has been received:

(a)	Original Contract Price.....	\$	_____
(b)	Original Contract Price with approved Change Orders.....	\$	_____
(c)	Total amount earned and approved to date (col. 6).....	\$	_____
(d)	Retainage.....	\$	_____ 0.00
(e)	Withholding	\$	_____
(f)	Total amount earned to date less Retainage and Withholding	\$	_____
(g)	Total paid to date	\$	_____
(h)	Amount due for this estimate to date	\$	_____
(i)	Unpaid amount from previous estimate.....	\$	_____
(j)	Total Amount Due	\$	_____
(k)	Balance to finish including Retainage and Withholding	\$	_____

I further certify that all Claims outstanding, as of this date, against Contractor for labor, materials, and expendable equipment employed in the performance of the Agreement and Contract Documents have been paid in full in accordance with the requirements thereof.

Contractor: _____ Date: _____

By: _____ Title: _____

CERTIFICATE OF GCDC-WWS' ENGINEER

I certify that I have verified this Periodical Estimate, and to the best of my knowledge and belief it is a correct and complete statement of labor performed and materials supplied under the Agreement and Contract Documents, and that the Contractor's certified statement of its account and the amount due to it is correct and complete, and that all labor and material included in this Periodical Estimate have been supplied in full accordance with the terms and conditions of the Agreement and Contract Documents and authorized amendments thereto.

Name: _____ (Print)

By: _____ (Sign)

Date: _____

GCDC-WWS' RECOMMENDATION FOR PAYMENT

Approved and Payment Recommended:
GENESEE COUNTY DRAIN COMMISSIONER'S OFFICE-
DIVISION OF WATER & WASTE SERVICES

By: _____

Title: _____

Date: _____

PERIODICAL ESTIMATE NO. _____
 PROJECT: _____
 FOR THE PERIOD: to _____ to _____ INCLUSIVE
 CONTRACTOR'S NAME: _____

Item No.	Item of Work	Unit	Project Quantity	Previous Quantity	Quantity This Estimate	Quantity to Date	Unit Price	Total Amt. Earned	Amount This Estimate
1									
2									
3									
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12									
13									

ORIGINAL CONTRACT PRICE:	\$	_____
ORIGINAL CONTRACT PRICE WITH APPROVED CHANGE ORDERS	\$	_____
TOTAL AMOUNT EARNED:	\$	_____
LESS RETAINAGE:	\$	_____ \$0.00
LESS WITHHOLDING:	\$	_____
SUBTOTAL:	\$	_____
PREVIOUSLY PAID:	\$	_____
TOTAL PAYMENT DUE:	\$	_____

CHANGE ORDER NO. _____

CONTRACT NO. _____

Dated: _____

PROJECT NAME: _____

LOCATION: _____

CONTRACTOR: _____

CONTRACT FOR: Genesee County Drain Commissioner's Office –
Division of Water & Waste Services

I. DESCRIPTION OF CHANGES INVOLVED AND COST:

II. REASON FOR CHANGE:

III. CHANGE ORDER CONDITIONS:

- A. 1) The date for Substantial Completion of the Work established in the Agreement or as modified by subsequent Change Orders is hereby (extended) (reduced) by _____ (____) days, making the Substantial Completion date of the Work _____, 20____.
- 2) The date for final completion of the Work established in the Agreement or as modified by subsequent Change Orders is hereby (extended) (reduced) by _____ (____) days, making the final completion date of the Work _____, 20____.

- B. Any additional Work to be performed under this Change Order shall be carried out in compliance with the Specifications included in the preceding Description of Changes Involved, the attached Drawings and under the provisions of the Agreement and Contract Documents, including compliance with the applicable Specifications for the same type of Work.
- C. This Change Order, unless otherwise provided herein, does not relieve Contractor from strict compliance with the provisions of the Agreement and Contract Documents.
- D. Contractor shall place under coverage of its Maintenance & Guarantee Bond, Performance Bond, Payment Bond and insurances, all Work covered by this Change Order.
- E. The costs established under this Change Order are acknowledged as including any and all costs associated with the Work described herein and including any and all costs associated with any and all Work performed or to be performed by the Contractor that may be affected in any manner by the Work described herein.

IV. ADJUSTMENTS IN AMOUNT OF CONTRACT PRICE:

- | | | |
|----|--|----------|
| 1. | Original Contract Price | \$ _____ |
| 2. | Net (Addition) (Reduction) due to all previous Change Orders | \$ _____ |
| 3. | Contract Price not including this Change Order | \$ _____ |
| 4. | Net (Addition) (Reduction) resulting from this Change Order | \$ _____ |
| 5. | Current Contract Price including this Change Order | \$ _____ |

Accepted by Contractor:

By: _____

Title: _____

Date: _____

Recommended for Acceptance by Engineer

By: _____

Title: _____

Date: _____

Genesee County Drain Commissioner's Office -
Division of Water and Waste Services

By: _____

Title: _____

Date: _____

WORK CHANGE DIRECTIVE NO. _____

CONTRACT NO. _____

ISSUE DATE: _____ EFFECTIVE DATE: _____

PROJECT NAME: _____ LOCATION: _____

CONTRACTOR: _____

Contractor is directed to proceed expeditiously with the following changes:

1. Modified Work from: _____
Specification Section Reference Drawing/Detail

2. Modified Work from: _____
Specification Section Reference Drawing/Detail

Attachments (List supporting documents for change):

- 1.
- 2.

Recommended To Owner: _____ Date: _____
Engineer's Signature

Owner Approved: _____ Date: _____
Owner's Signature

Contractor Acknowledgement: _____ Date: _____
Contractor's Signature

FIELD ORDER NO. _____

CONTRACT NO. _____

ISSUE DATE: _____ EFFECTIVE DATE: _____

PROJECT NAME: _____ LOCATION: _____

CONTRACTOR: _____

You are hereby advised to promptly complete this Field Order in accordance with General Conditions Paragraph 9.04.A, for minor variations in the Work without changes to the Contract Price or Contract Time. If you consider that a change in Contract Price or Contract Time is necessary, please notify the Owner/Engineer immediately and before proceeding with this Work.

Modified Work from: _____
Specification Section Reference Drawing/Detail

Description of Modified Work:

Attachments to Reference:

Issued By: _____ Approved By: _____
Engineer Owner

Date: _____ Date: _____

Received by: _____ Date: _____
Contractor

PART 3
CONDITIONS OF THE CONTRACT

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

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly by



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Endorsed by



CONSTRUCTION SPECIFICATIONS INSTITUTE

These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor (EJCDC C-520 or C-525, 2007 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the Narrative Guide to the EJCDC Construction Documents (EJCDC C-001, 2007 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (EJCDC C-800, 2007 Edition).

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 2. *Agreement*—The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.
 3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 4. *Asbestos*—Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.
 5. *Bid*—The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 6. *Bidder*—The individual or entity who submits a Bid directly to Owner.
 7. *Bidding Documents*—The Bidding Requirements and the proposed Contract Documents (including all Addenda).
 8. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid security of acceptable form, if any, and the Bid Form with any supplements.
 9. *Change Order*—A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.
 10. *Claim*—A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.
 11. *Contract*—The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*—Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.
13. *Contract Price*—The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).
14. *Contract Times*—The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any; (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.
15. *Contractor*—The individual or entity with whom Owner has entered into the Agreement.
16. *Cost of the Work*—See Paragraph 11.01 for definition.
17. *Drawings*—That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.
18. *Effective Date of the Agreement*—The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
19. *Engineer*—The individual or entity named as such in the Agreement.
20. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.
21. *General Requirements*—Sections of Division 1 of the Specifications.
22. *Hazardous Environmental Condition*—The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto.
23. *Hazardous Waste*—The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.
24. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
25. *Liens*—Charges, security interests, or encumbrances upon Project funds, real property, or personal property.
26. *Milestone*—A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

27. *Notice of Award*—The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.
28. *Notice to Proceed*—A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.
29. *Owner*—The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.
30. *PCBs*—Polychlorinated biphenyls.
31. *Petroleum*—Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.
32. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.
33. *Project*—The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.
34. *Project Manual*—The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.
35. *Radioactive Material*—Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.
36. *Resident Project Representative*—The authorized representative of Engineer who may be assigned to the Site or any part thereof.
37. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
38. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.
39. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

40. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
41. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.
42. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.
43. *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.
44. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.
45. *Successful Bidder*—The Bidder submitting a responsive Bid to whom Owner makes an award.
46. *Supplementary Conditions*—That part of the Contract Documents which amends or supplements these General Conditions.
47. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or Subcontractor.
48. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
49. *Unit Price Work*—Work to be paid for on the basis of unit prices.
50. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.
51. *Work Change Directive*—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an

addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 Terminology

A. The words and terms discussed in Paragraph 1.02.B through F are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives:*

1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. *Day:*

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

D. *Defective:*

1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - a. does not conform to the Contract Documents; or
 - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
 - c. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

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

1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
 2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
 3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
 4. When “furnish,” “install,” “perform,” or “provide” is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, “provide” is implied.
- F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

- A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
- B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

2.02 *Copies of Documents*

- A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *Commencement of Contract Times; Notice to Proceed*

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

2.04 *Starting the Work*

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

2.05 *Before Starting Construction*

- A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:
 - 1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;
 - 2. a preliminary Schedule of Submittals; and
 - 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.07 *Initial Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.
 - 1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on

Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

- A. The Contract Documents are complementary; what is required by one is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to Owner.
- C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 *Reference Standards*

- A. Standards, Specifications, Codes, Laws, and Regulations
 1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
 2. No provision of any such standard, specification, manual, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies:*

1. *Contractor's Review of Contract Documents Before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor discovers, or has actual knowledge of, and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.
2. *Contractor's Review of Contract Documents During Performance of Work:* If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) any standard, specification, manual, or code, or (c) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies:*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:
 - a. the provisions of any standard, specification, manual, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference in the Contract Documents); or
 - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

- A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.
- B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:

1. A Field Order;
2. Engineer's approval of a Shop Drawing or Sample (subject to the provisions of Paragraph 6.17.D.3); or
3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

A. Contractor and any Subcontractor or Supplier shall not:

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

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

3.06 *Electronic Data*

- A. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.
- B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.
- C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.
- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

- A. *Reports and Drawings:* The Supplementary Conditions identify:
 - 1. those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site; and
 - 2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
 - 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
 - 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
 - 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

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

1. is of such a nature as to establish that any “technical data” on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or
2. is of such a nature as to require a change in the Contract Documents; or
3. differs materially from that shown or indicated in the Contract Documents; or
4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *Engineer’s Review:* After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner’s obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer’s findings and conclusions.

C. *Possible Price and Times Adjustments:*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor’s cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and
 - b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:
 - a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or
 - b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and

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

- c. Contractor failed to give the written notice as required by Paragraph 4.03.A.
3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

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

1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data provided by others; and
2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
 - a. reviewing and checking all such information and data;
 - b. locating all Underground Facilities shown or indicated in the Contract Documents;
 - c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction; and
 - d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated:*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the

consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *Reference Points*

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

4.06 *Hazardous Environmental Condition at Site*

- A. *Reports and Drawings:* The Supplementary Conditions identify those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at the Site.
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
 2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.

- C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.
- D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.
- E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered written notice to Contractor: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.
- F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.
- G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

- H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 – BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.
- B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed each bond.
- C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

- A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also

meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

- A. Contractor shall deliver to Owner, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.
- B. Owner shall deliver to Contractor, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.
- C. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.
- D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.
- E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

5.04 *Contractor's Insurance*

- A. Contractor shall purchase and maintain such insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:
 - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;
 - 2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;
 - 3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;
 - 4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:

- a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or
 - b. by any other person for any other reason;
 5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and
 6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.
- B. The policies of insurance required by this Paragraph 5.04 shall:
1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, be written on an occurrence basis, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;
 2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;
 3. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;
 4. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);
 5. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and
 6. include completed operations coverage:
 - a. Such insurance shall remain in effect for two years after final payment.
 - b. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 *Owner's Liability Insurance*

- A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.06 *Property Insurance*

- A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:
1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee;
 2. be written on a Builder's Risk "all-risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than that caused by flood), and such other perils or causes of loss as may be specifically required by the Supplementary Conditions.
 3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);
 4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;
 5. allow for partial utilization of the Work by Owner;
 6. include testing and startup; and
 7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued.
- B. Owner shall purchase and maintain such equipment breakdown insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors,

members, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee.

- C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other loss payee to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.
- D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.
- E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under this Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

5.07 *Waiver of Rights*

- A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or loss payees thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.
- B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and
 2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

- A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the loss payees, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.
- B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

- A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's

interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

- A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 – CONTRACTOR’S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

6.02 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner’s written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.

- B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.
 - 1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.
 - 2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and “Or-Equals”*

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or “or-equal” item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.
 - 1. “*Or-Equal*” Items: If in Engineer’s sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an “or-equal” item, in which case review and approval of the proposed item may, in Engineer’s sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment Engineer determines that:
 - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

- 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole; and
 - 3) it has a proven record of performance and availability of responsive service.
- b. Contractor certifies that, if approved and incorporated into the Work:
- 1) there will be no increase in cost to the Owner or increase in Contract Times; and
 - 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. *Substitute Items:*

- a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.
- b. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.
- c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented by the General Requirements, and as Engineer may decide is appropriate under the circumstances.
- d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:
 - 1) shall certify that the proposed substitute item will:
 - a) perform adequately the functions and achieve the results called for by the general design,
 - b) be similar in substance to that specified, and
 - c) be suited to the same use as that specified;
 - 2) will state:
 - a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time,
 - b) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and

- c) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;
 - 3) will identify:
 - a) all variations of the proposed substitute item from that specified, and
 - b) available engineering, sales, maintenance, repair, and replacement services; and
 - 4) shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.
- B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.
- C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by a Change Order in the case of a substitute and an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.
- D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- E. *Engineer's Cost Reimbursement:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
- F. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

- A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be

required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.

- B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.
- C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:
 - 1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity; nor
 - 2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.
- D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.
- E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.
- F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as a loss payee on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner,

Contractor, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.
- B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.
- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 *Permits*

- A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.
- C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 *Taxes*

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

6.11 *Use of Site and Other Areas*

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

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.
2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.
3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought

by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

- B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.
- C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.
- D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

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

6.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
 - 1. all persons on the Site or who may be affected by the Work;
 - 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 - 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and

shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

- C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.
- D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
- E. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- F. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

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

6.15 *Hazard Communication Programs*

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

6.16 *Emergencies*

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is

required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

1. *Shop Drawings:*

- a. Submit number of copies specified in the General Requirements.
- b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

2. *Samples:*

- a. Submit number of Samples specified in the Specifications.
- b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.

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

C. *Submittal Procedures:*

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

- a. reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
- b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
- c. determined and verified the suitability of all materials offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
- d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.
3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

D. Engineer's Review:

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. Resubmittal Procedures:

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

6.18 *Continuing the Work*

- A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 *Contractor's General Warranty and Guarantee*

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on representation of Contractor's warranty and guarantee.
- B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
 - 1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
 - 2. normal wear and tear under normal usage.
- C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:
 - 1. observations by Engineer;
 - 2. recommendation by Engineer or payment by Owner of any progress or final payment;
 - 3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
 - 4. use or occupancy of the Work or any part thereof by Owner;
 - 5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;
 - 6. any inspection, test, or approval by others; or
 - 7. any correction of defective Work by Owner.

6.20 *Indemnification*

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

- B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.
- C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:
 - 1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
 - 2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 *Delegation of Professional Design Services*

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.
- B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.
- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.

- E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 *Related Work at Site*

- A. Owner may perform other work related to the Project at the Site with Owner's employees, or through other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:
1. written notice thereof will be given to Contractor prior to starting any such other work; and
 2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.
- B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.
- C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:
1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;
 2. the specific matters to be covered by such authority and responsibility will be itemized; and
 3. the extent of such authority and responsibilities will be provided.

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

7.03 *Legal Relationships*

- A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.
- B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's wrongful actions or inactions.
- C. Contractor shall be liable to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's wrongful action or inactions.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

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

8.02 *Replacement of Engineer*

- A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

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

8.04 *Pay When Due*

- A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

- A. Owner's duties with respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

8.06 *Insurance*

- A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

- A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

- A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner's Responsibilities*

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

8.10 *Undisclosed Hazardous Environmental Condition*

- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

- A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents.

8.12 *Compliance with Safety Program*

- A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed pursuant to Paragraph 6.13.D.

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

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

9.02 *Visits to Site*

- A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or

continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

- A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Authorized Variations in Work*

- A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

- A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

- A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.
- B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.
- C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.
- D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

- A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

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

- A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question.
- B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believes that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.
- C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.
- D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not

exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

9.10 *Compliance with Safety Program*

- A. While at the Site, Engineer's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Engineer has been informed pursuant to Paragraph 6.13.D.

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).
- B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.D.

10.03 *Execution of Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:
 - 1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;
 - 2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and
 - 3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

- A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

10.05 *Claims*

- A. *Engineer's Decision Required:* All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.
- B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data

shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

- C. *Engineer's Action:* Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:
1. deny the Claim in whole or in part;
 2. approve the Claim; or
 3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.
- D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.
- E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.
- F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

- A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 11.01.B, and shall include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.
2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.
4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
5. Supplemental costs including the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
 - c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of

said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

- d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
- e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
- f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.
- g. The cost of utilities, fuel, and sanitary facilities at the Site.
- h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, express and courier services, and similar petty cash items in connection with the Work.
- i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

- 1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.
- 2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
- 3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
- 4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not

limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A.
- C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.
- D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 Allowances

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.
- B. *Cash Allowances:*
 1. Contractor agrees that:
 - a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
 - b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.
- C. *Contingency Allowance:*
 1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 Unit Price Work

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to

the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:
 - 1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
 - 2. there is no corresponding adjustment with respect to any other item of Work; and
 - 3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:
 - 1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or
 - 2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or
 - 3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).

C. *Contractor's Fee*: The Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or
2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;
 - b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;
 - c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 12.01.C.2.a and 12.01.C.2.b is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;
 - d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;
 - e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
 - f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 *Delays*

- A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or

neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

- B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.
- D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.
- E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

ARTICLE 13 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 *Notice of Defects*

- A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. Defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 *Access to Work*

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

13.03 *Tests and Inspections*

- A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:
 - 1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;
 - 2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in Paragraph 13.04.C; and
 - 3. as otherwise specifically provided in the Contract Documents.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.
- E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation.
- F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

- A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.
- B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.

- C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.
- D. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *Owner May Stop the Work*

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 *Correction or Removal of Defective Work*

- A. Promptly after receipt of written notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).
- B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. repair such defective land or areas; or
 2. correct such defective Work; or
 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.
- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.
- E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and for the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *Owner May Correct Defective Work*

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct, or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.
- C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

- A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 *Progress Payments*

A. Applications for Payments:

- 1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an

Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. Review of Applications:

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
 - a. the Work has progressed to the point indicated;
 - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and any other qualifications stated in the recommendation); and
 - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or

- involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or
- b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
 - a. to supervise, direct, or control the Work, or
 - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
 - d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
 5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:
 - a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;
 - c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or
 - d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. Payment Becomes Due:

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. Reduction in Payment:

1. Owner may refuse to make payment of the full amount recommended by Engineer because:
 - a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;
 - b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
 - c. there are other items entitling Owner to a set-off against the amount recommended; or
 - d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.
2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor remedies the reasons for such action.
3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1 and subject to interest as provided in the Agreement.

14.03 Contractor's Warranty of Title

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 Substantial Completion

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before

final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will, within said 14 days, execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

- D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.
- E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the tentative list.

14.05 *Partial Utilization*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:
 - 1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 14.04.A through D for that part of the Work.
 - 2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
 - 3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 *Final Inspection*

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *Final Payment*

A. *Application for Payment:*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.
2. The final Application for Payment shall be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;
 - b. consent of the surety, if any, to final payment;
 - c. a list of all Claims against Owner that Contractor believes are unsettled; and
 - d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. *Engineer's Review of Application and Acceptance:*

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying

documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. Payment Becomes Due:

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor.

14.08 Final Completion Delayed

- A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 Waiver of Claims

- A. The making and acceptance of final payment will constitute:
 1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and
 2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 *Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will justify termination for cause:
1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);
 2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;
 3. Contractor's repeated disregard of the authority of Engineer; or
 4. Contractor's violation in any substantial way of any provisions of the Contract Documents.
- B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:
1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);
 2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere; and
 3. complete the Work as Owner may deem expedient.
- C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when

so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

- D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.
- E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.
- F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B and 15.02.C.

15.03 *Owner May Terminate For Convenience*

- A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
 - 1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 - 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;
 - 3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and
 - 4. reasonable expenses directly attributable to termination.
- B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days

to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 – DISPUTE RESOLUTION

16.01 *Methods and Procedures*

- A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.
- B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.
- C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:
1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions; or
 2. agrees with the other party to submit the Claim to another dispute resolution process; or
 3. gives written notice to the other party of the intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 – MISCELLANEOUS

17.01 *Giving Notice*

- A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended; or
2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

- A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 *Cumulative Remedies*

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 *Survival of Obligations*

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

17.05 *Controlling Law*

- A. This Contract is to be governed by the law of the state in which the Project is located.

17.06 *Headings*

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

SUPPLEMENTARY GENERAL CONDITIONS

These Supplementary General Conditions (“Supplementary Conditions”) amend and supplement the Standard General Conditions of the Construction Contract, EJCDC C-700 2007 Edition (“General Conditions”) and other provisions of the Contract Documents as described herein. All provisions in the General Conditions which are not amended by these Supplementary Conditions shall remain in full force and effect. Capitalized words used in the Supplementary Conditions correspond to defined terms in the General Conditions. The references to Paragraphs herein are references to Paragraphs in the General Conditions.

ARTICLE 1 DEFINITIONS AND TERMINOLOGY

SC-1.01 Defined Terms

- 1) Insert the following definitions in Paragraph 1.01 (in alphabetical order) as follows:

Approved Alternate – An Engineer approved and GCDC-WWS accepted alternate to equipment items listed in the Contract Documents per the guidelines set forth in the General Conditions, Instructions to Bidders, and Supplementary Conditions. See also the definition of Substitute.

Bid Security – The Security accompanied with the bid, provided by the Bidder as required as a condition of the Bid. Bid Security may be in the form of a certified check, cashier’s check, money order payable to GCDC-WWS, or a bid bond in an amount not less than five percent (5%) of the total base Bid.

Developer – The individual or entity for whom Contractor has agreed to perform construction activities and for whom the Work is being performed.

Final Acceptance – The date when the Project is complete in accordance with the Contract Documents so that the entire Project can be utilized for the purposes for which it is intended (including all final restoration and completion of the punch-list items), and all monies due Contractor have been paid to Contractor in accordance with the final Application for Payment.

GCDC-WWS – Genesee County Drain Commissioner - Water and Waste Services Division for whom the Work is being performed by Contractor.

Issuing Office – The office from which the Bidding Documents are issued, where the bidding procedures are administered, and where the Invitation to Bid is issued.

Major Equipment – The major equipment items listed by name in the Bid Form and in the Agreement which are to be furnished and installed under the Agreement.

Materials – Any articles, devices, products, materials, fixtures, forms or similar items which are necessary or desirable for the completion of the Work and/or are designated in the Specifications, including an “Approved Alternate.”

MDOT – The Michigan Department of Transportation.

M.I.O.S.H.A. – The Michigan Occupational Safety and Health Administration.

Modification – A written amendment of the Contract Documents signed by both parties.

O.S.H.A. – The Federal Occupational Safety and Health Administration.

Owner – Means GCDC-WWS.

Products – Means materials and equipment, other than labor and services.

Proof Roll – The process where compacted soil is checked for soft areas in order to provide uniform density in the uppermost zone of the natural stratum. When soft subgrade spots are located during construction, they are to be corrected so that the density of the subgrade is maintained. Proof rolling shall consist of:

- Two (2) to four (4) passes with a 25 ton rubber tire roller or equivalent.
- Additional passes in areas that exhibit instability as directed by Engineer.
- Permanent rutting in excess of 1 inch should be considered a failure. In addition, elastic (rebound) movement or rutting in excess of 1 inch with substantial cracking or substantial lateral movement should be considered a failure.
- The upper eight inches (8”) of subgrade shall be also scarified and compacted to 95% of the maximum dry density as defined by AASHTO T-180 (ASTM D-1557), prior to placement of subsequent lift of FILL material.

Standard Details - Means the Sanitary Sewer Construction Details, the Pressure Pipe Construction Details, the Standard Construction Notes Details, the Public Pump Station Details, the Standard Meter Pit Details for Single Meter Details, the Low Pressure System #1 Details, the Low Pressure System #2 Details, the Simplex Grinder Station Details and the Duplex Grinder Station Details.

Standard Specifications – Means the General Administrative Specifications, the Sanitary Sewer Specifications, the Watermain Specifications, the Forcemain Specifications, and the Pump Station Specifications.

Successful Bidder – The lowest qualified and responsible Bidder submitting a Bid to whom GCDC-WWS awards the Bid.

Substitute – An Engineer approved and GCDC-WWS accepted alternate to Products listed in the Contract Documents per the guidelines set forth in the General Conditions, Instructions to Bidders, and Supplementary Conditions.

- 2) In Paragraph 1.01.A, delete the following definitions in their entirety and replace it with the following:

Bidder – The Individual or Entity that submits a Bid directly to GCDC-WWS.

Bidding Documents – The Bidding Documents include the Invitation to Bid, the Bidding Requirements, Instructions to Bidders, and Bid Form including Attachments A through H, inclusive, and all addenda.

Contract - The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral. To the extent that Contractor has previously worked for Owner, no provisions of any prior contract or any course of conduct engaged in during any prior contract shall act to modify the written provisions of this Agreement.

Contractor – The Individual or Entity with which GCDC-WWS or Developer has entered into the Agreement.

Engineer – The individual or entity that has entered into an Agreement for Professional Services with GCDC-WWS. The Owner reserves the right to designate as Engineer an individual and/or entity other than the Engineer identified in the Agreement. If Owner exercises this right, it will notify Contractor of same in writing.

Resident Project Representative - The authorized representative of GCDC-WWS or Engineer who is assigned to the Site or any part thereof.

SC-1.02.B.1 Intent of Certain Terms of Adjectives

- 1) Add the following sentences at the end of Paragraph 1.02.B.1:

"As directed", "as permitted", "reviewed", "acceptable", "approved" or words of similar import mean the direction, requirements, permission, approval, or acceptance of GCDC-WWS and Engineer, unless stated otherwise. "As shown", "as indicated", "as detailed", or words of similar import refer to the Drawings, unless stated otherwise.

SC-1.02.E Furnish, Install, Perform, Provide

- 1) Delete Paragraph 1.02.E.1 in its entirety and replace it with the following:

The words “furnish” or “supply”, when used in connection with services or products, shall mean to supply, deliver, unload, and inspect for damage such services or products to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

- 2) Delete Paragraph 1.02.E.2 in its entirety and replace it with the following:

The word “install”, when used in connection with services or products, shall mean to unpack, assemble, erect, apply, place, finish, cure, protect, clean, to put into use, or place into final position such services or products, complete and ready for their intended use.

- 3) Delete Paragraph 1.02.E.3 in its entirety and replace it with the following:

The words “perform” or “provide”, when used in connection with services or products, shall mean to furnish, install, and make fully functional such services or products, complete and ready for their intended use.

ARTICLE 2 PRELIMINARY MATTERS

SC-2.02 Copies of Documents

- 1) Delete Paragraph 2.02.A in its entirety and replace it with the following:

GCDC-WWS shall furnish Contractor two (2) copies of the Contract Documents. Additional copies of the Contract Documents shall be furnished upon written request of Contractor at the cost of reproduction (to be paid by Contractor).

SC-2.03 Commencement of Contract Times; Notice to Proceed

- 1) Delete Paragraph 2.03.A in its entirety and replace it with the following:

The Contract Times shall commence to run on the date indicated in the Notice to Proceed.

SC-2.04 Starting the Work

- 1) Add the following sentence to the end of Paragraph 2.04.A:

Contractor shall provide written notice to GCDC-WWS ten (10) days prior to starting the Work. In the event of a temporary suspension of the Work, Contractor shall give GCDC-WWS reasonable written notice before resuming the Work.

SC-2.05 Before Starting Construction

- 1) Add the following sentence to the end of Paragraph 2.05.A.1 as follows:

This preliminary Progress Schedule and all other Progress Schedules shall be submitted in both a hard copy and Primavera P6 EPPM (or compatible) format.

SC-2.06 Preconstruction Conference; Designation of Authorized Representatives

- 1) Delete Paragraph 2.06.A in its entirety and replace it with the following:

- A. The Owner and Contractor shall attend a pre-construction conference before Contractor engages in any work. The Engineer (or Owner's Designee assigned to perform the responsibilities of the Engineer) shall also attend this conference. The Owner and Contractor may request the attendance of other appropriate parties/representatives/entities. The pre-construction conference shall be conducted for the purpose of reviewing the work, discussing schedules (see 2.05.A), procedures for the submission of shop drawings/ submittals and the response thereto, processing pay applications, and maintaining required records.
- B. To avoid confusion regarding work, change orders, work directives, contract interpretation, amendment or modification, or any claim or evaluation/ resolution thereof, Owner and Contractor, at the pre-construction conference, shall provide to each other in writing, the name of their authorized representative(s) who is designated to present and address same. Said individual shall be the only person so authorized unless otherwise specified by Owner and/or Contractor in writing.

SC-2.07 Initial Acceptance of Schedules

- 1) Delete the heading to Paragraph 2.07 in its entirety and replace it with the following:

Initial Acceptance of Progress Schedules & Schedule of Values

- 2) Add the words “Owner and” before the word “Engineer” in the last line of Paragraph 2.07.A.

- 3) Delete Paragraph 2.07.A.3 in its entirety and replace it with the following:

Contractor’s Schedule of Values shall be acceptable to Engineer and GCDC-WWS as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

SC-3.02.A Standards, Specifications, Codes, Laws and Regulations

- 1) Add the following sentence to the end of Paragraph 3.02.A.2.:

Contractor shall defend, indemnify and hold harmless Owner and Engineer from and against any and all liabilities, losses, costs, and damages sustained or incurred by Owner or Engineer in connection with this Paragraph 3.02.A.2.

SC-3.03.A.1 Contractor’s Review of Contract Documents Before Starting Work

- 1) Add the words “or should have discovered in the exercise of reasonable care”, following the words “may discover” in the second sentence on the fifth line of Paragraph 3.03.A.1.
- 2) Add the words “Owner and” before the word “Engineer” in the second sentence on the sixth line of Paragraph 3.03.A.1.
- 3) Add the words “or should have discovered in the exercise of reasonable care”, following the words “discovers” in the first sentence on the second line of Paragraph 3.03.A.2.
- 4) Add new Paragraph 3.03.A.4 as follows:

If Contractor fails to timely notify Engineer in writing as required by Paragraph 3.03.A.1 and 3.03.A.2, Contractor shall be solely responsible to bear any increases costs and time resulting from the conflict, error, ambiguity, or discrepancy.

SC-3.04.C Amending and Supplementing Contract Documents

- 1) Add new Paragraph 3.04.C as follows:

To the extent that Contractor previously has been awarded a contract by and/or performed work for or on behalf of Owner, no provision of any prior contract nor any course of conduct engaged in during any prior contract shall act to modify or amend any contract documents.

SC-3.07 Order of Precedence

- 1) Add new Paragraph 3.07 as follows:

Order of Precedence: In resolving inconsistencies among two (2) or more provisions in the Contract Documents, preference shall be given in the following order of priority with subparagraph (i) given the highest priority and subparagraph (viii) the lowest priority, so that, for example, if there are conflicting provisions in subparagraph (i) and subparagraph (iv) below, the provision in subparagraph (i) shall control: (i) Agreement and amendments thereto; (ii) Bid; (iii) Supplementary Conditions; (iv) Instructions to Bidders; (v) General Conditions; (vi) Specifications; and (vii) Drawings.

ARTICLE 4 [Retitled]: AVAILABILITY OF LANDS: SUBSURFACE AND PHYSICAL CONDITIONS; REFERENCE POINTS

SC-4.01 Availability of Lands

- 1) Add the words “at its own costs” at the end of Paragraph 4.01.C.

SC-403.A Differing Subsurface or Physical Conditions

- 1) Delete the word “believe” in the first sentence of Paragraph 4.03.A and replace it with the word “encounters”.
- 2) Delete the words “is uncovered or revealed either” in the first sentence of Paragraph 4.03.A.
- 3) Delete the words “after becoming aware thereof” in the first line following subparagraph four, and replace it with the words “upon encountering such conditions”.

SC-4.03.C Possible Price and Time Adjustments

- 1) Delete the words “becoming aware of thereof” in the third sentence of Paragraph 4.04.B.1 and replace them with “upon encountering such Underground Facility”.
- 2) Delete the words “will be” in the first sentence of Paragraph 4.03.C.1 and replace them with the words “may be reviewed and”.

SC-4.04.B Not Shown or Indicated

- 1) Delete the word “shall” in the second sentence of Paragraph 4.04.B.2 and replace it with the word “may”.

SC-4.05 Reference Points

- 1) Delete the first sentence in Paragraph 4.05.A and replace it with the following:

Benchmark locations and elevations have been provided within the Drawings as reference points for construction which in Engineer’s judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for coordinating the activities of the Owner supplied and paid surveyor to lay out the work. Contractor shall protect and preserve the established reference points and

property monuments, and shall make no changes or relocations without prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades, locations, or required construction activities, and shall be responsible for coordinating the Owner supplied surveyor for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel. Unnecessary cost for surveying, reference point, or property monument restoration, as determined by the Engineer/Owner, will be reimbursed by the Contractor to the Owner.

SCR-4.06.A Reports and Drawings

- 1) Delete Paragraph 4.06.A in its entirety.

ARTICLE 5 BONDS AND INSURANCE

SC-5.01 Performance, Payment, and Other Bonds

- 1) Delete the words “becomes due” in the second sentence of Paragraph 5.01.A and replace them with the words “is made”.
- 2) Delete the words "by Law or Regulations or" in the second sentence of Paragraph 5.01.A.
- 3) Add the following four sentences to the end of Paragraph 5.01.A:

Contractor shall also furnish a Maintenance and Guarantee Bond (“M&G Bond”) in an amount at least equal to one hundred percent (100%) of the Contract Price

increased by any Change Order and adjusted as required by Paragraph 5.01 of the General Conditions in lawful money of the United States of America. The M&G Bond shall guarantee the Work against defects due to improper materials, defective equipment and faulty workmanship for a period of two (2) years from the date of final payment. The M&G Bond shall be on the forms provided herein.

The M&G, Payment, and Performance Bond provider or issuer shall have a minimum of an “A” rating as determined by the A.M. Best Company.

SC-5.03 Certificates of Insurance

- 1) Delete Paragraph 5.03 in its entirety and replace it with the following:

5.03 Certificates of Insurance

- A. Contractor shall, as of the Effective Date of the Agreement, file with GCDC-WWS a Certificate of Insurance using the standard ACORD form or form found herein, copies of the policies covering all of its insurance as required herein, and the policy or policies of insurance (including, without limitation, declarations, printed policy forms, and all amendments) covering GCDC-WWS, Engineer and their members, partners, directors, officers, agents, employees, successors and assigns. The insurance provider or issuer shall have a minimum of an “A” rating as determined by the A.M. Best Company. In those states where use of the pre-printed Certificate of Insurance form is prohibited, Contractor shall submit an approved form of Certificate of Insurance providing the insurance coverages herein required. Each insurance policy and the Certificate of Insurance shall be satisfactory to GCDC-WWS in its sole discretion, and nothing contained in the insurance requirements shall be construed as limiting the extent of Contractor’s responsibility for payment of damages resulting from its operations under the Agreement.
- B. Contractor shall add as additional insureds on the following policies: General Liability, Automobile Liability, Umbrella Liability, and Builder’s Risk Liability: (i) Genesee County; (ii) Genesee County Drain Commissioner’s Office – Division of Water & Waste Services; and, (iii) **(INSERT OTHER INSURED)**.
- C. Certificates of Insurance will be accepted for all insurance coverages except GCDC-WWS’s Owner’s Contractor’s Protective insurance policy and excess/umbrella insurance policy. The Certificates of Insurance shall clearly state that an authorized representative of the insurance company has complied with the provisions as required by this SC-5.03. The Certificate of Insurance shall state which particular Agreement or Contract Document is covered by that particular Certificate of Insurance.

- D. GCDC-WWS does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.
- E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to GCDC-WWS in the Contract Documents.

SC-5.04 Contractor's Insurance

- 1) Delete Section 5.04 in its entirety and replace it with the following:

5.04 Insurance

Contractor shall obtain, pay for, and maintain throughout the term of and specifically for this Agreement the following insurance coverages. Contractor shall not begin the Work, nor shall it allow any Subcontractor to begin the Work until all of the insurance coverage stated herein have been obtained and are in full force and effect and a Certificate of Insurance showing such insurance coverage have been provided to GCDC-WWS.

A. Liability Insurance ("Insurance")

1. For Contractor

The Insurance shall protect the Contractor from claims for bodily injury and property damage (except automotive equipment) which may arise because of the nature of the Work and from operations under the Agreement. The Insurance shall be on an occurrence basis and shall insure Contractor against liability arising from its operations, the operations of Subcontractors, completed operations and contractual liability assumed under the indemnity provisions contained in the General Conditions and these Supplementary Conditions.

Each of the following policies of the Insurance shall provide coverage in the following minimum amounts:

COVERAGE	LIMITS OF LIABILITY
Comprehensive Property Damage	\$1,000,000 each occurrence
	\$2,000,000 aggregate
Comprehensive Bodily & Personal Injury	\$1,000,000 each person
	\$2,000,000 each occurrence

Contractor shall cause the insurance company to provide five (5) copies of the Insurance Policy or Certificates of Insurance which shall be included in the Contract Documents.

Included Coverage:

The above insurance policy shall also include the following coverages:

- a. Commercial General Liability
- b. Premises / Operations
- c. Products - Completed Operations
- d. Personal Injury (false arrest, libel, wrongful eviction, etc.)

2. For GCDC-WWS and Engineer (Owner's / Contractor's Protective Liability)

A separate policy of Insurance, GCDC-WWS's and Engineer's Owner's/Contractor's Protective Policy, shall name GCDC-WWS, Engineer and their members, partners, officers, directors, agents, employees, successors and assigns as insureds. This Insurance policy shall provide coverage to GCDC-WWS, Engineer and their members, partners, officers, directors, agents, employees, successors and assigns with respect to the Work. This Insurance policy shall be on an occurrence basis, and the Insurance policy shall provide that the coverage afforded thereby shall be primary coverage to the full limit of liability stated in the declarations and if GCDC-WWS, Engineer and their members, partners, officers, directors, agents, employees, successors and assigns have other insurance against the loss covered by such Insurance policy, such other insurance shall be excess insurance only.

This Insurance policy shall protect the insured against contingent liability, which may be imposed by law because of supervisory acts or omissions thereof in connection with the Work performed by the Contractor and its Subcontractors. This contingent liability insurance shall be on an occurrence basis and the Insurance policy shall provide coverage to the following stated limits:

COVERAGE	LIMITS OF LIABILITY
Comprehensive Property Damage	\$1,000,000 each occurrence
Comprehensive Bodily & Personal Injury	\$1,000,000 each person

Contractor shall cause the insurance company to provide five (5) copies of this insurance policy which shall be included in the Contract Documents.

3. Comprehensive Automobile Liability (“CAL Insurance”)

The CAL Insurance policy shall cover owned, hired and other non-owned automobiles and shall cover Contractor from claims for bodily injury or property damage to other persons which may arise from the use of motor vehicles engaged in various operations under the Agreement.

COVERAGE	LIMITS OF LIABILITY
Combined Single Limit	\$1,000,000 each accident
Property Damages	\$1,000,000 each occurrence

4. Umbrella Policy

Contractor shall purchase and maintain an "excess insurance" or "umbrella coverage" policy in the amount of Four Million Dollars (\$4,000,000) in excess of the General Liability policy.

Contractor shall deliver a copy of such insurance policy for review by GCDC-WWS. Contractor shall cause the insurance company to provide five (5) copies of such policies or Certificates of Insurance which shall be included in the Contract Documents.

5. Workers’ Compensation Insurance and Employer’s Liability

Workers’ Compensation Insurance with statutory benefits and limits shall fully comply with all State and Federal requirements and contain Broad Form All States and Voluntary Compensation Endorsements and Employer’s Liability Insurance with limits not less than \$100,000 per accident; \$100,000 per disease; and \$100,000 policy limit on disease.

6. Property Insurance (“Property Insurance”)

Contractor shall purchase and maintain Property Insurance for the Work to the full insurable value thereof. The Property Insurance shall include the interest of GCDC-WWS, Contractor, Sub-contractors, Engineer and Engineer’s consultants in the Work, shall insure against all perils, shall include "all risk" insurance for

physical loss and damage including theft, vandalism and malicious mischief, collapse and water damage, such other perils as may be provided in the Supplementary Conditions, and shall include damages, losses and expenses arising out of or resulting from any insured loss, or incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers, architects, attorneys and other professionals). If not covered under the "all risk" insurance, or otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain similar Property Insurance on portions of the Work stored on and off the Site, or in transit, when such portions of the Work are to be included in an Application for Payment.

The Property Insurance shall protect the insured against contingent liability, which may be imposed upon them by law because of their supervisory actions or omissions thereof, in connection with the Work performed by Contractor and its Subcontractors. The Property Insurance shall be on an occurrence basis and shall provide coverage to the following stated limits:

COVERAGE	LIMITS OF LIABILITY
Comprehensive Property Damage	\$1,000,000 each occurrence
	\$2,000,000 aggregate
Comprehensive Bodily & Personal Injury	\$1,000,000 each person
	\$2,000,000 each occurrence

7. Builder's Risk Insurance

"All Risk" Builder's Risk Insurance shall be in an amount equal to the Contract Price and shall cover, but not be limited to, fire, lightning, windstorm, hail, explosion, riot, riot attending a strike, civil commotion, smoke damage, damage by aircraft or vehicles, vandalism and malicious mischief, theft, collapse, flood and earthquake, and shall contain an all perils clause.

The Builder's Risk Insurance policy shall name GCDC-WWS and Contractor as co-insureds and shall include coverage, but not by way of limitation, for all damage or loss to the Work and to appurtenances, to materials and equipment to be used on the Project while the same are in transit or stored on or off the Site, and to construction plants and temporary structures. The Builder's Risk Insurance policy shall provide GCDC-WWS the right to

occupy the premises, without termination of the policy, until the final acceptance of the Project. Copies of the Builder's Risk Insurance policy shall be delivered to GCDC-WWS for its approval.

8. Subcontractors

Contractor shall not be required to have its Subcontractors named as co-insureds in its Insurance policy, but such Insurance policy shall protect Subcontractors from contingent liability which may arise from their operations. Contractor shall secure Certificates of Insurance as evidence that each Subcontractor carries insurance to provide coverage under the Agreement to the same limits as is required by Contractor. Contractor shall submit copies of its Subcontractor's Certificate of Insurance to GCDC-WWS and Engineer as evidence of insurance coverage.

9. Notice of Cancellation

All insurance policies and Certificates of Insurance required by this Agreement shall include an endorsement providing thirty (30) days prior written notice of termination, expiration or material change in terms to be provided to GCDC-WWS. Contractor shall cease the Work upon the occurrence of any of the foregoing events, and shall not resume the Work until a new insurance policy which is in compliance with all requirements hereof is in force.

SC-5.05 [Retitled] Notification of Insurance Companies

- 1) Delete Paragraph 5.05 in its entirety and replace it with the following:

5.05 Notification of Insurance Companies

- A. It is the responsibility of Contractor to provide written notice to all insurance companies to familiarize themselves with all of the conditions and provisions of the Agreement. The insurance companies shall waive their right of notification by GCDC-WWS of any change or modification of the Agreement, or of decreased or increased Work, of the cancellation of the Agreement or of any other acts by GCDC-WWS or its authorized employees or agents under the terms of the Agreement. The waiver by the insurance companies shall in no way relieve the insurance companies of their obligations under this Agreement.

SC-5.06 Property Insurance

- 1) Delete Paragraph 5.06 in its entirety.

SC-5.07 Waiver of Rights

- 1) Delete Paragraph 5.07 in its entirety.

SC-5.08 Receipt and Application of Insurance Proceeds

- 1) Delete Paragraph 5.08 in its entirety and replace it with the following:
 - A. Any insured loss under the policies of insurance required by Paragraph 5.04.A.6 will be adjusted by GCDC-WWS in good faith and made payable to GCDC-WWS for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. GCDC-WWS shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work in the cost thereof covered by an appropriate Change Order.
 - B. GCDC-WWS in good faith shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within fifteen (15) days after the occurrence of loss to GCDC-WWS' exercise of this power. If such objection be made, GCDC-WWS in good faith shall make settlement with the insurers in accordance with such agreements as the parties in interest may reach. If no such agreement among the parties in interest is reached, GCDC-WWS, in good faith, shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, GCDC-WWS shall give bond for the proper performance of such duties.

SC-5.09 [Retitled]: Acceptance of Bonds and Insurance; Option to Replace; No Waiver

- 1) Delete Paragraph 5.09 in its entirety and replace it with the following:

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

 - A. If GCDC-WWS has an objection to the coverage obtained by or other provisions of the bonds or insurance required to be purchased and maintained by Contractor in accordance with Paragraph 5.04 of the General Conditions and any amendments thereto as set forth in these Supplementary Conditions on the basis of the bond or insurance not complying with the Contract Documents, GCDC-WWS shall notify Contractor in writing of such objection. In such event, Contractor shall

purchase such conforming bonds and/or insurance policies and provide such additional information with respect to such bonds or insurance policies as GCDC-WWS may reasonably request.

- B. Failure of GCDC-WWS to (a) demand certifications or evidence of bonds or insurance from the contract, (b) notify Contract of objection to coverage or other provisions of bonds or insurance required by this Article 5, or (c) to identify a deficiency in compliance with bonding and insurance requirements from the documentation provided by Contractor, shall not be construed as a waiver of Contractor's obligation to obtain, pay for, and maintain such bonds and insurance and otherwise comply with the requirements of this Article 5.

ARTICLE 6 CONTRACTOR'S RESPONSIBILITIES

SC-6.01 Supervision and Superintendence

- 1) Delete the first sentence of Paragraph 6.01.B. and replace it with the following:

At all times during the Work, Contractor shall assign a competent construction superintendent who shall not be replaced without written approval of GCDC-WWS. Any request by Contractor to replace the construction superintendent shall be submitted in writing to GCDC-WWS and Engineer with a detailed explanation of the reason for such request. GCDC-WWS also may require the replacement of the construction superintendent and/or any Project managers at any time for any reason which GCDC-WWS deems necessary or appropriate.

SC-6.02 Labor; Working Hours

- 1) Add the following sentence to the end of Paragraph 6.02.A:

GCDC-WWS may require the immediate removal of any of Contractor's employees from the Site at any time for any reason upon written notice to Contractor.

SC-6.03 Services, Materials and Equipment

- 1) Delete the second sentence of Paragraph 6.03.B and replace it with the following:

All special warranties and guarantees required by the Specifications shall run from the date of installation of such Materials and equipment and shall expressly run to the benefit of GCDC-WWS, and if required by GCDC-WWS, Contractor shall purchase any extended warranty to comply with such provision.

SC-6.04 Progress Schedule

- 1) Add the following sentences as new Paragraph 6.04.A.3:

Progress Schedules shall be submitted with each payment application. The payment applications will not be approved until the Progress Schedule has been submitted and is approved. The Progress Schedule and all revisions to the Progress Schedule shall be submitted in both hard copy and the latest electronic version of Primavera the GCDC-WWS possesses. The Progress Schedule shall include the duration of each task in calendar days, planned start, planned finish, actual start, actual finish, critical path, and predecessors.

SC-6.05 Substitutes and “Or-Equals”

In Paragraph 6.05 wherever such references are made do the following:

- 1) Substitute the words "Instructions to Bidders" for "General Requirements".
- 2) Substitute the words “Approved Alternate” for “Or-Equals”.
- 3) Add the words “submittal by Contractor and” in the sixth line in Paragraph 6.05.B after the words “requirements for”.
- 4) Add the following to the end of the first sentence of Paragraph 6.05.C.:

... of the General Conditions and Article 10 of the Instructions to Bidders. Only Approved Alternates shall be allowed for use on the Project.

SC-6.06 Concerning Subcontractors, Suppliers, and Others

In Paragraph 6.06.B, wherever such references are made, do the following:

- 1) Substitute the words, “Instructions to Bidders” for "Supplementary Conditions", wherever such references are made in Paragraph 6.06.B.
- 2) Delete Paragraph 6.06.G in its entirety and replace it with the following:

All Work performed for Contractor by a Subcontractor shall be pursuant to an appropriate agreement between Contractor and the Subcontractor which specifically binds the Subcontractor to the applicable terms and conditions of the Agreement and Contract Documents for the benefit of GCDC-WWS. Contractor shall pay each Subcontractor a just share of any insurance moneys received by Contractor on account of losses under insurance policies issued pursuant to Paragraph 5.06 of the Supplementary Conditions.

- 3) Add new Paragraph 6.06.H as follows:

Claims filed or submitted by a third party shall be reported to GCDC-WWS and Engineer within two (2) days of any employees or agents of Contractor first being aware of the claim.

Any claim made by a third party that is deemed the responsibility of the Contractor shall be acted upon within seven (7) days of notification to Contractor. GCDC-WWS and Engineer shall at all times be kept apprised of the progress of all claims in writing. If Contractor fails to comply with the provisions of Paragraph 6.06.H, GCDC-WWS or Engineer shall have the right to resolve claims by third parties and subtract the amount of the claim from the final payment to Contractor or withhold an equal amount from Progress Payments.

- 4) Add new Paragraph 6.06.I as follows:

Any Bidder who has submitted a Bid and who intends to subcontract a portion of the Work shall comply with Paragraph 22.01 of the Instructions to Bidders.

SC-6.08 Permits

- 1) Add the following to end of Paragraph 6.08.A:

Copies of all written notices, permits, and licenses shall be submitted to the Engineer and GCDC-WWS prior to the commencement of the Work.

1. GCDC-WWS shall obtain preliminary plan approval for permits from the following organizations having jurisdiction: (i) Michigan Department of Environmental Quality-all divisions; (ii) Genesee County Road Commission; and (iii) Genesee County Drain Commissioner-all divisions, including Soil Erosion and Sedimentation Control.
2. Contractor shall be given copies of all approvals and licenses and shall be obligated to observe all terms and conditions of the approvals and licenses issued. Contractor shall furnish bonds, insurance policies, pay any fees and obtain final permits, if required, by the organizations described above at Contractor's cost.
3. For Projects requiring a National Pollution Discharge Elimination Systems (NPDES) Permit, Contractor shall obtain such permit, pay the required fee and comply with all permit conditions.

SC-6.11 Use of Work Site and Other Areas

- 1) Add new Paragraph 6.11.A.4 as follows:

Unless otherwise notified in writing by GCDC-WWS, Contractor shall promptly and lawfully dispose of all trash, debris and other surplus construction materials generated by Contractor or any of its Subcontractors or Suppliers in connection with the Project.

SC-6.12 Record Documents

- 1) Add new Paragraph 6.12.B as follows:

Contractor shall be responsible for maintaining up-to-date record drawings, presenting the current drawings at the monthly progress meetings and making them available to the Engineer/Owner when requested.

As much information as possible shall be placed on the actual drawings. The record drawings shall include, by way of illustration but not limitation, the following information:

- A. Stationing along the pipe and offset from centerline of road as well as a minimum of three (3) witness points for manholes, inlets, bends, elbows, fittings, and valves.
- B. Stationing along pipe, offset from centerline of road and location information for restrained joints, concrete encasement, corrosion protection linings, and all similar features.
- C. Stationing along the pipe and offset from centerline of road as well as a minimum of three (3) witness points for water and sewer leads, cleanouts, stubs, and all similar items.
- D. Length, depth, size, material, and other pertinent information of water and sewer leads, connections, cleanouts, stubs, and similar items.
- E. Detailed information about any deviation from what is shown on the contract plans or in the contract specifications.

SC-6.13 Safety and Protection

- 1) Add the following sentence after the first sentence of Paragraph 6.13.A:

Contractor shall comply with all applicable OSHA and MIOSHA requirements associated with the Work including, but not limited to, those requirements associated with trench safety and confined space entry.

- 2) Add the words “at its cost” in the fourth line of Paragraph 6.13.E after the words “by Contractor”.

SC-6.14 Safety Representative

- 1) Add new Paragraph 6.14.B as follows:

6.14.B *Property Damage, Injury, or Illness Reports*

Contractor shall file with GCDC-WWS three (3) copies of employer's first report of property damage incidents and incidents of injury or illness immediately following any such incident in connection with the Work. Contractor shall also furnish to GCDC-WWS three (3) copies of the employer's first report of property damage incidents and incidents of injury or illness involving any Subcontractor within 48 hours following any such incident.

SC-6.16 Emergencies

- 1) Add new Paragraph 6.16.B as follows:

At the preconstruction meeting, Contractor shall supply GCDC-WWS with the telephone numbers and other pertinent contact information of key supervisory personnel where they can be reached in case of an emergency during both working hours and non-working hours. The telephone numbers and contact information shall be on file with Engineer and GCDC-WWS' Project engineer prior to starting the Project.

SC-6.17 Shop Drawings and Samples

- 1) Delete the second sentence of Paragraph 6.17.A and replace it with the following:

All submittals of Shop Drawings and Samples shall be identified and submitted as GCDC-WWS and Engineer may require, including the number of copies of Shop Drawings and Samples as required by the Contract Documents plus any additional copies of the same which Contractor requires to be returned for its records.

SC-6.19 Contractor's General Warranty and Guarantee

- 1) Add the following after the first sentence of Paragraph 6.19.A:

Contractor shall comply with the approved Shop Drawings and Operation and Maintenance Manuals as submitted by Contractor. The Work shall be fit for its intended use.

SC-6.20 Indemnification

- 1) Add new Paragraph 6.20.D as follows:

Contractor acknowledges the receipt and sufficiency of specific valuable consideration and other benefits accruing to Contractor in exchange for Contractor's obligation to indemnify GCDC-WWS from and against all losses, costs, expenses, and damages for personal injury, death, and property damage caused by the contributory or concurrent negligence of GCDC-WWS or its authorized representatives, including, but not limited to, its Subcontractors and Suppliers. The specific consideration includes, but is not limited to, the first five percent (5%) of each payment made to the Contractor under this Agreement. If Contractor's obligation to indemnify GCDC-WWS and its authorized representatives (as a result of their negligence) is found to be unenforceable because of failure of consideration, Contractor's obligation to indemnify GCDC-WWS or its authorized representatives shall be limited to the limits of liability of the insurance policies provided pursuant to the Contract Documents. GCDC-WWS as used herein, shall include its officers, directors, agents, employees, commissioners, successors and assigns.

SC-6.21.B Delegation of Professional Design Services

- 1) Add at the end of paragraph B, "All professionals shall be licensed in the State of Michigan".

SC-6.22 Hold Harmless Agreement

- 1) Add new Paragraph 6.22 as follows:

6.22 Hold Harmless Agreement

Contractor shall defend, indemnify and hold harmless GCDC-WWS, Engineer, and all of their members, partners, officers, directors, agents, employees, commissioners, successors, and assigns from and against all suits, actions, or claims of any kind or character brought for or on account of any injuries to, death of, or damages received by any person or property resulting from the operations of Contractor or any of its Subcontractors or Suppliers, in connection with the Work, provided, however, such duty to indemnify and hold harmless shall not apply to injuries, death, or damages caused by the sole negligence of GCDC-WWS or Engineer.

ARTICLE 7 OTHER WORK AT THE SITE

SC-7.02 Coordination

- 1) Add the words "unless otherwise stated in the Contract Documents" following the words "Supplementary Conditions" in the first sentence of Paragraph 7.02.A.

ARTICLE 8 OWNER'S RESPONSIBILITIES

SC-8.01 Communications to Contractors

- 1) Delete Paragraph 8.01.A in its entirety and replace it with the following:

GCDC-WWS may communicate directly (verbally or in writing) with Contractor or through Engineer in its sole discretion.

SC-8.02 Replacement of Engineer

- 1) Delete Paragraph 8.02.A in its entirety and replace it with the following:

GCDC-WWS may appoint a new or replacement Engineer in its sole discretion for any reason at any time by written notice to Contractor.

SC-8.06 Insurance

- 1) Delete Paragraph 8.06.A in its entirety.

SC-8.10 Undisclosed Hazardous Environmental Condition

- 1) Delete Paragraph 8.10 in its entirety.

ARTICLE 9 ENGINEER'S STATUS DURING CONSTRUCTION

SC-9.03 Project Representative

- 1) Delete Paragraph 9.03.A. in its entirety and replace it with the following:

A. If GCDC-WWS deems it necessary, Engineer shall furnish a Resident Project Representative who shall be employed by Engineer to assist Engineer in providing more extensive observation of the Work. The Resident Project Representative shall act as directed by and under the supervision of GCDC-WWS. Dealings with Subcontractors shall only be through or with the full knowledge of Contractor.

B. The duties, responsibilities and limitations of the Resident Project Representative shall include, but not be limited to, the following:

1. Schedules - Review the Progress Schedule, the schedule of Shop Drawings submissions, and the Schedule of Values prepared by Contractor and consult GCDC-WWS and Engineer concerning their acceptability.

2. Meetings - Attend preconstruction meetings. Arrange and schedule progress meetings and other meetings as required in consultation with GCDC-WWS and Engineer and provide notice to those persons expected to attend. Attend meetings and conferences, prepare and maintain meeting minutes, and circulate copies thereof.
3. Liaison - Serve as GCDC-WWS's liaison with Contractor, working principally through Contractor's superintendent and assist Contractor regarding the interpretation of Contract Documents.
4. Shop Drawings and Samples - Advise GCDC-WWS, Engineer, and Contractor or its superintendent immediately of the commencement of any Work requiring Shop Drawings or a Sample submission, if the Shop Drawings or Sample submissions have not been approved by Engineer.
5. Review of the Work, Defective Work, Inspection, and Tests:
 - a. Conduct on-Site observations of the Work in progress to assist GCDC-WWS in determining whether the Work is proceeding in accordance with the Contract Documents.
 - b. Provide a written report to GCDC-WWS and Engineer whenever any Work is unsatisfactory, faulty, defective does not conform to the Contract Documents, does not meet the requirements of any inspections, tests, or approvals required to be made or has been damaged. Advise GCDC-WWS and Engineer in writing when Work should be corrected or rejected or should be uncovered for observation or special testing.
 - c. Verify that material and equipment tests, equipment and systems startup and equipment storage, operation and maintenance are conducted as required by the Contract Documents and in the presence of the required personnel, including, but not limited to, building inspectors, manufacturer's representatives and permitting agencies representatives, and that Contractor maintains adequate records thereof. Observe, record and report to GCDC-WWS and Engineer in writing appropriate details and results relative to test procedures, storage, startup, operation and maintenance.

- d. Accompany visiting inspectors representing public or other agencies having jurisdiction over the Project, record the outcome of these inspections and provide a written report to GCDC-WWS and Engineer in connection therewith.
 - e. Transmit to Contractor in writing Engineer's clarifications and interpretations of the Contract Documents.
 - f. Consider and evaluate Contractor's suggestions for Modifications in the Drawings and Specifications and provide a written report with recommendations to GCDC-WWS and Engineer.
6. Records:
- a. Maintain at the Site orderly files for correspondence, reports of job conferences, Shop Drawings and Samples, reproductions of Contract Documents including all Addenda, Change Orders, Field Orders, additional Drawing issued subsequent to the Effective Date of the Agreement, Engineer's clarifications and interpretations of the Contract Documents, progress reports and other Project related documents.
 - b. Keep an Observers Daily Report ("ODR"), ODR log book, a photographic schedule of the progress of the Work recording hours on the Site, weather conditions, Contractor and Subcontractor personnel and equipment, data relative to questions of extras or deductions, a list of visiting representatives of manufacturers, fabricators, Suppliers and distributors, daily observations of Work in progress, problems encountered, changed conditions, tests conducted, test procedures, test results and Materials received at the Site.
 - c. Record names, addresses and telephone numbers of the Contractor and all Subcontractors and all major Suppliers of materials and equipment.
7. Reports:
- a. Provide ODRs on a daily basis to GCDC-WWS via e-mail and first class mail with periodic written reports as required concerning progress of the Work and Contractor's compliance with the approved Progress Schedule and schedule of Shop Drawings submissions.

- b. Coordinate with Contractor in advance of scheduled major tests, inspections, or startup of equipment, plant processes, and other phases of the Work.
 - c. Provide a written report immediately to GCDC-WWS and Engineer upon the occurrence of any accident or incident involving personal injury or property damage. Carefully and immediately document and record all pertinent information related to the accident or incident including event sequence, times of day, Site and environmental conditions, injuries, property damage, witnesses and all other relevant information.
 - 8. Payment Applications - Review Applications for Payment with Contractor for accuracy and conformance to the approved Schedule of Values, actual Work completed and material and equipment delivered at the Site but not incorporated into the Work. Provide written comments and recommendations to GCDC-WWS.
 - 9. Certifications, Maintenance and Operations Manuals - During the Work, verify that operation and maintenance manuals, certificates of proper installation and startup and other pertinent data required to be assembled and furnished by Contractor are applicable to the items actually installed. Deliver this information to GCDC-WWS and Engineer for their review, comment and approval.
 - 10. Punch-List Review:
 - a. Before Engineer issues a Certificate of Substantial Completion, submit to Contractor a written punch list of items requiring completion or correction.
 - b. Conduct a final inspection of the Work in the presence of the Engineer, GCDC-WWS and Contractor and prepare an amended written punch list of items to be completed or corrected.
 - c. Verify that all items on the punch list and amended punch list have been completed or corrected and make recommendations to GCDC-WWS and Engineer concerning acceptance.
- C. Limitations of Authority of Resident Project Representative:
- 1. The Resident Project Representative shall not:

- a. Authorize any deviation from the Contract Documents or approve any substitution of materials or equipment;
- b. Undertake any of the responsibilities of Contractor, Subcontractors or Contractor's superintendent to schedule or expedite the Work;
- c. Advise or issue directions relative to any aspect of the means, methods, techniques, sequences or procedures of the Work, unless such is specifically addressed in the Contract Documents;
- d. Issue directions as to safety precautions and programs in connection with the Work; or,
- e. Take or not take any actions contrary to the best interests of GCDC-WWS.

SC-9.04 Authorized Variations in Work

- 1) Add the following to the end of Paragraph 9.04.A:

Any request for an adjustment in Contract Price or Contract Times must be in writing or said request is waived. A written denial or the absence of a written response with thirty (30) days to the request for an adjustment in Contract Price or Contract Time shall constitute the "Event" for purposes of the time requirements under Section 10.05.B.

ARTICLE 10 CHANGES IN THE WORK; CLAIMS

SC-10.05.B Notice

- 1) Replace the words "other party" with the word "Owner" in the first sentence of Paragraph 10.05.B.
- 2) Replace the words, "(but in no event later than 30 days)" with the words, "(but in no event later than fifteen (15) days)"; replace the words, "the other party to the Contract within 60 days" with the words, "the other party to the Contract within fifteen (15) days"; and the words, "the claimant within 30 days" with the words, "the claimant within fifteen (15) days" in Paragraph 10.05.B.
- 3) Delete the words "unless Engineer allows" in the sixth line of the second sentence of Paragraph 10.05.B and replace them with "upon written request by Contractor, the Engineer will specify the length of".

- 4) Add the word, “detailed” before the words, “supporting data” in the third sentence of Paragraph 10.05.B.

SC-10.05.C Engineer’s Action

- 1) Replace the number, “30” with the number, “15” in Paragraph 10.05.C.

SC-10.05.E

- 1) Delete Paragraph 10.05.E in its entirety and replace it with:

Engineer’s written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and contractor, unless Owner or Contractor invokes the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial, or Owner or Contractor provided written notice within 30 days preserving their right to invoke Article 16 at the conclusion of the contract. Failure to invoke Article 16 within 30 days of Engineer’s written notice under Paragraph 10.05.C or denial pursuant to 10.05.C.3 or 10.05.D and/or to provide written notice of reservation of rights to invoke Article 16 at the conclusion of the contract shall constitute a waiver of said right, and the actions of the Engineering shall be final and binding.

SC-10.05.G

- 1) Add new Paragraph 10.05.G as follows:

No action or inaction of the Owner shall constitute a waiver of any provision of Section 10.05 unless specified in writing. No claim that the parties have engaged in a course of conduct either during any prior contract shall act to modify or amend any provision within Paragraph 10.05.

ARTICLE 11 COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

SC-11.01 Cost of the Work

- 1) In Paragraph 11.01.A.5.f, delete the following:

(except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D)

- 2) Add new Paragraph 11.01.A.5.j as follows:

The cost of specific consideration for the indemnifications set forth in the Agreement.

ARTICLE 12 CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

SC-12.01 Change of Contract Price

- 1) Delete Paragraph 12.01.B.2 in its entirety and insert the following in its place:

Where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum and/or unit price which include an allowance for overhead and profit in accordance with Paragraph 12.01.C.2.

SC-12.03 Delays

- 1) Delete the words “abnormal weather conditions” from Paragraphs A and C.
- 2) Add the following sentence at the end of Paragraphs A and C:

“Abnormal weather conditions shall not be considered a basis for time extension. No time extension for delays shall be granted unless the delay was on the critical path for the project at the time the delay occurred and the request is substantiated by a critical path method (CPM) schedule based analysis.”

- 3) Insert the words “consequential damages of any kind whatsoever” after “claims, costs, losses,” in line 3 of Paragraph D.
- 4) Add the following new paragraph, 12.03F, to Article 12.03:

Avoidable delays in the prosecution or completion of the Work shall include all delays which might have been avoided by the exercise of care, prudence, foresight, or diligence on the part of Contractor.

Delays in the prosecution of parts of the Work, which may in themselves be unavoidable but do not necessarily prevent or delay the prosecution of other parts of the Work nor the completion of the whole Work within the time herein specified; reasonable loss of time resulting from the necessity of submitting drawings to ENGINEER for approval and from the makings of surveys, measurements, and inspections; and such interruptions as may occur in the prosecution of the work on account of the reasonable interference of other contractors employed by OWNER, which do not necessarily prevent the completion of the whole Work within the time herein specified, will be deemed avoidable delays within the meaning of this Agreement.

SC-12.04 Extensions

- 1) Add the following new paragraph, 12.04 Extensions, to Article 12:
 - A. If the work called for under this Agreement is not finished and completed by Contractor, in all parts and in accordance with all requirements, within the time specified for completion elsewhere in these Contract Documents, including extensions of time granted because of unavoidable delay; and if Contractor's failure or inability to finish the complete said Work as aforesaid within said time should be due, as determined by Owner or Engineer, to avoidable delay or delays, then in that event Owner, if it finds such to be in the best interests of Owner, may, but will not be required to, grant to Contractor an extension or extensions of time within which to finish and complete all said Work.
 - B. If an extension of time is granted due to avoidable delay(s), Contractor will be charged liquidated damages as provided for in these Supplementary Conditions of the Agreement.
 - C. In addition, if the time limit be so extended, Owner shall charge to Contractor, and may deduct from the final payment for the Work, all engineering and inspection expenses incurred by Owner in connection with the Work during the period of such extension or extensions, except that the cost of final inspections and preparation of final estimates will not be included in such charges.
 - D. The granting of any extension of time on account of delays which in the judgment of Owner are avoidable delays shall be in no way operate as a waiver on the part of Owner of its rights under this Agreement.
 - E. These Supplementary Conditions of the Agreement provide for the payment by Contractor to Owner of certain engineering and inspection expenses in the event Owner should grant to Contractor an extension or extensions of time because of avoidable delay. The amount of said engineering and inspection expenses shall be computed and determined on the basis of the charges as shown in Paragraphs SC-12.05, SC-12.06, and SC-12.-07.

SC-12.05 Liquidated Damages

- 1) Add the following new Paragraph 12.05:
 - A. Time is of the essence of this Agreement. If all of the Work is not finished and completed in accordance with all requirements of the

Agreement on or before the time specified for completion in the Contract Documents (extended by extensions of time granted because unavoidable delay), substantial damage will be sustained by GCDC-WWS. If, because of avoidable delays, GCDC-WWS should grant to Contractor an extension of time to finish and complete all the Work, it will be difficult and impracticable to determine the actual amount of damage which GCDC-WWS will sustain by reason of Contractor's failure to complete the Work within the time specified, as extended. In that event, Contractor shall pay to GCDC-WWS as liquidated damages, and not as a penalty, the sum as set forth in the Agreement for each and every calendar day required by Contractor to complete the Agreement. GCDC-WWS reserves the right to deduct the liquidated damages from the final payment, said amounts shall be additional to such other amounts as Contractor may be required to pay by virtue of other provisions of the Agreement because of the granted extensions of time necessitated by avoidable delays.

SC-12.06 Overtime and Excess Engineering

- 1) Add the following new Paragraph 12.06:
 - A. The regular eight (8) hour workday shall be the normal work hours for this Agreement. GCDC-WWS shall charge to Contractor and may deduct from the periodic and final payment for the Work all engineering and inspection expenses incurred by GCDC-WWS in connection with any overtime. For any overtime during the regular specified construction period beyond the regular eight (8) hour day and for any time worked on Saturday, Sunday or holidays, the charges or such personnel shall be determined from the costs as determined in SC 12.07.
 - B. During the Project, Contractor shall pay to GCDC-WWS the cost of engineering and observation expenses because of delays caused by or within the control of Contractor as determined by GCDC-WWS.
 - C. Contractor shall pay for all expenses associated with the review of any re-submittals more than the number allotted in the Submittal Procedures in the Technical Specifications. The amount of expenses shall be based on the actual cost incurred by GCDC-WWS and Engineer.

SC-12.07 Schedule of Charges

- 1) Add the following new Paragraph 12.07:

Overtime and excess engineering charges shall be based on Engineer's actual labor and expenses at the same rate GCDC-WWS is charged. Excess construction observation charges shall be based on GCDC-WWS's actual labor and expenses.

SC-12.08 Acceleration of Work to Meet Contract Completion Time

- 1) Add the following new paragraph, 12.08 Acceleration of Work to meet Contract Completion Time, to Article 12:
 - A. If at any time, prior to the expiration of the completion time as specified in the contract documents, including extensions of time granted because of unavoidable delays, it should appear to Owner or Engineer that Contractor will be unable to complete the work called for under this Agreement within the aforementioned times, then Owner shall have right to require Contractor to implement any and all measures necessary to accelerate the work in order to meet the specified completion times. In such event, Contractor shall immediately implement such remedial measures and shall bear all costs associated therewith.

ARTICLE 13 TESTS AND INSPECTION; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

SC-13.03 Tests and Inspections

- 1) Delete Paragraph 13.03.A. in its entirety and replace it with the following:

Contractor shall give GCDC-WWS and/or Engineer at least forty-eight (48) hours notice of readiness of the Work for all required inspections, tests or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- 2) Add new Paragraph 13.03.G as follows:

Notwithstanding anything herein to the contrary, GCDC-WWS may conduct its own tests to verify the quality of the Work. Contractor shall cooperate with GCDC-WWS and Engineer in connection with such tests.

SC-13.05 Owner May Stop Work

- 1) Add the following to the end of Paragraph 13.05.A:

If Owner refrains from exercising the right to order Contractor to stop the Work, or any portion thereof, Contractor shall not be permitted to employ the inaction of Owner as a basis to pursue a Claim against Owner for increased compensation and costs or a basis to defend against a Claim by Owner arising out of Work that does not conform to the Contract Documents or Work that is otherwise defective.

ARTICLE 14 PAYMENTS TO CONTRACTOR AND COMPLETION

SC-14.01 Schedule of Values

- 1) Delete Paragraph 14.01.A in its entirety and replace it with the following:

The Schedule of Values as provided in Paragraph 2.07.A will serve as the basis for progress payments. All progress payment requests must be submitted on standard GCDC-WWS payment request forms. Progress payments on account of Unit Price Work shall be based on the number of units completed.

SC-14.02 Progress Payments

- 1) Delete Paragraph 14.02.A.1 in its entirety, and replace it with the following:

At least forty-five (45) days before each progress payment is scheduled (but not more often than once a month), Contractor shall submit to GCDC-WWS for review an Application for Payment completed and signed by Contractor covering the Work completed as of the date of the Application for Payment and accompanied by the standard "Contractor's Declaration" form and such other supporting documentation as is required by the Contract Documents.

- 2) Delete Paragraph 14.02.A.3 in its entirety.
- 3) Replace "10 days" with "35 days" in Paragraph 14.02.C.1.

ARTICLE 16 DISPUTE RESOLUTION

SC-16.01 Methods and Procedures

- 1) Delete Paragraph 16.01 in its entirety and replace it with the following:

A. All claims, disputes and other matters in question between GCDC-WWS and Contractor arising out of, relating to the Contract Documents or the breach thereof (except for claims which have been waived by the making or acceptance of final payment as provided by Paragraph 14.09) shall be decided by a court having jurisdiction over such matters within Genesee County, Michigan.

ARTICLE 17 MISCELLANEOUS

SC-17.07 Archeological Finds

- 1) Add new Paragraph 17.07 as follows:

Notwithstanding anything herein to the contrary, if any archaeological artifacts are discovered during the Work, GCDC-WWS shall have all right, title and interest to such artifacts, and shall have the further right, during the term of the Agreement to examine or cause to have examined the Site for any such artifacts and to perform or have performed archaeological excavations and all other related activities to explore for, discover, recover, and remove such artifacts from the Site. In the event the archaeological examination and related activities delay the Work, Contractor shall be entitled to an extension of time to complete the Work equal to the number of days it is delayed.

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PART 4
TECHNICAL SPECIFICATIONS

SANITARY SEWER TECHNICAL SPECIFICATIONS

A. GENERAL AND ADMINISTRATIVE

- 1. Scope of Work.** These Sanitary Sewer Technical Specifications (“Sanitary Sewer Specifications”) are a supplement to and form a part of the Contract Documents and technically describe the nature of the Materials and the workmanship required to complete the Project. These Sanitary Sewer Specifications require that all gravity sanitary sewers be installed complete and ready in every respect for immediate use by GCDC-WWS. Any items not specifically required by or included in these Sanitary Sewer Specifications, but which are clearly necessary, are deemed to be included at no increase in the Contract Price. Contractor shall supply all labor, Materials and equipment required for the installation and testing of gravity sanitary sewers and appurtenances in full compliance with these Sanitary Sewer Specifications and the Contract Documents.

In resolving inconsistencies in two (2) or more provisions in the Contract Documents, preference shall be given in the following order of priority with subparagraph (i) given the highest priority and subparagraph (vii) given the lowest priority, so that, for example, if there are conflicting provisions in subparagraph (i) and subparagraph (iv) below, the provisions in subparagraph (i) shall control: (i) Agreement and any amendments thereto; (ii) Bid; (iii) Supplementary Conditions; (iv) Instruction to Bidders; (v) General Conditions; (vi) Standard Specifications; (vii) Standard Details; and (viii) Drawings.

All Work in connection with the installation of sanitary sewer pipe shall begin at the outlet end of the sanitary sewer and proceed upgrade. Contractor shall not make any connection to an existing sanitary sewer pipe until the sanitary sewer system proposed under the Contract Documents has been tested and approved by GCDC-WWS.

- 2. Shop Drawings.** Contractor shall deliver to GCDC-WWS and Engineer Shop Drawings or a material certification as set forth in Paragraph 6.17 of the General Conditions. The Engineer approved Shop Drawings shall be sent to Contractor, GCDC-WWS and Engineer. Contractor shall ensure that the manufacturer shall not ship any Materials until written approval of the Shop Drawings has been received from Engineer.

The following Materials require written approval of GCDC-WWS and Engineer prior to their installation: (i) sanitary sewer pipes, fittings and joint materials; (ii) manholes; (iii) manhole frames and manhole covers; and (iv) bedding material.

Where Materials are listed as being in conformance with these Sanitary Sewer Specifications, it shall mean the latest edition of the Genesee County Standard Specifications.

B. CONSTRUCTION MATERIALS

- 1. General.** All Materials and equipment supplied by Contractor shall be new and of first class ingredients and construction, designed, manufactured and guaranteed to comply with these Sanitary Sewer Specifications. Contractor shall deliver to GCDC-WWS a certificate of testing or actual test results certifying that the Materials to be used are in conformance with these Sanitary Sewer Specifications prior to using the Materials in the Work. All sanitary sewer pipe shall be clearly marked with the size and grade or class.

The Materials and labor shall be furnished and performed in accordance with customary and established construction practices and standards recognized by architects, engineers and similar professions or trades.

All Materials used in the installation of any sanitary sewer pipe shall be subject to inspections and tests as specified by ASTM, ANSI and AWWA regulations and these Sanitary Sewer Specifications. These tests and inspections shall be completed and paid for by Contractor. GCDC-WWS may subject any Materials to tests by an independent testing laboratory. Such tests, if conducted, shall be paid for by GCDC-WWS. The results of the tests conducted by GCDC-WWS shall govern the acceptance of the Materials.

- 2. PVC Sanitary Sewer Pipe.** All PVC sanitary sewer pipe less than 18" in diameter shall be a minimum of SDR-26 PVC and shall conform to ASTM D-3034-00 for PVC sanitary sewer pipe and ASTM D-1784-03 for PVC compounds. Pipe joints shall conform to ASTM D-3212-96a for push-on joints. Gaskets shall conform to ASTM F-477-02 regarding elastomeric seals for joining plastic pipe. The size and class of PVC sanitary sewer pipe shall be as specified on the Drawings.
- 3. Reinforced Concrete Sanitary Sewer Pipe**
 - (a) All sanitary sewer pipe eighteen inches (18") or larger in diameter, unless otherwise specified on the Drawings, shall be reinforced concrete sanitary sewer pipe, shall conform to ASTM C76-03 and contain joints which conform to ASTM C443-02.

- (b) The size and class of reinforced concrete sanitary sewer pipe shall be specified on the Drawings. The minimum class and wall thickness of reinforced concrete sanitary sewer pipe shall be Class III, Wall B (**unless otherwise specified on Drawings**).
- (c) Joints shall have a solid rubber compression gasket which shall conform to ASTM C443-02.

4. **Ductile Iron Sanitary Sewer Pipe.** All ductile iron sanitary sewer pipe shall conform to ANSI/AWWA C151/A21.51-09 and contain a cement mortar lining which shall conform to ANSI/AWWA C104/A21.4-13. All push on type rubber gasket joints shall conform to ANSI/AWWA C111/A21.11-12. The size and minimum class of the ductile iron sanitary sewer pipe shall be as specified on the Drawings.

The ductile iron sanitary sewer pipe fabricators shall be the ductile iron sanitary sewer pipe manufacturer unless otherwise approved by GCDC-WWS in writing. **All ductile iron pipe shall be manufactured in the United States of America.** All ductile iron pipe shall be cast, cleaned, cement-lined, coated, tested, and certified at a single manufacturing facility with all manufactured units contiguous to one another.

Polyethylene wrap shall be installed on all ductile iron sanitary sewer pipe, except for those located in manholes. The polyethylene wrap shall be cross-laminated, high density and manufactured of virgin polyethylene material and shall conform to the requirements of ASTM A-674-00. Raw materials used for the film, its strength, thickness, tube size or sheet width shall conform to ANSI/AWWA C105/A21.5.10. The size and class of ductile iron sanitary sewer pipe shall be as specified on the Drawings.

5. **Pre-Cast Manholes.** Pre-cast manholes shall conform to ASTM C478-03. Modified joint and premium rubber joints for pre-cast manholes shall conform to ASTM C443-02. All manhole sections shall be set on an eight inch (8") pre-cast slab for depths up to and including twenty feet (20') and a twelve inch (12") pre-cast slab for depths greater than twenty feet (20'). Integrally cast wall and slab sections shall be used.

All manhole steps shall be copolymer polypropylene plastic and installed in the manhole. Copolymer polypropylene steps shall be M.A. Industries PS-1-PF or American Step Co. ML-10 and contain a one-half inch (½") grade sixty (60) steel reinforcement or a GCDC-WWS approved alternate. Manhole steps shall be embedded in the riser and conical top sections wall a minimum distance of three inches (3") from the wall. The minimum clear distance of four inches (4") from the wall shall be measured from the point of embedment.

All manhole frames and covers shall be East Jordan Iron Works, Inc., No. 1040ZPT Type A solid cover, Neenah Foundry Company No. R-1916-F or a GCDC-WWS approved alternate.

All manhole frames shall have anchor base flange holes furnished for bolting the frames to the cone section. Manhole covers shall be equipped with four (4) stainless steel cap screws countersunk flush with the cover. The manhole frame and manhole cover shall be connected to the cone section by use of four (4) chromite coated five-eighths inch (5/8") thread studs with washers and nuts. Contractor shall field cut bolts to a proper length a maximum of one-half inch (1/2") above the nut. All manhole covers shall be stamped "SANITARY SEWER" and contain two inch (2") raised letters.

Pre-cast concrete grade rings shall be used to bring manhole covers to grade. The final adjustments shall be as determined by GCDC-WWS. The maximum adjustment allowed shall be nine inches (9"). The use of block or brick for adjustment shall not be permitted. Permissible grade ring sizes for manhole adjustment shall be three inches (3"), four inches (4") or six inches (6") as required to finish grade. A maximum of two (2) grade rings are allowed.

An exterior seal of Infi-Shield, Butyl or a GCDC-WWS approved alternate shall be installed to seal all manholes. Outside of road right-of-ways, Contractor shall use an approved one and one quarter inch (1 1/4") pre-formed butyl rubber sealant between grade rings, manhole frames and manhole sections. Within road right-of-ways, Contractor shall use mortar between grade rings, manhole frames and manhole sections.

All drop connections shall be external drop connections constructed of PVC pipe or ductile iron pipe and shall be used when the invert of the incoming sanitary sewer pipe is greater than thirty inches (30") above the invert of the outgoing sanitary sewer pipe.

Anchors for the drop connections shall be a five-eighth inch (5/8") re-rod epoxied in place and spaced vertically every twelve inches (12"). The rods shall be offset four inches (4") from each side of the sanitary sewer pipe. The rods shall be embedded three and one quarter inches (3 1/4") into the manhole. Additional anchoring shall be required if the sanitary sewer pipe is greater than eight inches (8") in diameter.

Future connections, when required by the Drawings, shall consist of a pre-cast hole in the manhole bottom section at the designated location. One (1) length of sanitary sewer pipe shall be installed and capped through this hole.

6. **Steel Casing Pipe.** All steel casing pipe shall meet the requirements of ASTM designation A-139-00 Grade B material and be of sufficient strength to meet the loading conditions of H-20 loading for pavements. Successive lengths of steel casing pipe shall be connected by continuous circumferential welds. Steel casing pipe diameter and wall thickness shall be as determined by the Agency having authority.

C. MATERIALS TESTING PRIOR TO INSTALLATION

All Materials used in the installation of gravity sanitary sewer pipe and appurtenances shall be subject to inspection and tests as specified by ASTM, ANSI and AWWA regulations. GCDC-WWS or Engineer may re-test any Materials supplied in connection with the Work by an independent testing laboratory. Such tests, if conducted, shall be paid for by GCDC-WWS. The results of the tests conducted by GCDC-WWS shall govern the acceptance of the Materials.

All Materials used in the installation of sanitary sewer pipe and appurtenances which are defective, of improper material or rejected by GCDC-WWS or Engineer shall be marked accordingly by GCDC-WWS or Engineer and be promptly removed from the Site by Contractor, at Contractor's sole expense.

D. CONSTRUCTION METHODS

1. **General.** The methods of construction shall generally be left to the discretion of Contractor provided, however, that these Sanitary Sewer Specifications are the minimum construction standards. In those municipalities where the municipality performs daily inspections or in those municipalities where GCDC-WWS or Engineer do not perform daily inspections, that municipality shall ensure that these Sanitary Sewer Specifications are met.

Contractor shall perform the Work to the alignment and grade shown on the Drawings. Contractor shall comply with the Contract Documents for general construction practices. Contractor shall comply with the County Road Commission requirements in the county where the Work is being performed in connection with graveling or re-graveling of contaminated roads.

Contractor shall comply with all applicable Laws and Regulations pertaining to underground construction, particularly the MIOSHA Regulations, P.A. 451 Part 91 Soil Erosion and Sedimentation Control and those acts pertaining to the deposit of excavated Materials in low lands,

wetlands, inland lakes and streams. Contractor shall also comply with all other Laws and Regulations.

2. **Trench Excavation.** Contractor shall conduct trench excavations in a safe and orderly manner in full compliance with the OSHA Regulations and the MIOSHA Regulations. Contractor shall defend, indemnify and hold harmless GCDC-WWS, Engineer and their designated representatives from and against any and all losses, costs, damages and liabilities due to the Contractor's failure to comply with the OSHA Regulations and the MIOSHA Regulations.

Trench excavation shall include clearing of the Site and the excavation to alignment and grade of all Materials necessary for the installation of the sanitary sewer pipe. Contractor shall deposit excavated material to minimize damages to trees, shrubs, drives, fences and other property at or adjacent to the Site so that it may be used as backfill when suitable material is encountered. Contractor shall reimburse the landowner for any damage or destruction to any of the foregoing. Unsuitable and surplus excavated material shall be disposed of by Contractor, at Contractor's sole expense. For excavation on easements or on road right-of-ways adjacent to private land, Contractor shall provide the private landowner with the first option to obtain the excess excavated material and Contractor shall provide GCDC-WWS with the second option to obtain the excess excavated material.

Prior to disposing of excavated material, Contractor shall obtain and pay for all necessary permits in connection therewith. Contractor shall comply with all of the requirements of Public Act 451 Part 91 (Soil Erosion and Sedimentation Control), Public Act 451 Part 301 (Inland Lakes and Streams) and any other Laws and Regulations having application thereto. Contractor shall defend, indemnify and hold harmless GCDC-WWS and Engineer from and against any and all losses, costs, damages or liabilities due to Contractor's failure or the failure of Contractor's Subcontractors and Suppliers to comply with any of the foregoing Laws and Regulations.

Contractor shall incorporate into the Unit Price Work all costs involved in the completion of the Work. Contractor shall not be entitled to additional compensation because of a change in ground conditions, unsuitable ground conditions, minor relocation of alignment, temporary sheeting, dewatering, undercutting of trench excavation or foundation strengthening.

For differing site conditions, refer to Article 4.03 of the General Conditions.

Any additional cost of boring, where noted on the Drawings, shall be included in the Contract Price and the Bid.

The bottom of the trench shall be excavated to a minimum depth of four inches (4") below the bottom of the sanitary sewer pipe barrel and this space refilled in accordance with the bedding and trench detail. The refill area shall be rounded to provide the lower one-third (1/3) of the sanitary sewer pipe with a satisfactory bearing area. The material placed under the haunch area shall be shovel sliced so the area is compacted. The cost of this undercutting and refill shall be included in the Unit Price Work for sanitary sewer pipe.

When ground water is encountered in the bottom of a trench, Contractor shall either dewater the trench or excavate the trench to a depth of six inches (6") below the bottom of the sanitary sewer pipe barrel and refill this area with a graded MDOT 6AA crushed limestone (A1) satisfactory to GCDC-WWS. All sanitary sewer pipe shall be installed in the trench only after the ground water has been completely removed to allow for the installation of the sanitary sewer pipe in a dry trench. The sanitary sewer pipe shall not be installed in water. The cost of the additional excavation, stone backfill and dewatering shall be included in the Unit Price Work for the sanitary sewer pipe. Any trench excavation that requires well pointing shall have the sanitary sewer pipe bedded in six inches (6") of graded MDOT 6AA crushed limestone (A1) or more as required to provide a stable trench bottom.

Contractor shall supply sheeting, shoring or bracing of trenches as necessary to prevent caving or sliding of trench walls. The sheeting shall not be removed below the top of the sanitary sewer pipe if the resulting slope of native soil increases the trench width to such an extent the load on the sanitary sewer pipe exceeds the safe field supporting strength of the sanitary sewer pipe and bedding material. Sheeting, shoring or bracing is included in the Work and the Contract Price.

When a trench box is used, the bottom of the trench box shall be installed within two feet (2') of the bottom of the excavation. When a movable trench box is used in place of sheeting or shoring, Contractor shall secure the installed sanitary sewer pipe to prevent sanitary sewer pipe movement when the trench box is moved.

3. **Over-Excavation.** Whenever the excavation is beyond the alignments and below the grades as shown on the Drawings, Contractor shall refill all such excavated space with MDOT 6AA crushed limestone (A1) as required and determined by GCDC-WWS or Engineer, at Contractor's sole expense. The areas beneath and around manholes or other concrete

structures excavated below grade shall be refilled and thoroughly compacted by Contractor as determined by GCDC-WWS or Engineer.

4. **Bearing Strengths.** The ground shall be excavated in open trenches at sufficient width to provide room within the excavation to install the sanitary sewer pipe to alignment and grade. The width of the trench is the single most important factor affecting the structural loading on an installed sanitary sewer. The width of the trench shall be measured at the top of the sewer barrel and shall not exceed the maximum trench width as set forth below.

<u>Sanitary Sewer Pipe Size</u>	<u>Maximum Trench Width</u>
8" – 12"	30"
15"- 18"	36"
> 21"	GCDC-WWS Approved

If the maximum trench width is exceeded, Contractor shall install concrete cradling or encasement or other bedding approved by GCDC-WWS or Engineer to support the added load of the backfill, at Contractor's sole expense.

All backfill material shall be assumed to be wet clay with an average weight of one hundred thirty (130) pounds per cubic foot. The factor of safety for all loading shall be 1.4.

5. **Sanitary Sewer Pipe Installation**

- (a) **General.** All sanitary sewer pipe and Materials shall be examined for defects by Contractor prior to being installed. All damaged or defective sanitary sewer pipe and Materials shall be removed immediately from the Site by Contractor, at Contractor's sole expense. The sanitary sewer pipe shall be free from all defects and foreign materials before and during installation. The sanitary sewer pipe shall be installed at the elevation specified on the Drawings. The bell-end of the sanitary sewer pipe shall be installed upgrade. All sanitary sewer pipe shall be completely connected to ensure passage of an air test. Any sanitary sewer pipe proposed to be installed with less than five feet (5') of cover shall require GCDC-WWS written approval, and in such event, GCDC-WWS shall determine whether insulation shall be used and the type of insulation to be used, which shall be installed by Contractor at Contractor's sole expense.

The full length of each section of sanitary sewer pipe shall rest solidly upon four inches (4") MDOT 6AA crushed limestone (A1) cushion with recesses only to accommodate pipe bells and joints.

Any sanitary sewer pipe that has its alignment, grade or joints disturbed after installation shall be promptly removed and re-installed by Contractor, at Contractor's sole expense.

The end of the sanitary sewer pipe shall be closed so that no water or foreign substances can enter the sanitary sewer pipe downstream during excavation or at any other time. Any section of sanitary sewer pipe found to be defective, either before or after installation, shall be replaced with new sanitary sewer pipe by Contractor, at Contractor's sole expense.

Where sanitary sewer pipes are installed along road right-of-ways, the alignment of the sanitary sewer pipe shall be parallel to the centerline of the roadway and at the distance as indicated on the Drawings. Where sanitary sewer pipe are shown crossing private property, the alignment of the sanitary sewer pipe shall be located as indicated on the Drawings and the installation of sanitary sewer pipe shall be performed within the easements provided to GCDC-WWS.

All sanitary sewer pipe shall be secured in place with approved backfill material properly compacted under the haunches. Sanitary sewer pipe, which does not allow a sufficient and uniform space for joints, shall be removed and replaced by Contractor with sanitary sewer pipe of proper dimensions to ensure such uniform space, at Contractor's sole expense. Contractor shall at all times prevent dirt from entering the joint space.

- (b) **Location of Sanitary Sewer Pipe and Manholes.** The location of sanitary sewer pipe and manhole structures, as shown on the Drawings, has been selected to provide the least possible interference with or the crossing of existing utilities. GCDC-WWS may make minor variations in the location of the sanitary sewer pipe and manhole structures to meet any conditions discovered. Contractor shall not receive additional compensation for the cost of such shifts in locations.
- (c) **Location of Underground Facilities.** Prior to submitting a Bid, prospective Bidders shall conduct a field survey to verify the locations of the Underground Facilities. The location of Underground Facilities, as shown on the Drawings, have been determined from the best available information, by surveys or from project record documents of utility companies. GCDC-WWS and Engineer shall not be liable for the possibility that during the Work, Underground Facilities, other than those shown, may be encountered or that the actual location of Underground Facilities

shown may be different from the locations provided by GCDC-WWS. At the locations where precise positions of the Underground Facilities are integral to the Work, Contractor shall verify the position of the Underground Facilities, at Contractor's sole expense.

- (d) **Protection of Underground Facilities.** Contractor shall give written notice to all persons or entities who own or use any Underground Facilities affected by the Work. Contractor shall maintain and protect the Underground Facilities during the Work and the cost of such protection shall be included in the Contract Price. If any Underground Facilities are blocked or interfered with by the Work, Contractor shall maintain such Underground Facilities in continuous operation and restore the Underground Facilities to at least the same condition as they were prior to the start of the Work, all at Contractor's sole expense. When storm drainage catch basins are located adjacent to a trench, Contractor shall ensure that foreign materials do not enter the drainage system. Contractor shall clean out catch basins and storm sewers during the Work and after completion of the Work.
- (e) **Sanitary Sewer Pipe and Fittings Installation.** All sanitary sewer pipe and fittings shall be handled so as to protect them from damage. Contractor shall carefully inspect all sanitary sewer pipe and all fittings before installation. Damaged or defective sanitary sewer pipe and fittings shall be promptly removed from the Site by Contractor, at Contractor's sole expense. Contractor shall not connect the sanitary sewer pipe with the existing sanitary sewer system until Contractor has received written approval from GCDC-WWS.
- (f) **Sanitary Sewer Pipe Separation.** The minimum horizontal separation between watermain pipes that carry potable water and sanitary sewer pipes or storm sewer pipes shall be ten feet (10'). The minimum vertical separation between watermain pipes that carry potable water and sanitary sewer pipes or storm sewer pipes shall be eighteen inches (18"). Wherever watermain pipes designated to carry potable water cross or are installed less than ten feet (10') horizontally or eighteen inches (18") vertically from existing or proposed sanitary sewer pipes or storm sewer pipes, Contractor shall take the following special precautions.
 - (i) **Horizontal Separation.** If conditions prevail which prevent a lateral separation of ten feet (10'), the sanitary sewer pipes may be installed closer than ten feet (10') to watermain pipe, provided the watermain pipe is installed in

a separate trench and at such an elevation so that the top of the sanitary sewer pipe is at least eighteen inches (18") below the bottom of the watermain pipe and MDEQ and GCDC-WWS written approval is obtained.

- (ii) **Vertical Separation.** Where a sanitary sewer pipe must cross a watermain pipe, a vertical separation of eighteen inches (18") from the two pipes shall be maintained. In making such crossings, a full length of sanitary sewer pipe shall be centered under the watermain pipe to be crossed so that the pipe joints are equidistant from the centerline of the watermain pipe. The minimum vertical separation shall be maintained for a distance of eight feet (8') each way of a watermain pipe being crossed. If a crossing cannot meet the eighteen inch (18") requirement, Contractor shall install a concrete cradle, at Contractor's sole expense, at the location of the mainline crossing.
- (iii) **Sanitary Sewer Pipe Material.** The sanitary sewer pipe shall be constructed of material approved by GCDC-WWS. The sanitary sewer pipe shall be supported to prevent its settling.
- (g) **Staking.** Contractor shall hire a land surveyor, licensed in the State of Michigan, to provide alignment, grade stakes and cut sheets, at Contractor's sole expense. The licensed surveyor shall provide grade stakes and cut sheets at all structures with a maximum of fifty foot (50') intervals between structures.
- (h) **Sanitary Sewer Pipe Bedding.** All sanitary sewer pipe bedding shall provide uniform and continuous support of the sanitary sewer pipe barrel and be installed so that the sanitary sewer pipe is true to alignment and grade. In no case shall the field supporting strength be less than the minimum crushing strength, plus the factor of safety of 1.4.

All sanitary sewer pipe shall be installed on an even firm bedding with recesses in the bedding for the bell of the sanitary sewer pipe. The sanitary sewer pipe shall be installed at the elevation specified on the Drawings. The bell-end of the sanitary sewer pipe shall be installed upgrade. All sanitary sewer pipes shall be securely connected to ensure passage of a hydrostatic air test.

After all sanitary sewer pipe has been brought to final grade and alignment, Contractor shall deposit and shovel slice or spade proper bedding material under the sanitary sewer pipe haunches.

Wyes shall be bedded with crushed stone to prevent shear loading. Crushed stone shall be placed from firm ground to the top of sanitary sewer pipe in areas excavated around manholes, bore pits and other wide trench areas as determined by GCDC-WWS or Engineer.

The bedding class and load factors to be used for situations not above described are as follows:

Class A-1 (Concrete Cradle)..... Bedding Factor = 2.8
Crushed Stone Encasement..... Bedding Factor = 2.2

Contractor shall comply with detail sheets for bedding requirements.

- 6. Backfilling Trenches.** Unless otherwise directed by GCDC-WWS or Engineer, the trench shall be backfilled promptly after the sanitary sewer pipe is installed, provided, however, that the trench shall not be backfilled until GCDC-WWS or Engineer has inspected the grade, alignment and pipe joints. A trench backfilled without the inspection of GCDC-WWS or Engineer shall be promptly re-excavated by Contractor, at Contractor's sole expense. In the case of concrete cradle or concrete encased bedding, the trench backfilling shall be delayed until the concrete has set sufficiently to support the backfill load.

(a) Method and Requirements of Backfilling. Contractor shall comply with the following methods and requirements of trench backfilling.

- (i)** Backfill areas to contours and elevations with unfrozen materials;
- (ii)** Systematically backfill to allow the maximum time for natural settlement;
- (iii)** Do not backfill over porous, wet, frozen or spongy subgrade material;
- (iv)** Place backfill material in continuous layers and compact in accordance with the schedule of backfilling in Paragraph D.6(d) hereof;

- (v) Place material in continuous layers as follows:
 - Subsoil Backfill: Maximum eight inch (8") compacted depth;
 - Structural Backfill: Maximum eight inch (8") compacted depth; and
 - Granular Backfill: Maximum eight inch (8") compacted depth;
 - (vi) Employ placement methods that do not disturb or damage other portions of the Work, including buried utility structures;
 - (vii) Maintain optimum moisture content of backfill materials to attain required compaction density;
 - (viii) Place or remove backfill evenly on each side of structures such as vaults, manholes and pump stations to prevent imposing unbalanced forces against the structure;
 - (ix) Create gradual grade changes; and
 - (x) Blend slope into level areas.
- (b) **Backfill Soil Material and Aggregates.** The analysis of backfill soil material and aggregates shall be performed in accordance with ASTM D2487, ASTM D4318 and ASTM C136.

The testing for non-piping related backfill shall be performed in accordance with ASTM D6938, ASTM D1557 and ASTM D6938.

The testing for all piping related backfill shall be in accordance with MDOT One Point Michigan Cone Test and MDOT One Point T-99 Test for all piping related backfill.

When the results of tests indicate backfill soil material and aggregates do not meet the specified requirements, the backfill soil material and aggregates shall be removed, re-tested, and re-deposited, at Contractor's sole expense.

Contractor shall prepare a compaction testing plan ("Compaction Testing Plan") which shall be submitted to GCDC-WWS or Engineer at the pre-construction meeting. The Compaction Testing Plan shall include the Compaction Tests Frequency. The frequency of Compaction Test shall meet the minimum testing

requirements of the agency having authority over any roadways and the following requirements:

- (i) Haunch Compaction Verification Testing shall be conducted four times in the first 1000 feet of pipe installation at locations at least 200 feet apart. During this initial installation period, the Contractor shall demonstrate use of means and methods that will be consistently used for the full length of the pipe installation to achieve Contract compaction limits. Contractor also shall be responsible for adjusting these means and methods as necessary to achieve Contract compaction limits where different conditions occur.
 - (1) Contractor shall use an ASTM accepted compaction testing methodology to perform Haunch Compaction Verification Testing of the area below the springline of the pipe. Testing methodology shall be submitted and approved by Engineer prior to being used in the field. Testing will be conducted by the Contractor's testing agency under the direction and oversight of the Engineer.
 - (2) The backfill material for the pipe in the work space area shall be placed and compacted using the same materials, equipment, and compaction effort as will be routinely used on other areas outside of the work space.
 - (3) Protective trench boxes, sheeting, bracing, or sloping will be required to comply with the applicable trench safety requirements required on the remainder of the project.
 - (4) The work space may be constructed on either side of the pipe at the discretion of the engineer.
 - (5) The construction of the individual work space on one side of the pipe, including all time and materials and safety provisions, shall be included at no additional cost to the Owner.
 - (6) In addition to initial Haunch Compaction Verification Testing, Engineer may require up to 20 additional Haunch Compaction Verification Tests be conducted at locations of his choosing. Examples of when these additional tests may be required include if, in the sole opinion of the Engineer, the Contractor makes significant changes to the backfill materials, or methods of placement and compaction or if surrounding soil conditions change. The time, materials, and safety provisions required for these

Haunch Compaction Verification Tests shall be at no additional cost to the Owner.

- (7) In the event that Haunch Compaction Verification testing fails, Contractor shall immediately adjust means and methods to achieve required compaction limits, re-compact area tested, and retest. Once revised means and methods are demonstrated to achieve compaction limits, they shall be implemented.
- (ii) In Green Belts (90% compaction required to springline, 85% compaction required from springline to surface), provide compaction tests every 1000 linear feet and at locations identified by the Engineer. Perform one compaction test every 2 feet above crown of pipe to surface with a minimum of 2 tests required.
- (iii) Within influence of road (95% compaction required), provide compaction tests every 500 linear feet and at locations identified by the Engineer and/or the Road Commission. Perform one compaction test every 2 feet above crown of pipe to surface with a minimum of 2 tests required.
- (iv) The first set of testing will take place in the initial stages of the project when no more than 200 lf of pipe has been placed. Tests need to be performed as the trench is being backfilled.
- (v) If compaction tests fail to meet the Contract compaction limit for pipe installation, the Contractor shall perform additional compaction to correct the problem and additional compaction testing as described above every 200 feet until the compaction criteria in Subparagraph 2 above has been satisfied. The Engineer has the right at any time to require compaction testing every 500 feet if he believes it is warranted.

Proof roll compacted fill surfaces under slabs-on-grade, and paving.

Compaction testing shall be performed by a certified materials testing company in the frequency, number and depths required to satisfy GCDC-WWS, Engineer and the agency having authority over the roadways, at Contractor's sole expense. Contractor shall not perform compaction testing after the trench has been backfilled.

Density reports shall be delivered to GCDC-WWS, Engineer and the agency having authority over the roadways by Contractor prior to final compaction testing and approval. In the event that any material testing fails, Contractor shall re-compact and re-test to achieve the required results, at Contractor's sole expense. All material test results shall be promptly delivered in writing to GCDC-WWS, Engineer and the agency having authority over the roadways. GCDC-WWS at its sole expense may perform or have performed density tests in addition to those provided by Contractor. Upon the request of GCDC-WWS, Engineer or the agency having authority over the roadways, Contractor shall open and provide a safe trench for testing.

(c) **Types or Classification of Backfill Material.** The following are the different types or classifications of backfill material which may be used in the Work according to the schedule of backfilling set forth in Paragraph D.6(d) below.

(i) **S1 (Excavated and Re-Used Material).**

- (1) Graded.
- (2) Free of lumps larger than three inches (3"), rocks larger than two inches (2") and debris.
- (3) Conform to ASTM-D2487.

(ii) **S2 (Imported Borrow).**

- (1) Graded.
- (2) Free of lumps larger than three inches (3"), rocks larger than two inches (2") and debris.
- (3) Conform to ASTM-D2487.

(iii) **S3 (Excavated and Re-Used Material).**

- (1) Graded.
- (2) Free of roots, rocks larger than one-half inch (1/2"), subsoil, debris, large weeds and foreign matter.
- (3) Conform to ASTM-D2487.

(iv) **S4 (Imported Borrow).**

- (1) Friable Loam.
- (2) Reasonably free of roots, rocks larger than one-half inch (1/2"), subsoil, debris, large weeds and foreign matter.
- (3) Acidity range (pH) of 5.5 to 7.5.
- (4) Contain a minimum of four percent (4%) and maximum of twenty-five percent (25%) inorganic matter.

- (5) Limit decaying matter to ten percent (10%) of total content by volume.
- (6) Conform to ASTM-D2487.
- (v) **(Topsoil).**
 - (1) Refer to G.RESTORATION 6.Surface Restoration
- (vi) **A1 (Gravel).**
 - (1) Conform to MDOT Series 6AA Limestone.
- (vii) **A2 (Gravel).**
 - (1) Conform to MDOT Series 22A Limestone.
- (viii) **A3 (Gravel).**
 - (1) Conform to MDOT 23A limestone and GCRC special provisions for 23A modified limestone.
- (ix) **A4 (Pea Gravel).**
 - (1) Natural Stone; free of clay, shale, organic matter; graded in accordance with ASTM C136 to the following limits:

Minimum Size: one-quarter inch (1/4")
Maximum Size: five-eighths inch (5/8")
- (x) **A5 (Sand).**
 - (1) Conform to MDOT Class II material.

(d) Schedule of Backfilling

- (i) **Under Manholes.** Backfill Type A1 thickness as noted on the Standard Details, compacted to ninety-five percent (95%) of the material unit weight by modified proctor.
- (ii) **Outside Paved Areas/Outside Influence of Roadway, Driveways, Sidewalks.**
 - (1) The trench shall be backfilled to twelve inches (12") over the barrel of the sanitary sewer pipe with clean low void sand (A5) and/or MDOT 6AA crushed limestone (A1) as required and satisfactory to GCDC-WWS and Engineer. The backfill shall be shovel sliced or compacted under the haunches of the sanitary sewer pipe to provide full-length sanitary sewer pipe support. Contractor shall

comply with the Specifications in connection therewith.

- (2) The remainder of the trench shall be backfilled with material free of debris, organic material or large rocks (S1, S2, or as specified in the Contract Documents placed and compacted in eight inch (8") lifts to ninety percent (90%) of the material unit weight by modified proctor). Excavated material may be used for backfill unless disallowed by GCDC-WWS and Engineer. The trench shall be slightly mounded to allow for settlement.

(iii) Under Paved Areas/Within Influence of Roadway, Drives, Sidewalks.

- (1) The trench shall be backfilled to twelve inches (12") over the barrel of the pipe with clean low void sand (A5) and/or MDOT 6AA crushed limestone (A1) as required, satisfactory to GCDC-WWS, Engineer and the agency having authority over the roadways.

The backfill shall be shovel sliced or compacted under the haunches of the sanitary sewer pipe to provide full-length sanitary sewer pipe support. Contractor shall comply with the Standard Details in connection therewith.

- (2) All trench excavation, within a one-on-one influence of a roadway, at all road and drive crossings or as otherwise noted on the Drawings, shall be backfilled and compacted to ninety-five percent (95%) of the material unit weight by modified proctor with MDOT Class II Sand (A5) in twelve inch (12") lifts and in accordance with the Compaction Testing Plan. The compaction requirement mentioned below also includes sanitary sewer pipe service leads, unless bored.

- (3) Twelve inches (12") of MDOT 21AA limestone (A2) shall be compacted to ninety-five percent (95%) of the material unit weight by modified proctor under areas to be concrete or ninety-eight (98%) of the material unit weight by modified proctor under areas to be paved or gravel driveways. Density tests shall be performed by a

certified materials testing company, at Contractor's sole expense. In the event that any material fails the density test, Contractor shall recompact and re-test to achieve the required result, at Contractor's sole expense.

(iv) Backfill to Correct Over-Excavation.

- (1) Backfill Type A1, to required elevation.
- (2) Place in eight inch (8") thick lifts, each lift compacted to ninety-five percent (95%) of the material unit weight by modified proctor.

(v) Granular Trench Backfill.

- (1) Backfill Type A5 to required elevation.
- (2) Place in maximum eight inch (8") thick lifts, each lift compacted to ninety-five percent (95%) of the material unit weight by modified proctor.

7. Bore and Jacking

- (a) General.** All Work under pavements, railroads or where shown on the Drawings shall be completed in accordance with this Paragraph D.7. Contractor shall comply with the applicable County Road Commission's specifications and requirements regarding sanitary sewer pipe installation within the limits of the county road right-of-ways in the county where the Work is being performed here-under. For Work under State of Michigan highways jurisdiction, Contractor shall comply with all MDOT requirements and standards. For work under railroad jurisdiction, Contractor shall comply with all railroad requirements and standards.
- (b) Steel Casing Pipe.** The steel casing pipe shall be of sufficient strength to meet the loading conditions of H-20 loading for pavements, Cooper D-72 loading for railroad crossings and shall meet the minimum required wall thickness set forth in the Standard Details. Contractor shall comply with the Drawings for areas under railroads and other affected jurisdictions which may require greater thickness.

All Work performed beneath existing structures, across railroad right-of-ways, and under pavements shall be performed in accordance with the requirements of the parties or governmental agencies which own or have jurisdiction over these locations.

Contractor shall give written notice to the representatives of all affected parties and governmental agencies prior to starting the Work and shall meet all requirements of the parties and governmental agencies in regard to methods of construction and the safety precautions to be taken in performing the Work, all at Contractor's sole expense.

A suitable approach trench shall be opened adjacent to the toe of the slope of the embankment and shall be long enough and wide enough to provide sufficient working room for the steel casing pipe and sanitary sewer pipe to be installed. Guide timbers or rails shall be installed in the bottom of the trench to keep the installation of the steel casing pipe online. Heavy timber backstop supports shall be installed at the rear of the trench "pushing frame" and furnished to fit or match the end of the steel casing pipe to be jacked so the pressure of the jacks are evenly distributed over the end of the steel casing pipe.

Two (2) hydraulic jacks of sufficient power shall be used to apply pushing or jacking pressure to the steel casing pipe. The excavation at the top and sides of the bored area shall be less than one inch (1") greater than the outside periphery of the steel casing pipe. The bored area shall be accurately cut to the alignment as shown on the Drawings. Adjoining sections of steel casing pipe shall be welded with a continuous weld. Steel casing pipe shall be jacked up grade where possible. Any undercutting at the bore pit shall be backfilled with MDOT 6AA crushed limestone (A1). MDOT 6AA crushed limestone (A1) shall be placed from the bottom of the bore pit to the top of the steel casing pipe in bore pits. The gradation of the crushed stone shall be approved by GCDC-WWS and Engineer. Concrete bedding or encasement may be required as determined by GCDC-WWS and Engineer at depths requiring special pipe support, at Contractor's sole expense.

Flowable concrete fill shall be pumped between the sanitary sewer pipe and the steel casing pipe the entire length of the bore. The concrete fill shall conform to the following mixture or a GCDC-WWS approved alternate.

Sand	1,640 lbs/CY	\	
Geo Foam (W-304)	7.5 CU FT	\	1
Cement	693 lbs/CY	/	CY
Water	45 lbs/CY	/	
Compressive Strength	1,500 psi @ 28 days	/	

The aforementioned Materials shall conform to the MDOT Standard Specifications for Construction.

For roadways maintained by MDOT, the steel casing pipe shall begin thirty feet (30') from the edge of pavement in areas where the posted traffic speed is at or above forty-five miles per hour (45 MPH). The steel casing pipe shall begin twenty feet (20') from the edge of the pavement where the posted traffic speed is below forty-five miles per hour (45 MPH). Contractor shall comply with the requirements of MDOT Standard Specifications for Construction in connection with the installation of steel casing pipe within MDOT right-of-ways. For all other road right-of-ways, the steel casing pipe shall begin ten feet (10') from the edge of the pavement on roads with a shoulder and/or ditch and the steel casing pipe shall begin five feet (5') from the edge of the pavement on roads with a curb and gutter.

After the bore is augered, the grade shall be tested for slope by pouring water through the steel casing pipe. This test shall be performed in the presence of GCDC-WWS. Any steel casing pipe with backfall or not bored at the appropriate depth, as determined by GCDC-WWS or Engineer, shall be rejected and a new steel casing pipe installed until satisfactory testing results are achieved as determined by GCDC-WWS, all at Contractor's sole expense. Steel casing pipe which is rejected shall be abandoned and filled with flowable fill. The steel casing pipe shall be re-bored, at Contractor's sole expense, at an adjacent location as approved by GCDC-WWS.

8. **Surplus and Unsuitable Excavated Material.** All excavated material shall be deposited so that it does not interfere with the Work. Surplus and unsuitable excavated material not used in the Work shall be properly and lawfully disposed of by Contractor, at Contractor's sole expense. The excavated non-contaminated material shall first be offered to adjacent private landowners. If such adjacent private landowners do not accept the excavated non-contaminated materials, Contractor offer the same to GCDC-WWS. If surplus and unsuitable non-contaminated material is to be deposited onto private land, Contractor shall obtain written consent from the private landowner agreeing to such deposit and provide GCDC-WWS and Engineer with a certified copy of such agreement. Prior to depositing any surplus and non-contaminated excavated material, Contractor shall obtain a Soil Erosion and Sedimentation Control permit. The deposit of surplus and unsuitable excavated material shall comply with all Laws and Regulations.

9. **Ground Water Wells and/or Well Points.** Contractor shall perform all ditching, pumping, well pointing, bailing, build all drains and perform all other activities necessary to keep the trench, bore pit and shaft area free and clear of ground water, sewage and storm water at all times during the Work. Where the trench, bore pit or shaft areas are wet and suitable construction conditions cannot be obtained by other methods, Contractor shall install and operate a pumping system connected with wells and/or well points to effectively drain the same, at Contractor's sole expense. No manholes or sanitary sewer pipe shall be installed in water. All water pumped or drained from the Site shall be disposed of in a manner satisfactory to GCDC-WWS and all governmental agencies having jurisdiction, without damage to property or to other portions of the Work. Contractor shall use its best efforts to protect the Site against flooding and in connection therewith Contractor shall defend, indemnify and hold harmless GCDC-WWS and Engineer from and against all losses, costs, damages and expenses for Contractor's failure to use its best efforts to protect the Site against flooding. All wells and/or well points shall be removed by Contractor after the Work is completed and all voids filled by Contractor in accordance with all Laws and Regulations, at Contractor's sole expense.

E. CONNECTION FOR SERVICE RISERS

1. **General.** Service risers for properties serviced by sanitary sewer pipes shall be as provided in the main sewers as shown on the Drawings. The exact location of the service risers shall be determined by GCDC-WWS in the field. The service risers shall extend from the sanitary sewer pipe to a property line or easement line for the purpose of providing sanitary sewer service. This includes boring a roadway to serve properties on the opposite side of the roadway where sanitary sewer pipe is being installed.

All service riser openings on PVC mainline sanitary sewer pipe shall be wye branches with the outlet being six inches (6") in internal diameter. Tees or saddles shall not be used. All service riser openings in concrete sanitary sewer pipe shall be cast in place with the shape, size, and dimension of the opening corresponding to the bell end of a standard sewer pipe six inches (6") in internal diameter.

All service risers shall be six inches (6") in diameter. In all cases, a minimum of one pipe length of sewer connection shall be extended from the sanitary sewer pipe opening or from the service riser pipe.

Where possible, the service connections shall be separated by one (1) length of mainline pipe or a minimum of 5', rather than butting two (2) wyes together.

Contractor shall install the service risers at a sufficient depth to service any building floor below grade if the mainline sewer has sufficient depth. Where feasible, service risers shall be installed at a minimum depth of eight feet (8') to ten feet (10') at the property line.

2. **Material.** All service risers shall be PVC and conform to ASTM D-3034-00. The minimum sanitary sewer pipe wall thickness shall be SDR-26. All sanitary sewer pipes shall have a "home" mark. Joints shall be of the elastomeric gasket push-on type and conform to ASTM D-3212-96a.
3. **Installation.** The location of all service risers shall be marked with a two inch (2") by four inch (4") by fourteen foot (14') wood marker along with a three-eighths inch (3/8") by twelve inch (12") steel rod attached to such wood marker, one foot (1') below the ground surface, along with a GPS or conventional witness points or a GCDC-WWS approved alternate supplied to GCDC-WWS. Such wood marker shall extend from the invert of the service riser to a minimum of four feet (4') above finish grade. The service riser shall terminate within one foot (1') of the property line with an airtight plug. Service risers within easements shall be extended a minimum of one (1) pipe length from the mainline sewer or to the edge of the easement, whichever is longer.

Contractor shall measure and keep a record in spreadsheet format at all manhole and sewer opening locations by measurement to the nearest downstream manhole and length of service riser installed at each sewer opening. All manhole locations shall be witnessed by at least two (2) ties to existing topographical features. This spreadsheet shall be delivered to GCDC-WWS and Engineer on a monthly basis, along with the progress payment applications during the Work. When constructing sanitary sewer connections in wet ground, Contractor shall place a bend in the service riser at the property end of the connection and install enough service risers to bring the connection above the natural ground water level which shall be approved in writing by GCDC-WWS and Engineer.

When the invert of the sanitary sewer pipe is in excess of fourteen feet (14'), the portion of the service riser shall be installed vertically to elevate the service riser connection to a point approximately ten feet (10') below the proposed grade. All service riser connections shall be installed in accordance with the Standard Details and Specifications.

All service risers shall be plugged at the end with PVC screw type stoppers or be glued on capable of withstanding the air test described in Paragraph F below. The service riser plugs may be blocked with concrete, but the ends of the service riser plugs shall not be encased in concrete.

F. FIELD PERFORMANCE AND ACCEPTANCE

- 1. General.** All six inch (6") through twenty-one inch (21") diameter sanitary sewer pipes and service risers shall be tested for integrity by using an air test thirty (30) days after installation of the sanitary sewer pipe and thirty (30) days after the dewatering operations are terminated. The air test shall comply with the test procedures described in ASTM C924-02 and 969-02. All sanitary sewer pipes and service risers shall be tested for infiltration and shall be visually inspected for straightness, cleanliness and shall be clear of all obstructions. All PVC sanitary sewer pipe shall pass an appropriate size mandrel. All sanitary sewer pipe twenty-four inches (24") in diameter and larger shall be field tested for infiltration by using a V-notched weir and shall be visually inspected by GCDC-WWS.

All testing apparatus shall be furnished and installed by Contractor, as directed by GCDC-WWS, at Contractor's sole expense. All pipe joints shall be free of leakage. All PVC sanitary sewer pipe shall have a mandrel test performed and witnessed by GCDC-WWS. All sanitary sewer pipe shall be televised and witnessed by GCDC-WWS.

- 2. Preparation and Testing of the Sanitary Sewer Pipe.** Contractor shall preliminarily test the sanitary sewer pipe before contacting GCDC-WWS for the infiltration, mandrel and air tests described herein. Contractor shall clean the sanitary sewer pipe prior to testing to wet the sanitary sewer pipe surface and eliminate all debris.

- (a) Air Test.** Contractor shall conduct the air test in the presence of GCDC-WWS as follows. Contractor shall determine the test time for the section of the sanitary sewer pipe using Table 1 below. Contractor shall plug all openings in the sanitary sewer pipe to be tested. Contractor shall add air until the internal pressure of the sanitary sewer pipe is raised to at least four (4.0) pounds per square inch. After the internal pressure of four (4.0) pounds per square inch is reached, Contractor shall allow the air pressure to stabilize which usually takes from two (2) to five (5) minutes, depending on the sanitary sewer pipe size. When the air pressure has stabilized and is at or above the starting test pressure of three and one-half (3.5) pounds per square inch, Contractor shall start the air test. If the air pressure drops more than one (1.0) pound per square inch during the test period, the sanitary sewer pipe has failed the air test. If a one (1.0) pound per square inch drop does not occur during the test period, the sanitary sewer pipe has passed the air test. Table 1 below shows the required test periods, T (time), in minutes/one hundred feet (100') of sanitary sewer pipe for each nominal sanitary sewer pipe size. If the section of sanitary sewer pipe to be tested includes more than one sanitary sewer pipe size,

GCDC-WWS shall calculate the test period for each sanitary sewer pipe size and add the test periods to arrive at the total test period.

TABLE 1: MINIMUM TEST PERIODS FOR VARIOUS SANITARY SEWER PIPE SIZES

Nominal Sanitary Sewer Pipe Size	T (Time) Minutes/100 Feet
4"	0.5
6"	0.7
8"	1.2
10"	1.5
12"	1.8
15"	2.1
18"	2.4
21"	3.0

(b) **Infiltration Test.** The maximum allowable infiltration for PVC sanitary sewer pipe shall be zero (0) gallons per mile per inch diameter of sanitary sewer pipe for a twenty-four (24) hour day. The maximum allowable infiltration for concrete sanitary sewer pipe shall be one-hundred (100) gallons per mile per inch diameter of sanitary sewer pipe for a twenty-four (24) hour day. The sanitary sewer pipe shall be tested with a v-notch weir. The maximum allowable length of sanitary sewer to be tested at one time is 1200 feet.

(c) **Mandrel Test.** Contractor shall furnish all equipment and personnel to conduct a mandrel test. The mandrel test shall be conducted by Contractor under the supervision of GCDC-WWS and Engineer. A mandrel of a dimension specified by GCDC-WWS and Engineer shall be pulled through the sanitary sewer pipe to measure pipe deflection. The ability of the mandrel to pass through the sanitary sewer pipe shall be used to determine the status of the sanitary sewer pipe.

Prior to performing the mandrel test Contractor shall ensure that the sanitary sewer pipe shall have been: (i) installed for at least thirty (30) days; (ii) flushed and cleaned; and (iii) threaded with the pull line. The physical dimensions of the test section of the sanitary sewer pipe shall be measured in order to ascertain an appropriate value from the Mandrel Dimension Table set forth below. The mandrel diameter shall be checked to ensure it

complies with the value from the Mandrel Dimension Table set forth below.

Contractor shall securely attach the mandrel to both the pull line and the tag-line. Contractor shall smoothly and evenly pull the mandrel through the sanitary sewer pipe (by hand). If the gauge stops lightly, Contractor shall pull on the sanitary sewer pipe to determine if it will clear the obstruction. If it appears the mandrel will not go forward, Contractor shall pull back out the mandrel and the distance to the obstruction shall be recorded using the length of back-pull line as a gauge.

The procedure shall be considered complete (i.e., the mandrel test satisfied) when the mandrel smoothly passes through the sanitary sewer pipe. If the mandrel does not smoothly pass through the sanitary sewer pipe, the sanitary sewer pipe shall be repaired by Contractor, using approved methods and the test repeated until such time that a satisfactory test result is obtained.

**MANDREL MINIMUM DIMENSION TABLE
FOR
PLASTIC SANITARY SEWERS
Based on ASTM F 679
Specification Dimension (in) for Mandrel to pass through Plastic Sewer Line**

Pipe Diameter (D)	4	6	8	10	12	15	18	21	24
Base (ID)	3.902	5.853	7.853	9.811	11.684	14.295	17.054	23.430	14.000
Base ID Fraction	3 14/16	5 14/16	7 14/16	9 13/16	11 11/16	14 5/16	17 1/16	23 7/16	14
Mandrel Diameter	3.707	5.560	7.460	9.320	11.100	13.580	16.201	22.259	13.300
Mandrel D. Fraction	3 11/16	5 9/16	7 7/16	9 5/16	11 2/16	13 9/16	16 3/16	22 4/16	13 5/16

- (d) **Televising.** After completion of the Work, Contractor shall provide to GCDC-WWS a video of the entire sanitary sewer pipe system once it has been approved by Engineer. The video shall conform to industry standards and practices for sanitary sewer system videotaping. Contractor shall promptly correct any deficiencies in the sanitary sewer pipe system as revealed by the videotape, at Contractor's sole expense.

G. RESTORATION

1. **General.** All disturbed areas on the Site shall be completely and promptly restored by Contractor in strict compliance with the GCDC-WWS Soil Erosion and Sedimentation Specifications and to the reasonable

satisfaction of GCDC-WWS, GCDC-SWM, MDOT, the local municipality and the landowner. All ground surfaces shall be restored to at least their original condition prior to final approval, at Contractor's sole expense. All costs for the cleanup, restoration work and other operations including, but not limited to, construction signage, street sweeping and maintaining existing utilities are included in the Contract Price.

2. **Protection and Restoration of Property.** Contractor represents, warrants and covenants to GCDC-WWS that Contractor shall not damage any trees, fences, culverts, bridges, pavements, driveways, sidewalks, Underground Facilities, electric lines or appurtenances thereof or any public or private property along or adjacent to the Site. Contractor shall give written notice to GCDC-WWS, the authorized representatives of any public service entity and any person at least forty-eight (48) hours prior to beginning any Work that may damage, interfere or affect the operation or use of their property or facilities. Contractor shall be responsible for all damage to property as well as for all damages, losses, costs and expenses arising from any act, omission, neglect or misconduct in the manner of executing the Work, due to the non-execution of the Work or due to defective Work or Materials. When and where any damage is done to public or private property, Contractor shall promptly restore such property to a condition at least as good as existed before such damage and injury was done and Contractor shall promptly repair such damage or injury in an acceptable manner to GCDC-WWS and the injured party, all at Contractor's sole expense.
3. **Driveways and Sidewalks.** All backfill shall be compacted granular material MDOT Class II (A5) backfill and shall be used at all driveways, parking areas, and under sidewalks, placed and compacted in accordance with the Compaction Testing Plan.

Twelve inches (12") of MDOT 21AA limestone (A2) shall be compacted to ninety-five percent (95%) of the material unit weight by modified proctor under areas to be concrete or ninety-eight (98%) of the material unit weight by modified proctor under areas to be paved or gravel driveways. Density tests shall be performed by a certified materials testing company, at Contractor's sole expense. In the event that any material fails the density test, Contractor shall recompact and re-test to achieve the required result, at Contractor's sole expense.

All edges broken from driveways and sidewalks shall be sawed or cut off at right angles to the driveway or sidewalk and replaced by Contractor, which shall be approved by GCDC-WWS or Engineer. Paved drives cut or broken within five feet (5') from a joint shall be removed and replaced to the joint by Contractor, at Contractor's sole expense.

Contractor shall provide temporary gravel driveways for those driveways disturbed during the Work, at Contractor's sole expense. Contractor shall ensure that all driveways are accessible during the Work, unless otherwise approved by GCDC-WWS in writing. These temporary gravel driveways shall be maintained by Contractor until the driveways have been paved.

All driveways and sidewalks shall be replaced in full sections and of the same material and thickness as the existing material, except that the minimum depth of compacted gravel in gravel driveways shall be twelve inches (12") over the entire trench area.

4. **Roadways.** If it is determined by the agency having authority over the roadways that gravel roadways have become contaminated during the Work, Contractor shall promptly repair the gravel roadway in accordance with the requirements and specifications of the agency having authority over the roadways, at Contractor's sole expense. For areas where the road gravel is removed because of the Work, all labor and Materials shall meet the requirements and specifications of the agency having authority over the roadways.

For areas where the trench is in the roadway or within a one on one influence, all backfill shall be MDOT Class II Sand backfill (A5) in accordance with the schedule of backfilling in Paragraph D.6(d) above. The sand backfill shall extend from the foreslope of ditch to foreslope or ditch or for curb and gutter sections shall be extended five feet (5') from the outside edge of the curb. All shoulders shall be re-graveled in accordance with the agency having authority over the roadways.

When open cutting of roadways are part of the Work, Contractor shall obtain the approval from and comply with all the requirements and specifications of the agency having authority over the roadways and GCDC-WWS. Contractor shall replace the roadway surface with approved methods and Materials in accordance with the agency having authority over the roadways, at Contractor's sole expense.

For gravel shoulders contaminated by the Work, Contractor shall remove the contaminated gravel and re-gravel the shoulders in accordance with the agency having authority over the roadways. All labor and Materials shall meet the requirements and specifications of the agency having authority over the roadways. Contractor shall remove and dispose of contaminated gravel shoulders in accordance with all Laws and Regulations, at Contractor's sole expense.

5. **Trees.** Contractor shall give written notice to all affected private landowners prior to the removal of trees within the public right-of-ways or easements. All trees in public right-of-ways or easements that are not to

be removed shall be protected by Contractor, including from the operations of its Subcontractors and Suppliers. Contractor shall defend, indemnify and hold harmless the private landowners from and against any damages, losses, costs and expenses in connection with any trees wrongfully damaged or removed by Contractor or its Subcontractors and Suppliers.

All trimming or repair to trees shall be done by a licensed arborist.

The cost of tree removal, tree replacement, or tunnel auger operations shall be included in the Unit Price Work per foot for open cut sanitary sewer pipe and shall not be paid for separately, unless otherwise provided in the Bid.

6. **Surface Restoration.** The surface shall be rough graded within two hundred feet (200') of the excavation immediately after completion of the Work. The final grade of the surface shall eliminate all uneven or low spots. Contractor shall remove all debris, roots, branches, and stones in excess of one-half inch (½") in size. The rough grade shall be scarified to a depth of three inches (3") where the topsoil is scheduled to be placed. The topsoil shall be placed to a nominal depth of four inches (4") and placed during dry weather.

The composition of the topsoil shall be screened, fertile, friable, free draining, loam or silt loam soil. The topsoil shall be free of subsoil or soils of a mixed textural class and shall not contain rocks or stones larger than one-half inch (½") in diameter. The topsoil shall not contain any contaminated substances or impurities such as roots, brush, weeds, slag, cinders, ash, trash, herbicides or any other substances detrimental to vegetative growth. The topsoil shall be free of contamination by heavy metals, including lead, zinc and any other materials which may be toxic to seedlings or established grass. Notwithstanding anything herein to the contrary, topsoil obtained from a location different from the Site shall be submitted by Contractor to GCDC-WWS for approval prior to its use.

The moisture content of the topsoil shall not exceed six percent (6%), and the topsoil shall conform to the following tables.

Topsoil Guidelines

Soluble Salts (DS/m or mmho/cm)	pH	Sand (%)	Silt (%)	Clay (%)	Texture Class*	Organic Matter (%)	% Coarse fragments (>2 mm in diameter)**	Sodium Adsorption Ratio (SAR)
<2	5.5 to 7.5	<70	<70	<30	L, SiL	≥ 2.0	≤ 2	< 3 for any Texture

*L = loam; SiL = Silt Loam

**This guideline also includes no fragments larger than one-half inch (½") in diameter.

Nutrients

Electrical Conductivity 1:2.5 (w/v) Extract	<1500 us/cm
Nitrogen	>0.2% (w/w)
Extractable Phosphorus	> 45 mg/Kg
Extractable Potassium	> 240 mg/Kg
Extractable Magnesium	> 80 mg/Kg

Contractor shall fine grade the topsoil, maintain the profiles and contours of the rough grade and insure positive drainage with respect to surface run-off. The final elevation shall be at the proposed grades and cross sections in accordance with the Drawings.

Contractor shall remove any roots, weeds, rocks and all foreign material while spreading the topsoil. Contractor shall manually spread the topsoil when close to plants, buildings, fences and other structures and improvements to prevent any damage to them. Contractor shall roll the topsoil and any surplus subsoil and topsoil shall be removed from the Site. Contractor shall then rake the topsoil until smooth.

Contractor shall apply fertilizer (12-12-12 or 20-10-10) at the rate of two hundred forty (240) pounds per acre after the topsoil has been raked. Contractor shall mix the fertilizer thoroughly into the upper two inches (2") of the topsoil and lightly water the topsoil to aid in the dissipation of the fertilizer.

Contractor shall use its best efforts to match the existing lawn and/or vegetation. Contractor shall seed per GCDC-WWS Soil Erosion and Sedimentation Control Specifications.

Notwithstanding the foregoing, Contractor shall complete the final restoration of the Work within three (3) months of completion of the Work and under no circumstances shall Contractor allow more than two thousand (2,000) lineal feet of disturbed area to exist at any time, unless otherwise agreed in writing by GCDC-WWS and subject to best management practices as determined by GCDC-WWS.

H. BARRICADES AND WARNING SIGNS

Barricades and warning signs for the Work shall be provided by Contractor in accordance with the Specifications, the Michigan Manual of Uniform Traffic Control Devices, Part 6 and the requirements and approval of the agency having authority over the roadways.

For excavation in the area of Work, in or adjacent to any public right-of-way or in any other areas covered by an easement, Contractor shall protect such areas by barricades, warning signs, snow fences or other appropriate measures, at Contractor's sole expense. Contractor shall take all required and prudent traffic control measures which shall be approved by the agency having authority over the roadways in connection with the Work. Warning signs and barricades left in place after dark shall be clearly visible and the barricades shall be lighted at all times, with at least one (1) light on each barricade. Contractor shall erect a sufficient number of barricades to keep vehicles from being driven on or into the Site. If Contractor fails to comply with any of the foregoing, GCDC-WWS or the agency having authority over the roadways may immediately secure the Site and order Contractor to discontinue the Work until Contractor has complied therewith, all at Contractor's sole expense.

In areas of Work where Contractor's activities may impede, affect or otherwise interrupt normal traffic flow, Contractor shall provide and maintain adequate flag persons, at Contractor's sole expense. In the event Contractor blocks off a roadway in accordance with the Drawings and Specifications, Contractor shall provide necessary detour signs to reroute traffic properly in accordance with the agency having authority over the roadways.

Contractor shall be liable for all damage to the Work, to Materials or to injuries to third parties due to failure of barricades, signs, lights and flag persons to protect it, and whenever evidence of such damage is found prior to acceptance of the Work, GCDC-WWS may order the damaged portion of the Work immediately removed and replaced by Contractor, at Contractor's sole expense. Contractor shall maintain the barricades, signs, lights, and provide flag persons until the Work has been finally accepted by GCDC-WWS.

I. MEASUREMENT FOR PAYMENT

1. General. Bids on a Unit Price Work basis shall be paid for on a Unit Price Work basis for the actual number of units installed. The quantities stated in the Bid are for bidding purposes only. On lump sum contracts and lump sum items, no measurements for separate payment shall be made. Items not listed in this section for payment or further defined by the Specifications are included in the Contract Price.

2. Items for Payment

(a) Gravity Sanitary Sewer Pipe by Open Cut. The measurement of gravity sanitary sewer pipe shall be made along the centerline of the installed sanitary sewer pipe. The measurements for the length of various sized sanitary sewer pipe shall be along the centerline of the sanitary sewer pipe with no deductions for the manholes and

measured to the inside face of walls, wet wells or existing manholes. Sanitary sewer pipe installed in a steel casing pipes shall be paid for under Paragraph I.2(b) below and is not included in this item.

Payment for gravity sanitary sewer pipe shall include all labor, Materials, excavation, dewatering, sheeting, tree removal, backfill, restoration, clean-up and all other activities required for installation of such gravity sanitary sewer pipe. Items not listed in the Bid shall be considered as incidental activities and included in the Unit Price Work per foot of gravity sanitary sewer pipe.

Wye fittings for service connections shall not be paid for separately but shall be included in the sanitary sewer pipe price. Service connections added or deleted after the Contract Documents are executed shall require a written Change Order.

- (b) **Gravity Sanitary Sewer Pipe in Steel Casing Pipe.** The gravity sanitary sewer pipe encased in steel casing pipe shall be measured along the centerline of the sanitary sewer pipe. The measurement shall be made from end to end of the steel casing pipe as installed, per the Specifications and Drawings. In no case shall the gravity sanitary sewer pipe in steel casing pipe be paid for in addition to the quantity shown on the Drawings without the prior written approval of GCDC-WWS. The steel casing pipe, shall include the casing, carrier pipe, sanitary sewer pipe and all Work necessary for installation.
- (c) **Concrete Encasement for Gravity Sanitary Sewer Pipe.** The payment for concrete encasement for gravity sanitary sewer pipe shall be on the basis of a Unit Price Work per lineal foot of the size of sanitary sewer pipe encased. The payment shall include the cost of all labor, excavation, reinforcing steel and two thousand five hundred (2500) pounds per square inch concrete as shown on the Drawings. The gravity sanitary sewer pipe shall be paid for under Paragraph I.2(a) above, and payment for the concrete encasement is in addition to this payment. There shall be no payment for concrete encasement of the gravity sanitary sewer pipe due to a wide trench.
- (d) **Manholes and Castings.** The payment for manholes and castings shall be on a Unit Price Work basis for the total number of units installed. No allowances shall be made for the depth of the manhole, unless provided in the Bid. The Bid price shall include the base, sidewall, adjusting rings, frames, manhole covers, steps, fillets, bulkheads, flexible joints and all other Materials and labor

for the installation of a complete manhole. The payment for future connections or for extra work involved in the installation shall be incorporated into the Unit Price Work per manhole, unless otherwise specifically listed in the Bid.

- (e) **Service Risers– Open Cut – Six Inches (6”).** The payment for service risers shall be made on the horizontal basis of the length of sanitary sewer pipe installed.
- (f) **Service Risers – Casing & Carrier – Six Inches (6”).** The payment for service risers installed within a steel casing pipe under hard surface roads shall be measured from the end of the casing to the end of the steel casing pipe. The length of service risers to be encased shall not exceed the length indicated in the Drawings without the prior written approval of GCDC-WWS. The payment shall include the steel casing pipe and the service risers.
- (g) **Drop Connections.** The payment for drop connections shall be made on a lump sum basis. Each drop connection shall be complete with tee, bend, drop pipe and concrete encasement. The payment for the drop connection shall be in addition to payment for the standard manhole, if so specified in the Bid. All drop connections shall be the external type.

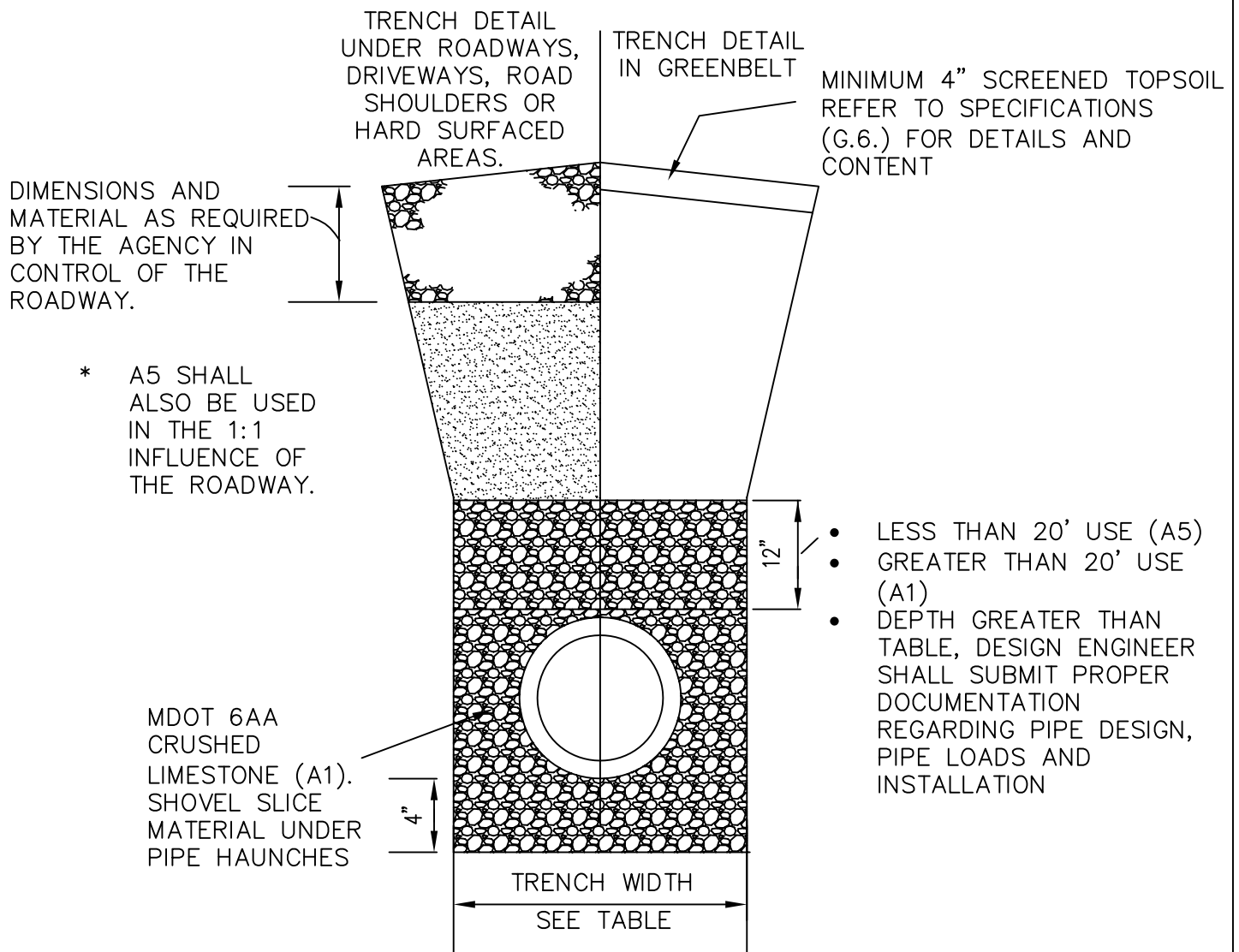
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NOTES

1. PLACE AGGREGATE MATERIAL ON THE COMPACTED SAND BACKFILL (A5) FOR ALL DRIVES, ROAD SHOULDERS, PARKING LOTS OR OTHER HARD SURFACED AREAS PER THE APPROVED PLANS.
2. THE CONTRACTOR SHALL COMPACT THE SAND BACKFILL (A5) TO 95% OF THE MATERIAL UNIT WEIGHT BY MODIFIED PROCTOR ACROSS ALL ROADWAYS AND DRIVES PER THE SCHEDULE OF BACKFILLING IN THE SANITARY SEWER SPECIFICATIONS. THIS INCLUDES SERVICE LEADS, UNLESS BORED. THE CONTRACTOR SHALL DO THE TESTING WITH THE RESULTS SUBMITTED TO GCDC-WWS PRIOR TO FINAL TESTING.
3. STONE BEDDING (A1) IS REQUIRED IN ALL AREAS OF DEWATERING.

SEE GCDC-WWS SPECIFICATIONS FOR TRENCHES

DIAMETER	MAX. TRENCH WIDTH
8"-12"	30"
15"-18"	36"
> 21"	DESIGN ENGINEER MUST SUBMIT TRENCH WIDTH FOR REVIEW AND APPROVAL



SD-1

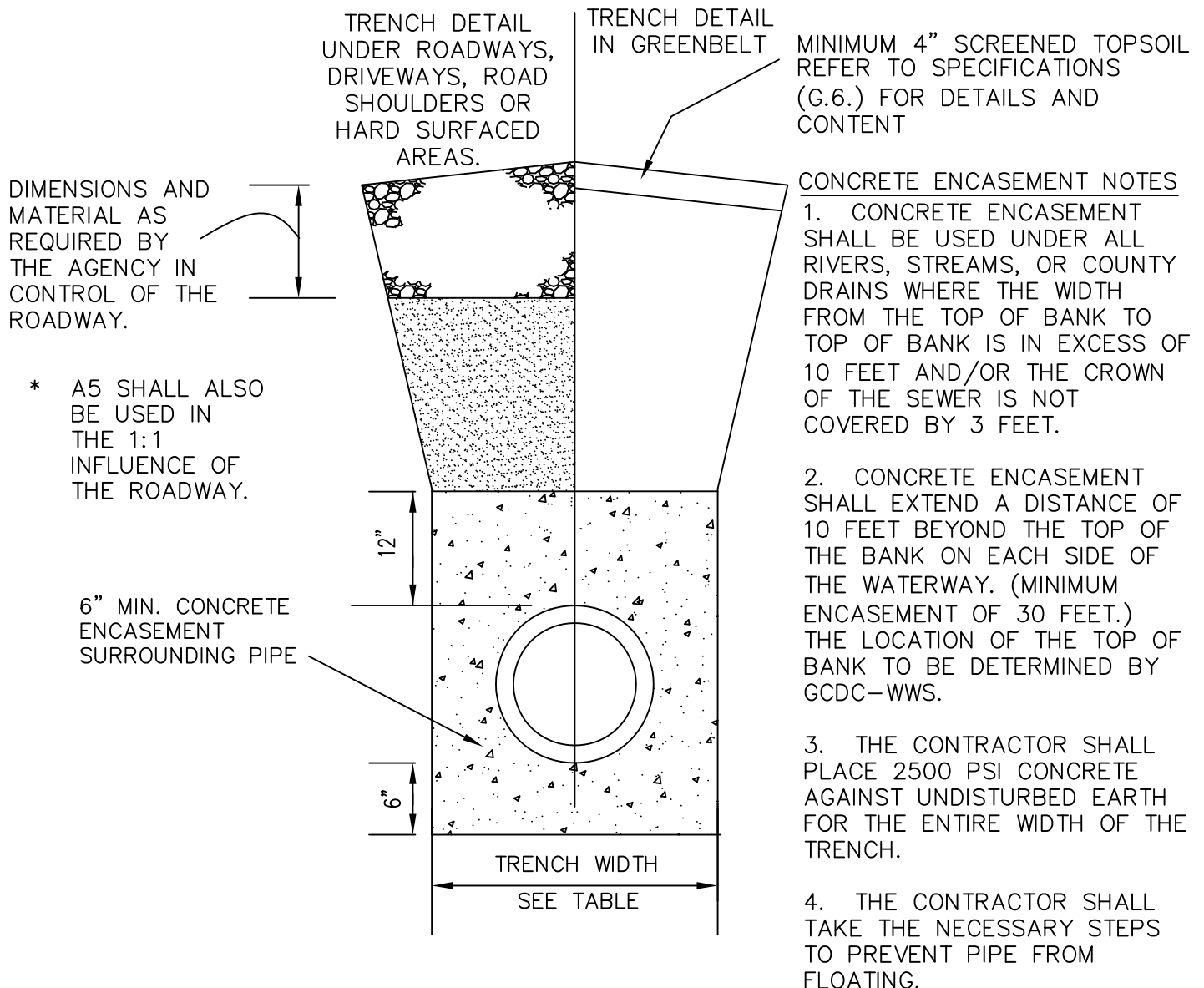
BEDDING & TRENCH DETAILS

NOTES

1. PLACE AGGREGATE MATERIAL ON THE COMPACTED SAND BACKFILL (A5) FOR ALL DRIVES, ROAD SHOULDERS, PARKING LOTS OR OTHER HARD SURFACED AREAS PER THE APPROVED PLANS.
2. THE CONTRACTOR SHALL COMPACT THE SAND BACKFILL (A5) TO 95% OF THE MATERIAL UNIT WEIGHT BY MODIFIED PROCTOR ACROSS ALL ROADWAYS AND DRIVES PER THE SCHEDULE OF BACKFILLING IN THE SANITARY SEWER SPECIFICATIONS. THIS INCLUDES SERVICE LEADS, UNLESS BORED. THE CONTRACTOR SHALL DO THE TESTING WITH THE RESULTS SUBMITTED TO GCDC-WWS PRIOR TO FINAL TESTING.
3. STONE BEDDING (A1) IS REQUIRED IN ALL AREAS OF DEWATERING.

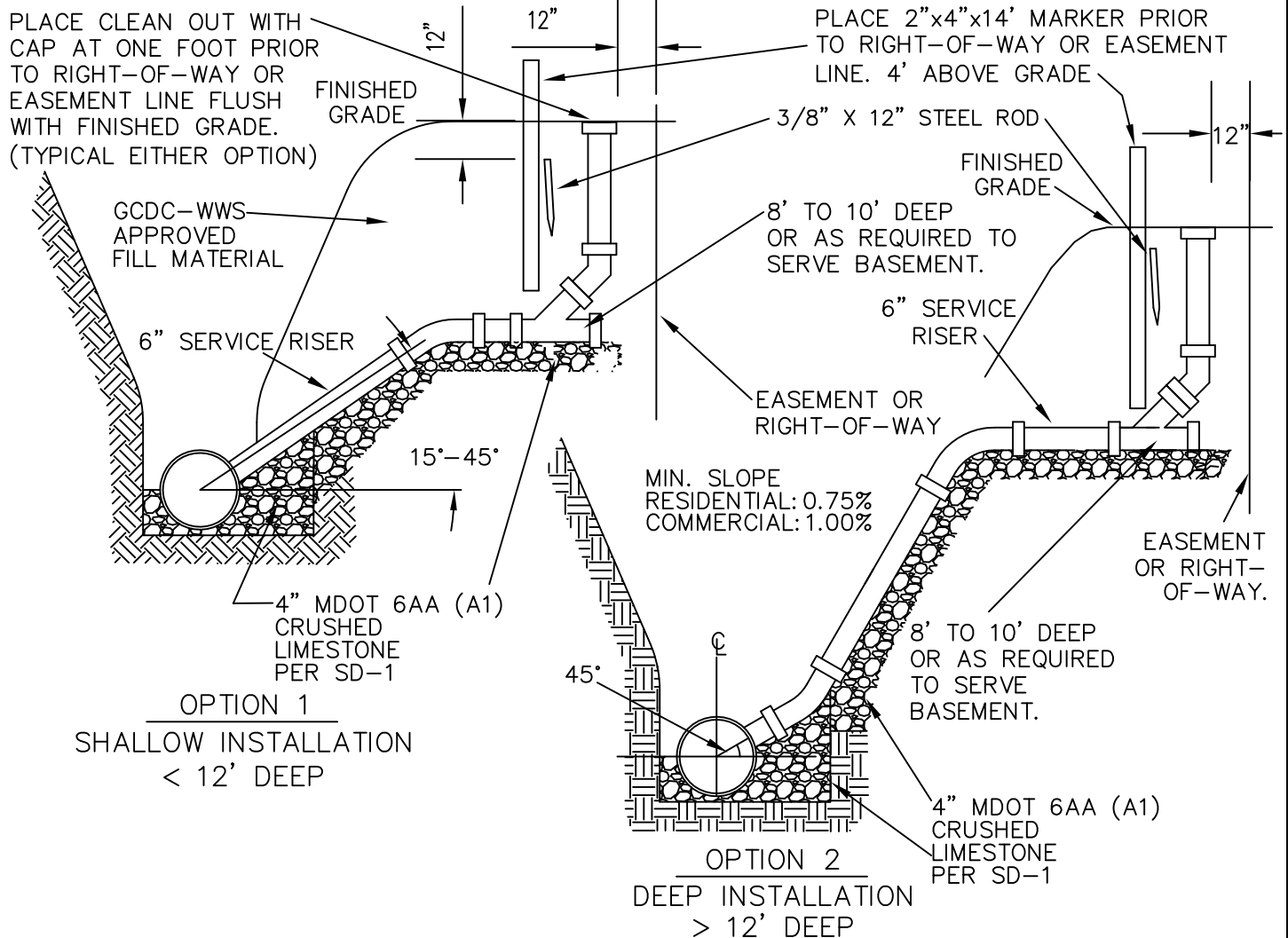
SEE GCDC-WWS SPECIFICATIONS FOR TRENCHES

DIAMETER	MAX. TRENCH WIDTH
8"-12"	30"
15"-18"	36"
> 21"	DESIGN ENGINEER MUST SUBMIT TRENCH WIDTH FOR REVIEW AND APPROVAL



SD-2

PROTECTION OF SANITARY SEWERS BY CONCRETE ENCASEMENT OF CRADLE

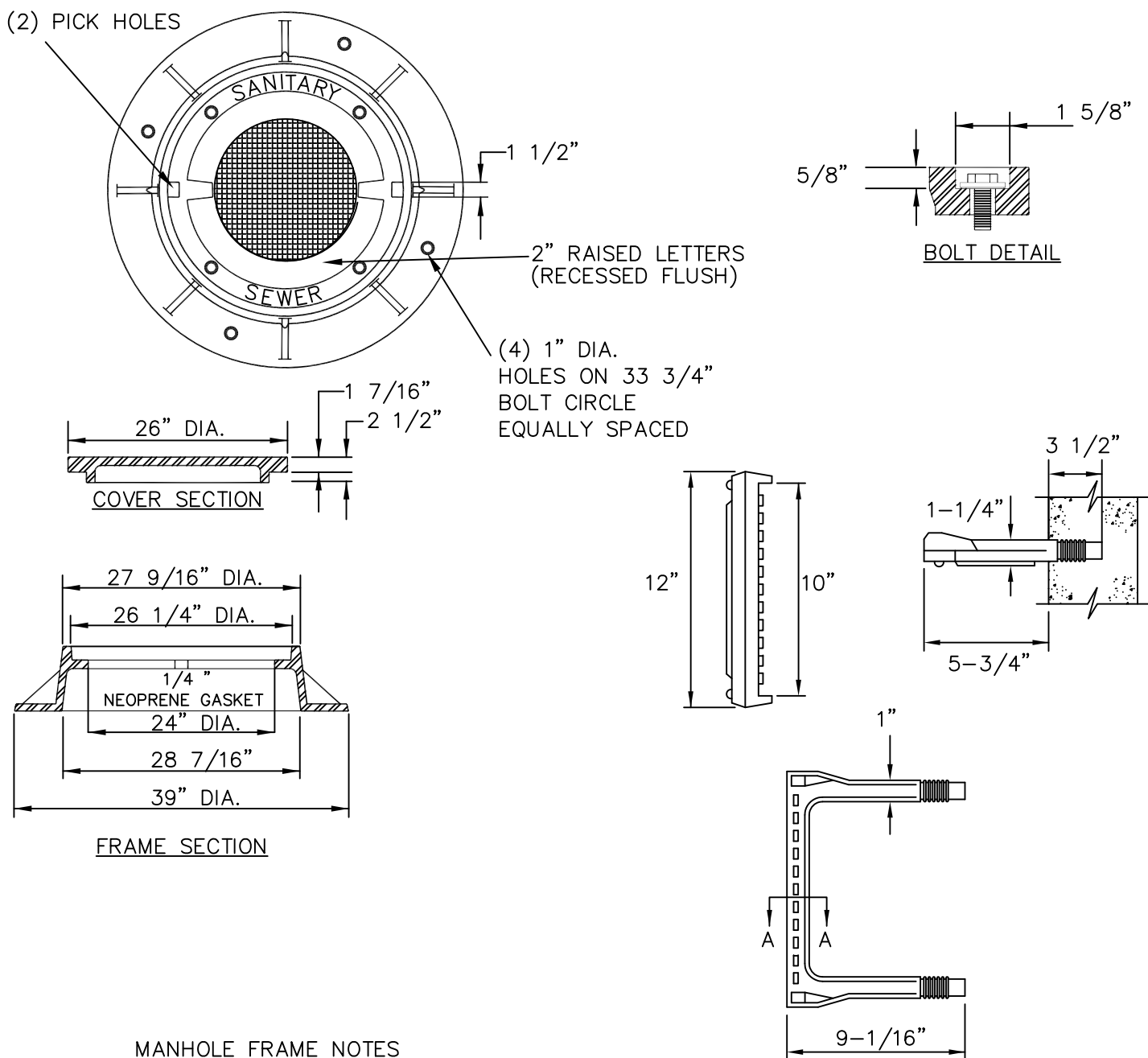


NOTES

1. THE ENGINEER & CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING CURRENT LOT SPLITS AND ENSURING THAT ALL LOTS ON BOTH SIDES OF THE ROAD ARE SERVICED WITH SANITARY SEWER TO THEIR RESPECTIVE RIGHT-OF-WAY LINE OR EASEMENT LINE.
2. SERVICE RISERS SHALL BE 6" PVC WITH A MINIMUM SDR OF 26, OR OTHER AS REQUIRED FOR DEPTH. ONLY WYE CONNECTIONS TO THE MAINLINE SEWER ARE ACCEPTABLE.
3. THE LOCATION OF ALL SERVICE RISERS SHALL BE MARKED WITH A 2"x4"x14' MARKER, WITH A 3/8" X 12" STEEL ROD PLACED 1' BELOW THE SURFACE, ALONG WITH WITNESS POINTS SUPPLIED TO GCDC-WWS. THE 2"x4"x14' MARKER SHALL EXTEND FROM THE INVERT OF THE LEAD TO A MINIMUM OF 4' ABOVE FINISH GRADE. THE SERVICE RISER SHALL TERMINATE WITHIN 1' OF THE EASEMENT OR RIGHT-OF-WAY LINE WITH AN AIRTIGHT PLUG. SERVICE RISERS WITHIN EASEMENTS SHALL BE EXTENDED A MINIMUM OF ONE PIPE LENGTH FROM THE MAIN LINE SEWER OR TO THE EDGE OF THE RIGHT-OF-WAY OR EASEMENT, WHICHEVER IS LONGER.
4. SERVICE RISERS MEASUREMENT IS HORIZONTAL ALONG THE CENTERLINE OF THE LEAD AS CONSTRUCTED FROM THE MAIN TO THE PLUG. PAYMENT SHALL BE MEASURED HORIZONTAL, NOT VERTICAL.
5. THERE SHALL BE NO 90° BENDS ALLOWED IN THE SERVICE RISERS.
6. CLEAN OUTS ARE REQUIRED EVERY 90 FEET OR AT BENDS.
7. FOR NEW DEVELOPMENTS, PLACE A 2"x4"x14' MARKER AT THE END OF THE LEAD. THE CLEAN OUTS SHALL BE INSTALLED AT THE TIME THE SERVICE LEAD IS EXTENDED TO THE HOUSE.
8. EXISTING HOUSES SHALL BE PROVIDED WITH CLEAN-OUTS.

SD-3

RISER AND SERVICE LEAD



MANHOLE FRAME NOTES

1. THE FRAME SHALL HAVE FOUR 7/8" ANCHOR BASE FLANGE HOLES WITH BOLT CIRCLE TO MATCH MANHOLE CONE.
2. ALL BEARING SURFACES SHALL BE MACHINED.
3. FRAMES AND COVERS SHALL BE BOLT DOWN WATER TIGHT: EAST JORDAN IRON WORKS, INC. #1040 ZPT TYPE A SOLID, NEENAH FOUNDRY CO. #R-1916-F, OR A GCDC-WWS APPROVED ALTERNATE.
4. THE WORD "SANITARY SEWER" SHALL BE CAST IN THE CENTER OF THE COVER.
5. THE COVER SHALL BE BOLTED TO THE FRAME WITH FOUR 1/2"-13 NC HEX HEAD STAINLESS STEEL BOLTS AND WASHERS WITH RUBBER GASKETS

MANHOLE STEP NOTES

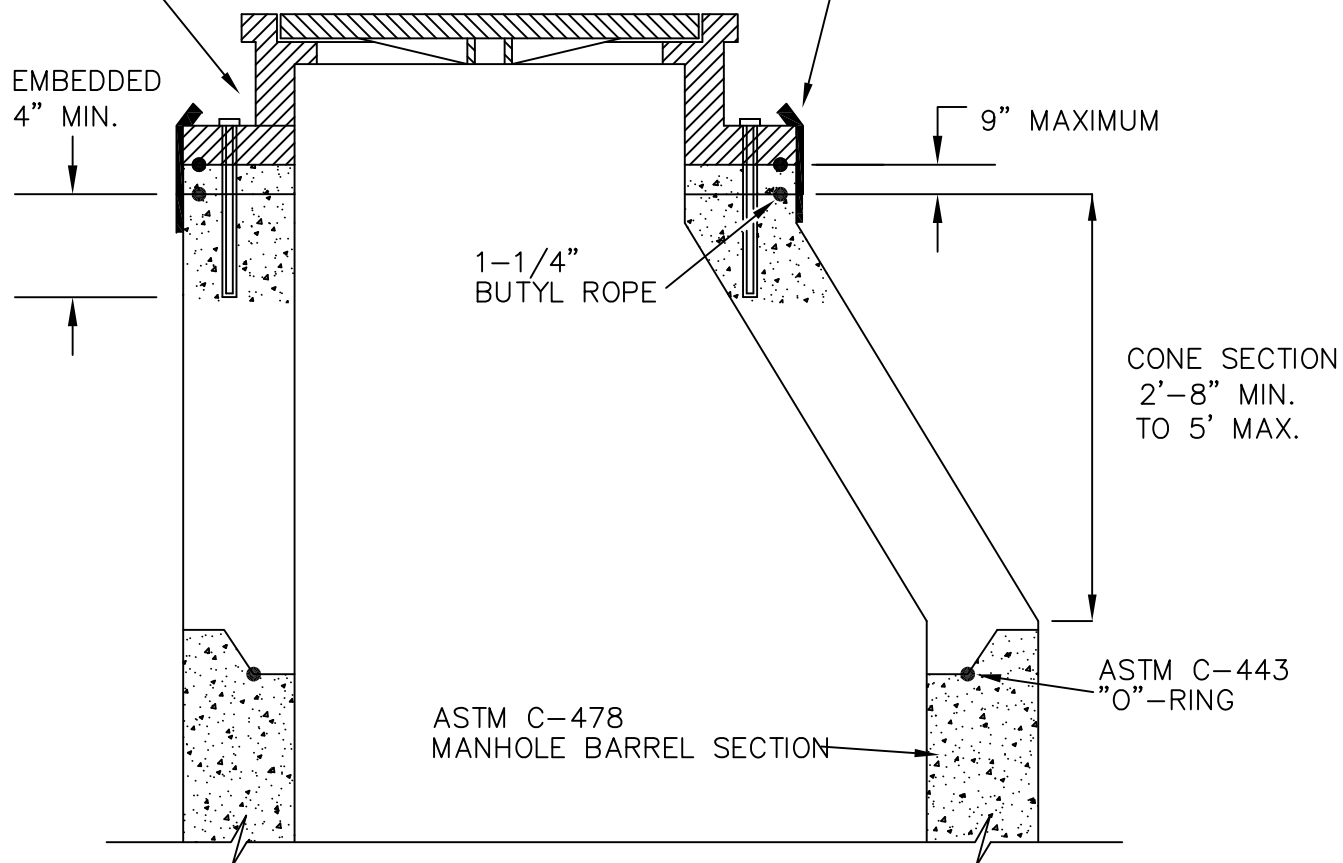
1. MANHOLE STEPS SHALL BE CAST INTEGRALLY WITH PRECAST MANHOLE.
2. STEPS SHALL BE COPOLYMER POLYPROPYLENE PLASTIC WITH 1/2" STEEL REINFORCEMENT.
3. STEPS SHALL BE M.A. INDUSTRIES PS-1-PF, AMERICAN STEP CO. ML-10, OR A GCDC-WWS APPROVED ALTERNATE.

SD-4

MANHOLE FRAME, COVER & STEP

4 STAINLESS STEEL ANCHORS SHALL BE EMBEDDED INTO THE CONE SECTION. 4 CHROMITE COATED, THREADED 5/8" RODS WITH WASHERS SHALL BE PLACED INTO THE ANCHORS. FIELD CUT THE RODS TO THE PROPER LENGTH (1/2" MAX). THE BOLT CIRCLE AND LOCATION OF THE EMBEDDED RODS AND ANCHORS SHALL BE COORDINATED WITH THE FRAME MANUFACTURER.

ELASTOMETRIC SEAL COMPLETELY SEAL AROUND THE JOINTS OF THE MANHOLE CASTING, THE ADJUSTING RINGS, AND THE MANHOLE BY INSTALLING WRAPID SEAL ON THE EXTERIOR OR A GCDC-WWS APPROVED ALTERNATE.

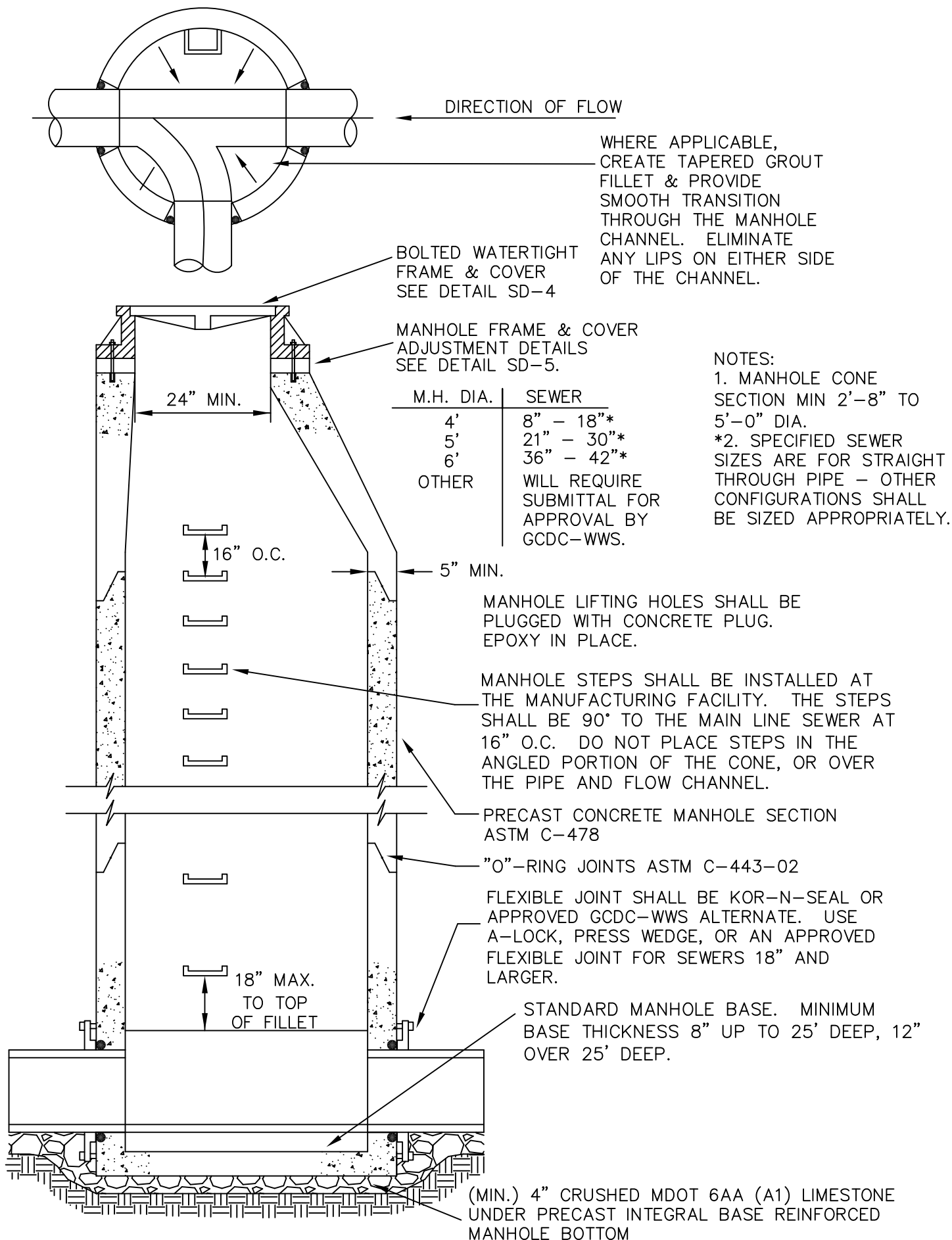


NOTES

1. DURING THE FINAL INSPECTION, FINAL ADJUSTMENT SHALL BE AS DIRECTED BY GCDC-WWS. MAXIMUM ADJUSTMENT ALLOWED SHALL BE 9". THE USE OF BLOCK OR BRICK FOR ADJUSTMENT SHALL NOT BE PERMITTED.
2. PERMISSIBLE GRADE RING SIZES FOR MANHOLE ADJUSTMENT SHALL BE 3", 4", OR 6", AS REQUIRED, TO FINISH GRADE. NOTE: A MAXIMUM OF TWO GRADE RINGS WILL BE ALLOWED.
3. THE CONTRACTOR SHALL USE AN APPROVED 1-1/4" PRE-FORMED BUTYL RUBBER JOINT SEALANT BETWEEN GRADE RING, MANHOLE FRAME, & MANHOLE SECTION. USE MORTAR FOR MANHOLES IN ROADWAYS.

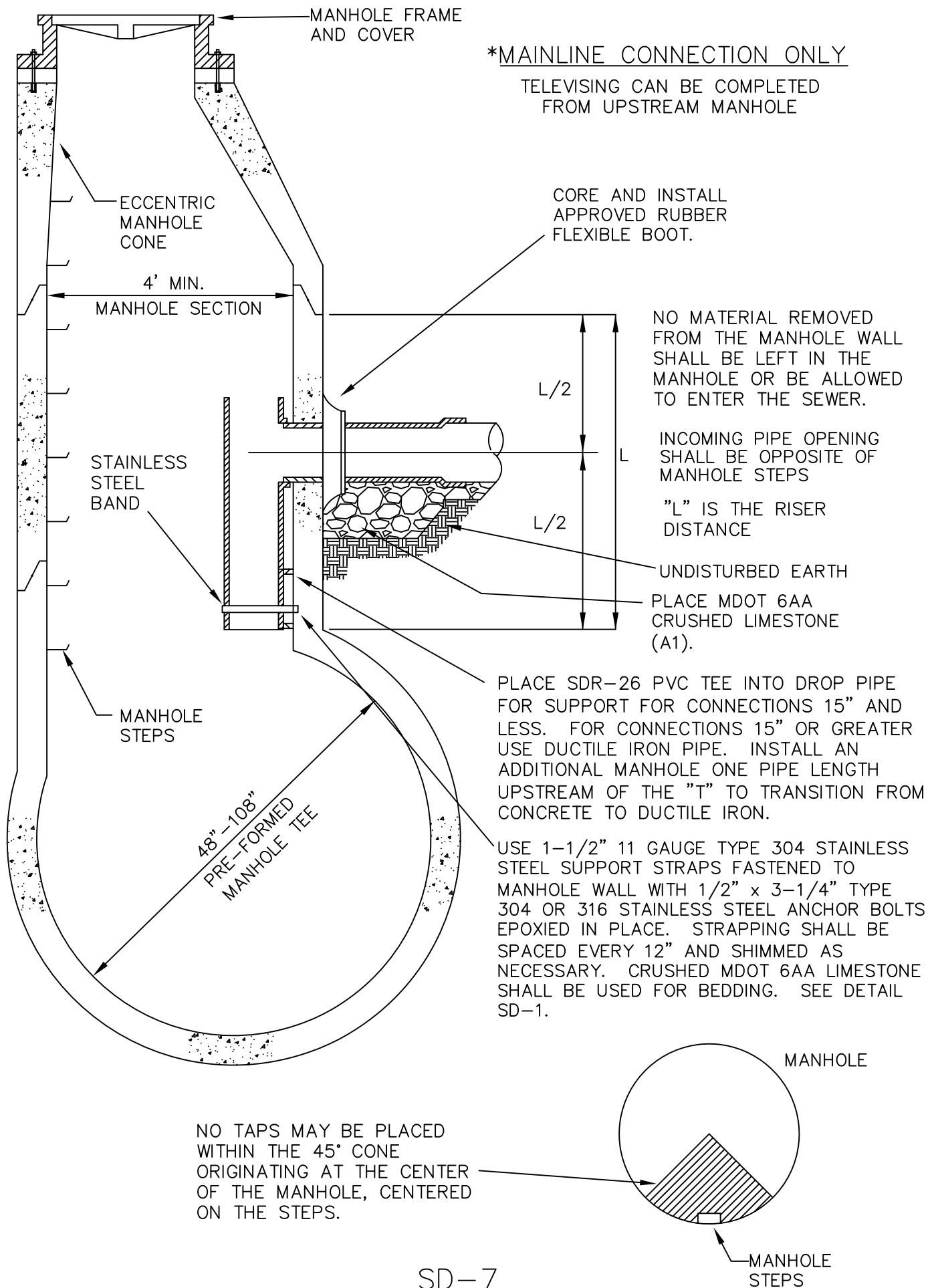
SD-5

MANHOLE FRAME & ADJUSTMENT



SD-6

PRECAST FLEXIBLE JOINT MANHOLE



SD-7
CONNECTION TO "T" MANHOLE

NOTES

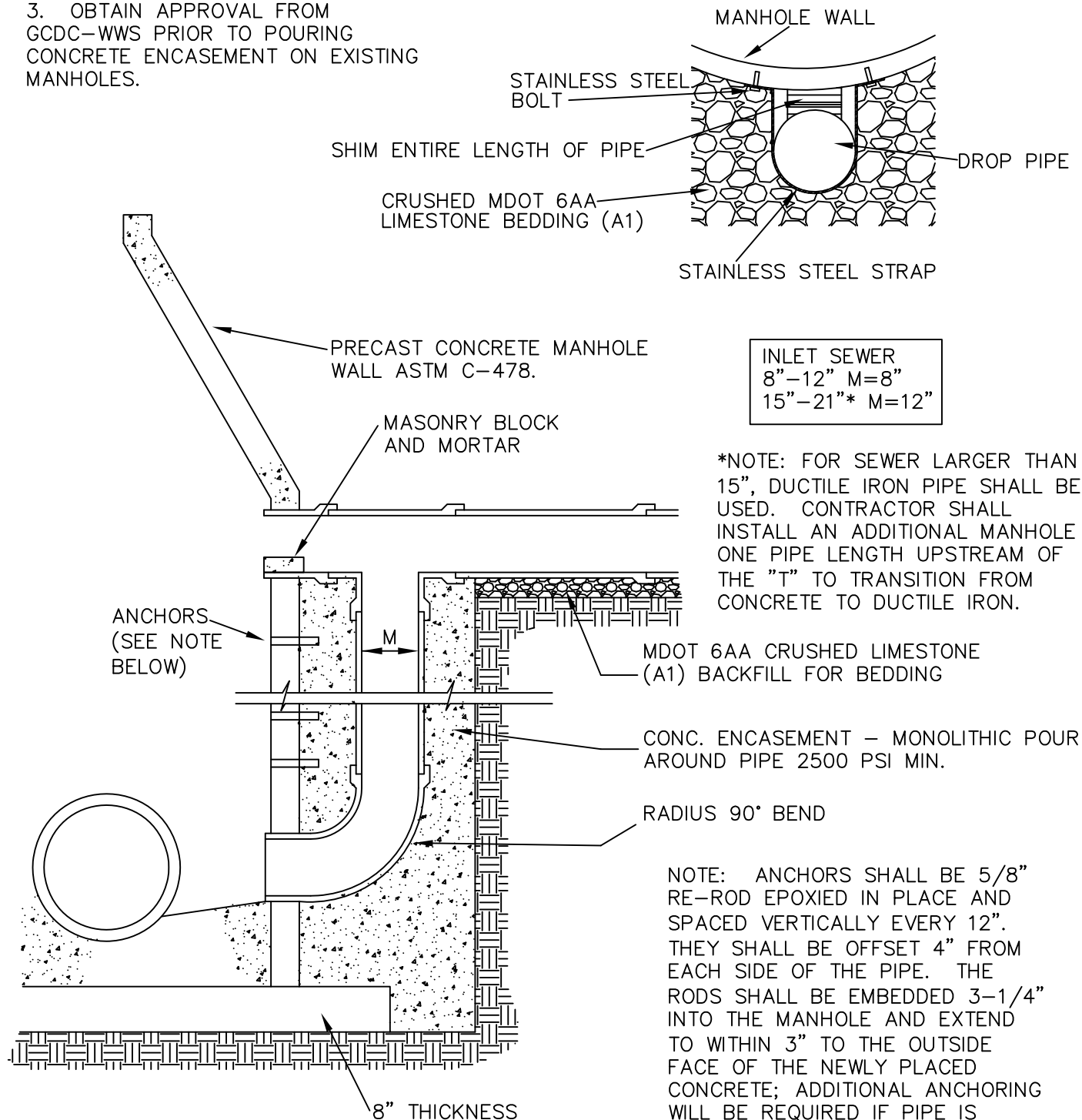
1. A DROP PIPE CONNECTION IS REQUIRED FOR ALL SEWERS WHERE INCOMING INVERT ELEVATIONS EXCEEDS 30" ABOVE OUTLET INVERT ELEVATION.

2. ALL DROP CONNECTIONS SHALL BE EXTERNAL DROP CONNECTIONS, CONSTRUCTED OF PVC OR DUCTILE IRON.

3. OBTAIN APPROVAL FROM GCDC-WWS PRIOR TO POURING CONCRETE ENCASEMENT ON EXISTING MANHOLES.

ALTERNATE METHOD

USE 1-1/2" 11 GAUGE TYPE 304 STAINLESS STEEL SUPPORT STRAPS FASTENED TO THE MANHOLE WALL WITH 1/2" x 3-1/4" TYPE 304 OR 316 STAINLESS STEEL ANCHOR BOLTS EPOXIED IN PLACE. STRAPPING SHALL BE SPACED EVERY 12" AND SHIMMED AS NECESSARY. CRUSHED MDOT 6AA LESTONE WILL BE USED FOR BEDDING. THE CRUSHED STONE SHALL ENCASE THE PIPE A MINIMUM OF 6" IN ALL DIRECTIONS FROM THE PIPE. SEE DETAIL BELOW.

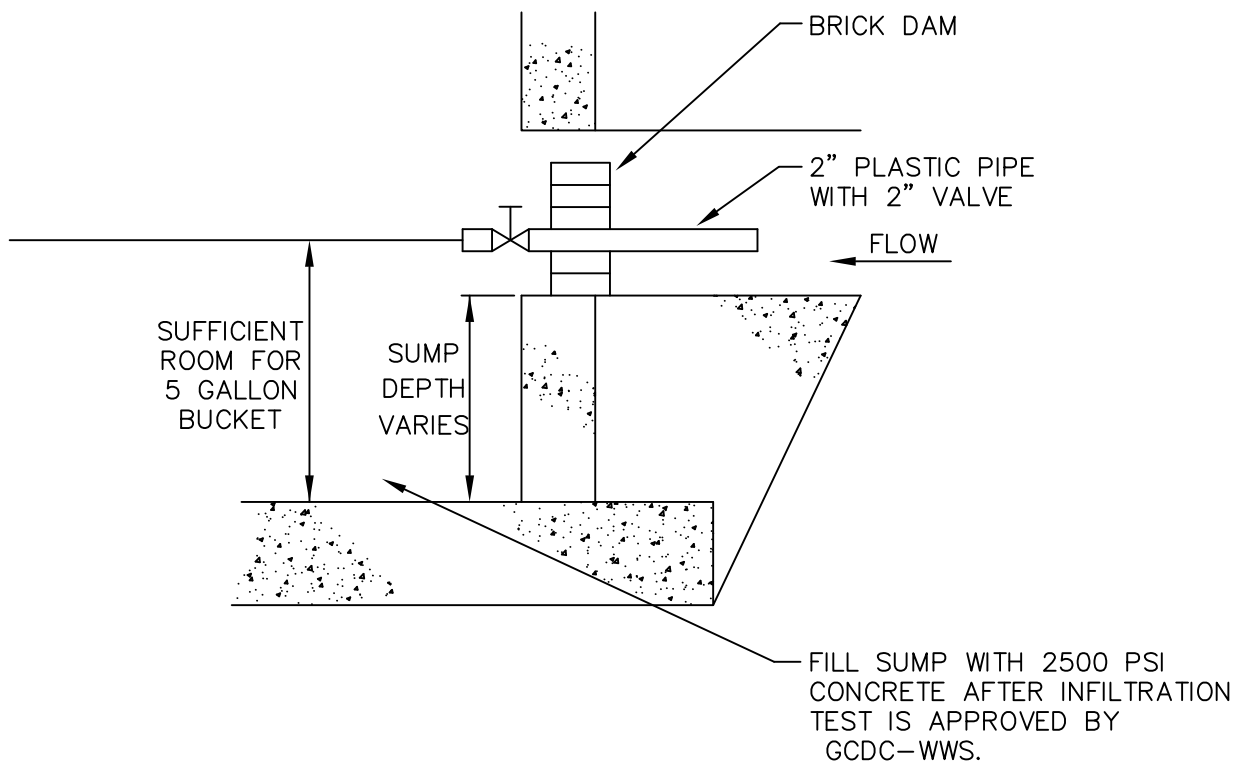


SD-8 CONCRETE ENCASED EXTERNAL DROP PIPE

NOTES

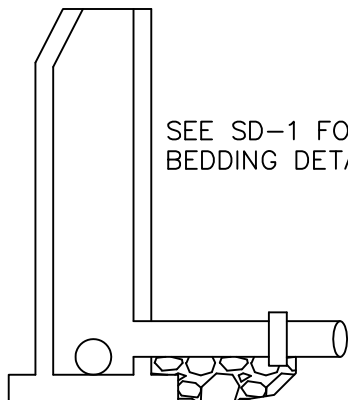
1. ALL SANITARY SEWERS SHALL BE TESTED FOR INFILTRATION.
2. A NEW INFILTRATION TEST MANHOLE MUST BE CONSTRUCTED FOR EACH SEPARATE DIVISION OR SECTION OF A PROJECT. (SEE DETAIL)
3. NO CONNECTION SHALL BE MADE TO THE EXISTING SANITARY SEWER SYSTEM UNTIL ALL TESTING OF THE SANITARY SEWER HAS BEEN PERFORMED AND APPROVED BY GCDC-WWS.
4. TESTING WEIRS ARE AVAILABLE FROM GCDC-WWS WITH PRIOR NOTICE.
5. ALL EXTENSIONS OF 8"-21" SEWER SHALL BE AIR TESTED. ALL LINES 24" AND LARGER SHALL BE TESTED WITH A "V" NOTCH WEIR.
6. THE FOLLOWING OUTLINES AN ALTERNATE METHOD FOR TESTING:

ALTERNATE METHOD

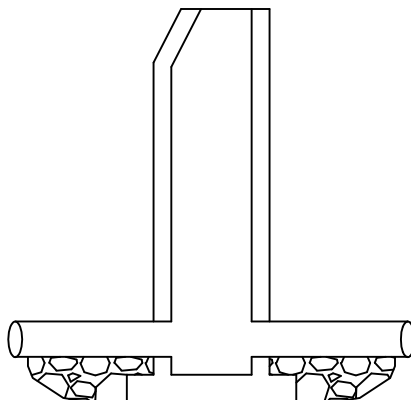


METHOD #1
FINAL CONNECTION PROCEDURE

EXISTING MANHOLE

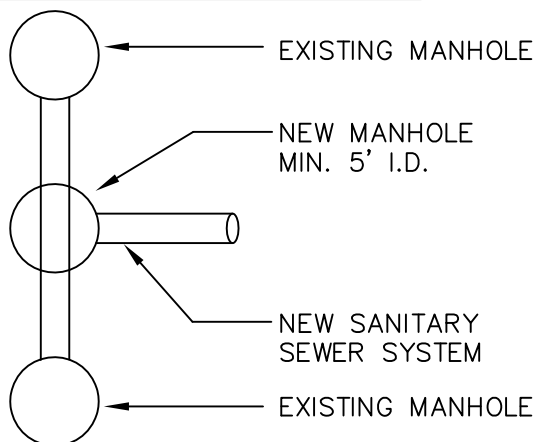


FIRST NEW MANHOLE



1. BEGIN WORK AT THE FIRST MANHOLE.
2. TEST, TELEWISE AND CLEAN ALL WORK UPGRADE.
3. OBTAIN APPROVAL FROM GCDC-WWS TO TIE INTO THE EXISTING SYSTEM.
4. CONSTRUCT THE SEWER LINE BETWEEN THE FIRST MANHOLE AND THE EXISTING MANHOLE.
5. TEST, TELEWISE AND CLEAN THE SEWER LINE.
6. OBTAIN FINAL APPROVAL FROM GCDC-WWS.

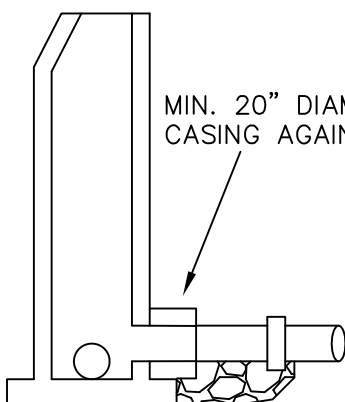
METHOD #2
FINAL CONNECTION PROCEDURE



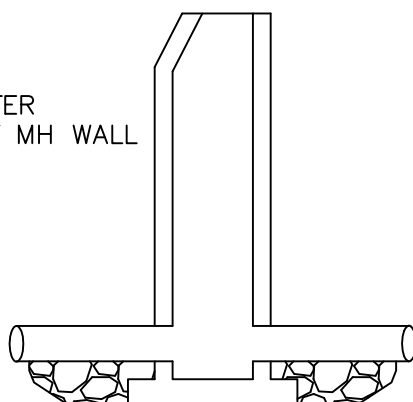
1. USE AN APPROVED PRECAST SLAB.
2. SCORE EXISTING PIPE TO BE REMOVED.
3. CONSTRUCT THE FIRST MANHOLE OVER THE EXISTING SANITARY SEWER WITHOUT REMOVING THE EXISTING MAIN.
4. TEST, TELEWISE, AND CLEAN ALL WORK IN THE SANITARY SEWER SYSTEM.
5. OBTAIN APPROVAL FROM GCDC-WWS FOR EXISTING PIPE REMOVAL & FINAL CONNECTION.
6. SAW CUT & REMOVE PIPE SECTION AFTER RECEIPT OF APPROVAL, AND POUR THE FLOW CHANNEL.
7. THE CONTRACTOR IS RESPONSIBLE TO CATCH DEBRIS & PREVENT IT FROM ENTERING THE SANITARY SEWER.

METHOD #3
FINAL CONNECTION PROCEDURE

EXISTING MANHOLE



TEST MANHOLE

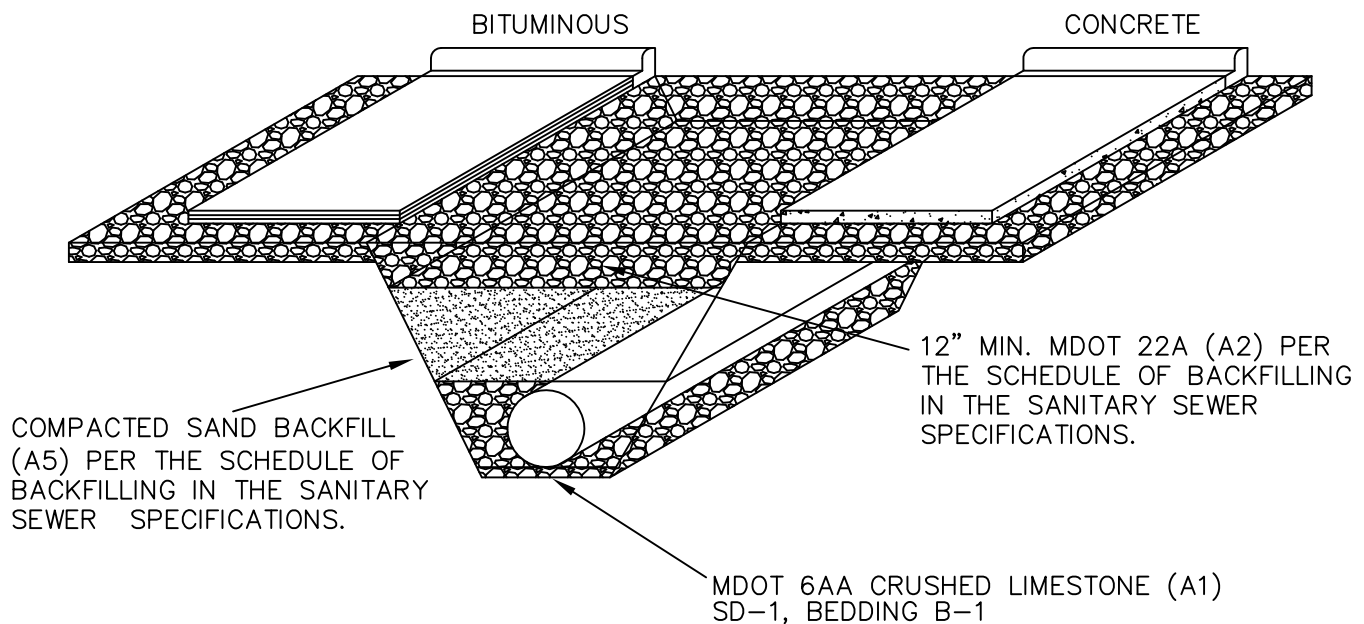


SD-1 FOR
BEDDING INFORMATION

1. BEGIN WORK AT THE TEST MANHOLE.
2. ALL WORK UPGRADE MUST BE CLEAN & FREE OF DEBRIS BEFORE COMPLETING ANY INSTALLATION OF SANITARY SEWER LINE BETWEEN TEST MANHOLE & EXISTING MANHOLE.
3. OBTAIN APPROVAL FROM GCDC-WWS TO BORE DIRECTLY THROUGH MANHOLE WALL. NOTE: PROVIDE NECESSARY DOCUMENTATION TO DEMONSTRATE NECESSITY TO UTILIZE THIS PROCEDURE. FIELD/SITE VISIT MAY BE NECESSARY.
4. THE CONTRACTOR IS RESPONSIBLE TO MAINTAIN GRADE & MATCH INVERTS AS CALLED FOR ON APPROVED CONSTRUCTION PLANS. CONTRACTOR ALSO REQUIRED TO PROVIDE POSITIVE SEAL AROUND MANHOLE PENETRATION VIA FLEXIBLE RUBBER BOOT.

SD-10

SANITARY SEWER FINAL CONNECTION

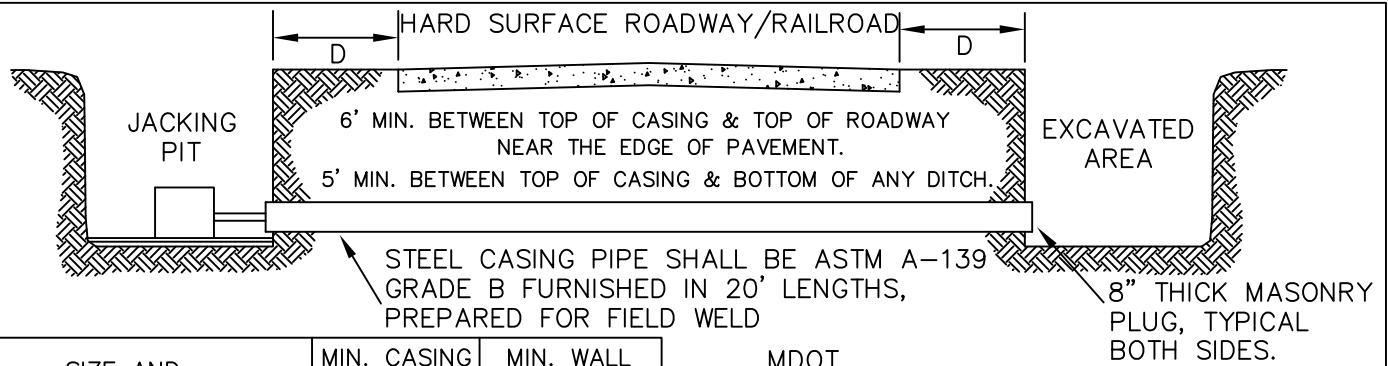


SPECIAL REQUIREMENTS FOR OPEN CUTTING HARD SURFACE AND/OR GRAVEL ROADS

1. THE CONTRACTOR SHALL ACQUIRE A SPECIAL OPEN CUT APPROVAL FROM THE AGENCY HAVING AUTHORITY OVER THE ROADWAYS.
2. THE CONTRACTOR SHALL SUPPLY CONTINGENT LIABILITY INSURANCE FOR THE AGENCY HAVING AUTHORITY OVER THE ROADWAYS.
3. THE PROTECTION OF THE WORK SHALL BE IN ACCORDANCE WITH THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, PART 6. BARRICADES, WARNING AND LIGHTING NECESSARY FOR PUBLIC SAFETY TO BE APPROVED BY THE ENGINEER AND THE AGENCY HAVING AUTHORITY OVER THE ROADWAYS PRIOR TO STARTING THE WORK.
4. THE CONTRACTOR SHALL EXCAVATE ALL MATERIAL TO PROPOSED GRADE.
5. THE SANITARY SEWER PIPE SHALL BE PLACED ON MDOT 6AA CRUSHED LIMESTONE (A1) BEDDING, PER SD-1 B-1 BEDDING.
6. ALL BACKFILL SHALL BE MDOT CLASS II SAND (A5), PLACED PER THE SCHEDULE OF BACKFILLING.
7. THE SAND BACKFILL SHALL EXTEND FROM THE OUTSIDE EDGE OF SHOULDER TO OUTSIDE EDGE OF SHOULDER, INCLUDING THE ONE ON ONE INFLUENCE OF THE ROADWAY OR THE SAND BACKFILL SHALL EXTEND FROM THE BACK OF CURB TO BACK OF CURB, INCLUDING THE ONE ON ONE INFLUENCE OF THE ROADWAY.
8. THE FINAL 12" OF ALL BACKFILL SHALL BE MDOT 22A LIMESTONE (A2) SUBBASE MODIFIED PER GCRC SPECIFICATIONS. ALL SHOULDERS SHALL BE REPAIRED PER THE AGENCY HAVING AUTHORITY OVER THE ROADWAYS.
9. THE CONTRACTOR SHALL REPLACE THE ROAD SURFACE WITH THE AGENCY HAVING AUTHORITY OVER THE ROADWAYS APPROVED MATERIAL.
10. THE CONTRACTOR SHALL MAINTAIN TEMPORARY ACCESS TO ALL AREAS DURING THE WORK. A PUBLIC ROAD MAY BE CLOSED FOR 1/2 WIDTH CONSTRUCTION WITH GENESEE COUNTY ROAD COMMISSION OR AGENCY HAVING AUTHORITY OVER THE ROADWAYS APPROVAL, BUT THE CLOSING TIME CANNOT EXCEED 8 HOURS. THE CONTRACTOR MAY USE SHOULDERS AND TEMPORARY PATCHES TO KEEP A ROAD OPEN.

SD-11

OPEN CUTTING ROAD



SIZE AND MATERIAL	MIN. CASING DIA. O.D. INCHES *	MIN. WALL THICKNESS INCHES
6" SANITARY SEWER** V.C.P. OR P.V.C.	12.75	0.375
8"-12" D.I. PRESSURE	20.00	0.375
8"-10" SANITARY SEWER		
16" D.I. PRESSURE PIPE	24.00	0.375
12"-15" SANITARY SEWER		
18"-24" D.I. PRESSURE	30.00	0.406
18" SANITARY SEWER CONCRETE		
21"-24" SANITARY SEWER CONCRETE	36.00	0.469

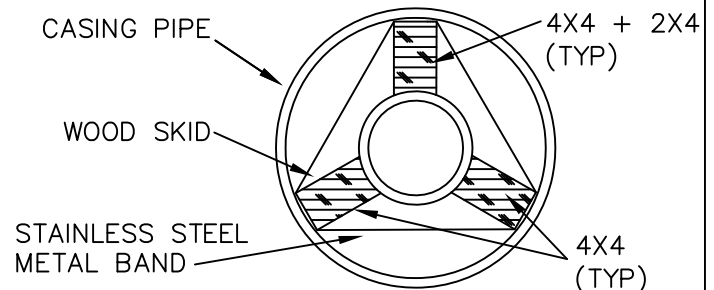
**ALLOWED ONLY UNDER ROADS NOT RAILROADS.

MDOT

D=30' FOR TRAFFIC OVER 45 MPH
D=20' FOR TRAFFIC UNDER 45 MPH

GCRC

D=10' FOR ROADS WITH SHOULDER/DITCH
D=5' FOR ROADS WITH CURB AND GUTTER



- ALL BORE AND JACK OPERATIONS WITHIN THE ROADWAYS/RAILROADS WILL REQUIRE A PERMIT FROM THE AGENCY HAVING AUTHORITY OVER THE ROADWAYS/RAILROADS.
- THE CONTRACTOR SHALL ABIDE BY ALL SAFETY PRECAUTIONS INCLUDING THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, PART 6 AS REQUIRED BY THE AGENCY HAVING AUTHORITY OVER THE ROADWAYS/RAILROADS..
- THE CONTRACTOR SHALL PROTECT AND RESTORE ALL PROPERTY.
- THE CONTRACTOR SHALL NAME THE AGENCY HAVING AUTHORITY OVER THE ROADWAYS/RAILROADS AS AN ADDITIONAL NAMED INSURED FOR CONTINGENT LIABILITY FOR THE PROPOSED WORK.
- THE CONTRACTOR SHALL ABIDE BY ALL CONDITIONS STATED IN THE GCRC MEMO OF 9-1-75 LABELED SANITARY SEWER AND WATERMAIN INSTALLATION WITHIN THE LIMITS OF COUNTY HIGHWAYS OR THE REQUIREMENTS OF THE AGENCY HAVING AUTHORITY OVER THE ROADWAYS/RAILROADS.
- THE SHEETING OF THE FRONT FACE OF THE BORE PIT WILL BE REQUIRED IF UNSTABLE SOIL CONDITIONS ARE ENCOUNTERED.
- THE AUGER MUST ALWAYS PROCEED THE CASING PIPE HEAD.
- THE CONTRACTOR SHALL NOTIFY THE AGENCY HAVING AUTHORITY OVER THE ROADWAYS/RAILROADS A MINIMUM OF 72 HOURS PRIOR TO BEGINNING WORK.
- TREATED WOOD SKIDS SHALL BE INSTALLED THE ENTIRE LENGTH OF PIPE HELD IN PLACE BY STAINLESS STEEL METAL BANDS MIN. 5/8" WIDE SHALL BE INSTALLED EVERY FOUR FEET TO KEEP THE CARRIER PIPE ON LINE AND GRADE. THE MAXIMUM DISTANCE FROM THE I.D. OF THE CASING PIPE TO THE OUTSIDE EDGE OF THE SKID SHALL BE 1".
- THE ENDS OF THE CASING PIPE SHALL BE BULKHEADED WITH AN 8" WATER TIGHT MASONRY BULKHEAD.
- ANY ADDITIONAL REQUIREMENTS THAT MAY COME FROM THE AGENCY HAVING AUTHORITY OVER THE ROADWAY/RAILROAD.
- FLOWABLE CONCRETE FILL SHALL BE PUMPED BETWEEN THE PIPE AND THE CASING PIPE THE ENTIRE LENGTH OF THE BORE.

*WITH DUCTILE IRON BOLTLESS RESTRAINT, CONTRACTOR MUST VERIFY CASING SIZE CAN CARRY PIPE.

SD-12

BORE & JACK CONSTRUCTION
ON ALL ROADWAYS/RAILROADS

SANITARY

WATERMAIN TECHNICAL SPECIFICATIONS

A. GENERAL AND ADMINISTRATIVE

- 1. Scope of Work.** These Watermain Technical Specifications (“Watermain Specifications”) are a supplement to and form a part of the Contract Documents and technically describe the nature of the Materials and the workmanship required to complete the Project. These Watermain Specifications require that all watermain pipe be installed complete and ready in every respect for immediate use by GCDC-WWS. Any items not specifically required by or included in these Watermain Specifications, but which are clearly necessary, are deemed to be included herein at no increase in the Contract Price.

In resolving inconsistencies in two (2) or more provisions in the Contract Documents, preference shall be given in the following order of priority with subparagraph (i) given the highest priority and subparagraph (vii) given the lowest priority so that, for example, if there are conflicting provisions in subparagraph (i) and subparagraph (iv) below, the provisions in subparagraph (i) shall control: (i) Agreement and any amendments thereto; (ii) Bid; (iii) Supplementary Conditions; (iv) Instructions to Bidders; (v) General Conditions; (vi) Standard Specifications; (vii) Standard Details; and (viii) Drawings.

All Work in connection with the installation of watermain pipe shall begin at a valve with a stub. If there is no valve with a stub, a pressure tapping sleeve and valve shall be used. Pressure taps to existing watermain pipe or connections made to existing valve with a stub shall be made only under the direct supervision of GCDC-WWS. In addition, Contractor shall give written notice to the Operation and Maintenance Department of GCDC-WWS at least forty-eight (48) hours in advance of the opening or closing of existing valves. Under no circumstances may Contractor operate any existing valves.

- 2. Shop Drawings.** Contractor shall deliver to GCDC-WWS and Engineer Shop Drawings or a material certification as set forth in Paragraph 6.17 of the General Conditions. The Engineer approved Shop Drawings shall be sent to Contractor, GCDC-WWS and Engineer. Contractor shall ensure that the manufacturer shall not ship any Materials until written approval of the Shop Drawings has been received from Engineer.

The following Materials require written approval of the GCDC-WWS and Engineer prior to their installation: (i) watermain pipe, fittings and joints; (ii) joint materials; (iii) valves, fire hydrants and valve boxes; (iv) valve

manholes including manhole frames, manhole covers and manhole steps; (v) meters, couplings and appurtenances; and (vi) reinforcing steel layout bars for all structures.

Where Materials are listed as being in conformance with these Watermain Specifications, it shall mean the latest edition of the Genesee County Standard Specifications.

Contractor shall deliver to GCDC-WWS and Engineer an installation schedule for the watermain pipe at or before the pre-construction meeting. The installation schedule shall also include the location of all restraint joints.

B. CONSTRUCTION MATERIALS

- 1. General.** All Materials and equipment supplied by Contractor shall be new and of first class ingredients and construction, designed, manufactured and guaranteed to comply with these Watermain Specifications. Contractor shall deliver to GCDC-WWS a certificate of testing or actual test results certifying that the Materials to be used hereunder are in conformance with these Watermain Specifications prior to using the Materials in the Work. All watermain pipe shall be clearly marked with the size and grade or class.

The Materials and labor shall be furnished and performed in accordance with customary and established construction practices and standards recognized by architects, engineers and similar professions or trades.

All Materials used in the installation of watermain pipe shall be subject to inspections and tests as specified by ASTM, ANSI and AWWA regulations and these Watermain Specifications. These tests and inspections shall be completed and paid for by Contractor. GCDC-WWS may subject any Materials supplied to tests by an independent testing laboratory. Such tests, if conducted, shall be paid for by GCDC-WWS. The results of tests conducted by GCDC-WWS shall govern the acceptance of the Materials.

- 2. Ductile Iron Watermain Pipe.** Except for ductile iron river crossing pipe described in Paragraph B.3 below, all ductile iron watermain pipe shall conform to the most current version of the ANSI/AWWA C151/A21.51 standard and contain a cement mortar lining which shall conform to the most current version of the ANSI/AWWA C104/A21.4 standard. Except for ductile iron river crossing pipe described in Paragraph B.3 below, all ductile iron watermain pipe with a nominal inside diameter of sixteen inches (16") or smaller shall be pressure class or thickness class pipe with

a minimum wall thickness of 0.33 inches. Ductile iron watermain pipe joints shall be the push-on type consisting of a single molded rubber gasket and shall conform to the most current version of the ANSI/AWWA C111/A21.11 standard. The type of restraint utilized for ductile iron watermain pipe joints shall be approved in writing by GCDC-WWS.

The ductile iron watermain pipe fabricators shall be the ductile iron watermain pipe manufacturer unless otherwise approved by GCDC-WWS in writing. **All ductile iron pipe shall be manufactured in the United States of America.** All ductile iron pipe shall be cast, cleaned, cement-lined, coated, tested, and certified at a single manufacturing facility with all manufactured units contiguous to one another.

The exterior of ductile iron pipe watermain pipe shall be coated with a layer of arc-sprayed zinc. The mass of the zinc applied shall be 200 g/m² of pipe surface area. A finishing layer topcoat shall be applied to the zinc. The mean dry film thickness of the finishing layer shall not be less than 3 mils with a local minimum not less than 2 mils.

Polyethylene wrap shall be installed on all ductile iron watermain pipe, except for those located in manholes. The polyethylene wrap shall be cross-laminated, high density and manufactured of virgin polyethylene material and shall conform to the requirements of ASTM A-674-00. Raw materials used for the film, its strength, thickness, tube size or sheet width shall conform to the most current version of the ANSI/AWWA C105/A21.5 standard.

3. **Ductile Iron River Crossing Pipe.** All ductile iron river crossing pipe shall conform to the most current version of the ANSI/AWWA C151/A21.51 standard and contain a cement mortar which shall conform to the most current version of the ANSI/AWWA C104/A21.4 standard. Ductile iron river crossing pipe joints shall be boltless ball and socket flexible type which shall permit a deflection of fifteen degrees (15°) without leakage. The nominal ductile iron river crossing pipe size and the wall thickness class number shall be approved by GCDC-WWS.

The ductile iron river crossing pipe fabricators shall be the ductile iron river crossing pipe manufacturer, unless otherwise approved in writing by GCDC-WWS.

4. **Fittings.** All bends, tees, wyes and other special fittings used on watermain pipe shall be ductile iron Class 350 which shall conform to the most current version of the ANSI/AWWA C153/A21.53 standard and contain a cement mortar lining which shall conform to the most current version of the ANSI/AWWA C104/A21.4 standard. All ductile iron

watermain pipe fitting joints shall be the push-on type and shall conform to the most current version of the ANSI/AWWA C111/A21.11 standard and contain the required conductivity devices. GCDC-WWS approved restraints as set forth in Paragraph D.11(f) below shall be utilized when restraining fittings and joints.

5. **Gate Valves.** Gate valves shall be ductile iron resilient wedge valves for watermain pipe sixteen inches (16") and smaller in diameter. Resilient seat gate valves shall conform to the most current version of the AWWA C515 standard and contain a two hundred fifty (250) pound working pressure. Gate valve stems shall be high tensile strength, non-rising type with double O-Ring stem seals. The gate valve wedge shall be ductile iron encased in an EPDM rubber covering which shall form the sealing surface and provide sealing in either direction. All gate valves shall open with a "CLOCKWISE ROTATION" of the standard two inch (2") operating nut. The operating unit shall have a minimum of forty inches (40") of ground cover. Resilient wedge gate valves shall be American Flow Control Series 2500, East Jordan Iron Works Flowmaster Series, Mueller 2360 Series or a GCDC-WWS approved alternate.

All gate valves for watermain pipe which are sixteen inches (16") or smaller in diameter shall be installed in the vertical position.

Contractor shall ensure that all gate valves for watermain pipe are tested for leakage by the gate valve manufacturer, at Contractor's sole expense. Contractor shall deliver to GCDC-WWS a written certification (with the Drawings) from the gate valve manufacturer certifying that its gate valves have passed the above-mentioned leakage tests. All gate valves shall contain the name of the gate valve manufacturer. Any gate valves which leak or which show any defects shall be promptly replaced by Contractor, at Contractor's sole expense.

Contractor shall comply with the Drawings for the required valve type to be installed.

6. **Solid Sleeves**

- (a) Contractor shall provide bolted solid sleeves manufactured of ductile iron specifically for use with ductile iron watermain pipe. The nuts and bolts for the solid sleeves shall be low carbon steel and conform to ASTM A307, Grade B, Blue Bolts, NO-OX-ID A-Special grease shall be used on all bolts.

- (b) Mechanical joints which conform to the most current version of the AWWA C111 standard shall be used with solid sleeves only. Contractor shall furnish wall fittings with Mega-Lugs manufactured by Ford Series 1400 or a GCDC-WWS approved alternate. All bolts and nuts for the mechanical joints shall be low carbon steel and conform to ASTM A307, Grade B, Blue Bolts, NO-OX-ID A-Special grease shall be used on all bolts.

7. Valve Boxes and Valve Manholes

- (a) **Valve Boxes.** Valve boxes shall be supplied by Contractor for all valves.

All valve boxes shall be installed at a minimum depth of five feet (5') and a maximum depth of eight feet (8'). All valve boxes shall be installed in a true and vertical position over the bonnet of the valve. Following final backfill and/or final grading, Contractor shall verify that the valve can be opened by operating the valve through a full range of travel and ensuring that the valve box is completely free of dirt and other debris.

All valve boxes shall be made of good quality cast iron and shall be of the sectional type. The lower section of the valve box shall be a minimum of five inches (5") in diameter and enlarged at the base to fit around the bonnet of the valve. The upper section of the valve box shall be arranged to screw down over the adjoining lower section of the valve box and shall be the same diameter throughout. All valve boxes shall contain cast iron lids or covers which shall be marked "WATER". The length of valve boxes shall be sufficient to permit the top of the valve box to be set flush with the final surface grade. All valve boxes shall be East Jordan Iron Works 8500 Series, Tyler 6800 Series or a GCDC-WWS approved alternate.

- (b) **Pressure Tapping Sleeves.** All pressure tapping sleeves shall be installed in an appropriately sized valve manhole. All pressure tapping sleeves shall be push on restrained joints by flanged outlet, stainless steel or ductile iron built in two (2) parts. All mechanical joint sleeves shall be Romac 452 All Stainless Steel, Clow F5205, Ford FTSS, JCM SS, Mueller H-615, American Darling H-1004 or a GCDC-WWS approved alternate.

- (c) **Valve Manholes.** All valve manhole frames and covers shall be as specified on the Drawings. All valve manholes shall be installed in accordance with the Standard Details.

An exterior seal of Wrapid Seal or a GCDC-WWS approved alternate shall be installed to seal all valve manholes. Outside of road right-of-ways, Contractor shall use a GCDC-WWS or Engineer approved one and one-quarter inch (1¼") pre-formed butyl rubber sealant between grade rings, valve manhole frames and valve manhole sections. Within road right-of-ways, Contractor shall use mortar between grade rings, valve manhole frames and valve manhole sections.

All tapping valves shall be installed in valve manholes. All valves installed in paved areas shall be installed in manholes. All structures shall be at grade when installed under paved areas or at six inches (6") below grade when installed under gravel roads.

The top of the valve manhole frames and covers shall be installed flush with finished pavement grade, finished lawn grade or six inches (6") below road grade in gravel roads.

Openings for watermain pipe inlets or outlets shall be provided in pre-cast units at the locations required and shall be true to form and approximately one inch (1") larger in diameter than the outside of the watermain pipe to provide for a mortar seal. The openings around all watermain pipe shall be completely sealed using non-shrink cement mortar grout.

Valve manholes shall be constructed of pre-cast concrete and shall conform to ASTM C478-03 and contain a modified joint and premium rubber gasket which shall conform to ASTM C443-02. Valve manhole sections shall be installed on eight inch (8") thick pre-cast base slabs or installed integrally with the slab section. The valve manhole size shall be determined in accordance with the following table:

<u>Sleeve Size</u>	<u>Minimum Manhole Basin Size</u>
16" and Lower	5' Diameter Manhole
20" – 24"	8' Diameter Manhole
Larger than 24"	Consult GCDC-WWS

- (d) **Manhole Steps.** All manhole steps shall be copolymer polypropylene plastic and installed in valve manholes at a spacing of sixteen inches (16") on center. All Copolymer polypropylene

steps shall be M.A. Industries PS-1-PF, American Step Co. ML-10 with one-half inch ($\frac{1}{2}$ ") grade 60 steel reinforcement or a GCDC-WWS approved alternate.

8. **Fire Hydrant Assembly.** All fire hydrants and necessary appurtenances shall be installed in accordance with the Standard Details. Contractor shall ensure that all fire hydrants are manufactured in accordance with the most current version of the AWWA C502 standard. All fire hydrants shall be equipped with a minimum five and one-quarter inch ($5\frac{1}{4}$ ") compression type valve that assures a tight closure and prevents water from seeping into the fire hydrant barrel. Contractor shall give written verification to GCDC-WWS and Engineer that fire hydrant valves shall open against water pressure and close with water pressure. All fire hydrants shall be designed for two hundred fifty (250) pounds per square inch working water pressure and Contractor shall give written verification to GCDC-WWS and Engineer that they are tested to five hundred (500) pounds per square inch hydro-statically by the manufacturer. All fire hydrants shall have a breakaway fire hydrant barrel flange at the ground line and a safety stem coupling designed to breakaway in the event of a severe impact. All fire hydrants shall be equipped with two (2) two and one-half inch ($2\frac{1}{2}$ ") hose connections and one (1) four and one-half inch ($4\frac{1}{2}$ ") pumper connection with threads which conform to the National Standard Design. Nozzle caps shall be secured to all fire hydrants with chains. The inlet to all fire hydrant shoes shall be six inches (6").

All fire hydrants shall open clockwise with a standard seven-eighths inch ($\frac{7}{8}$ ") square operating nut. All fire hydrants shall be equipped with a second means of operation if the standard seven-eighths inch ($\frac{7}{8}$ ") square operating nut becomes inoperative. The upper operating assembly of all fire hydrants shall be weather-proof and contain either an oil reservoir or a permanent lubrication system. Fire hydrants shall not contain drain holes or if drain holes are integrally cast in place by the manufacturer, the drain holes shall be plugged by the manufacturer with a bronze plug. All fire hydrants shall be factory painted a bright yellow in accordance with the most current version of the AWWA C503 standard.

All fire hydrants shall have a minimum bury of five feet (5'). Where field conditions dictate, as determined by GCDC-WWS, barrel extensions shall be used to bring the top of the fire hydrant to final grade plus thirty-two inches (32") and in such case Contractor shall install such barrel extensions or fire hydrants with a longer bury as determined by GCDC-WWS, at Contractor's sole expense. All fire hydrants shall be installed with the pumper nozzle facing the roadway unless otherwise directed by GCDC-WWS in writing.

All fire hydrants shall be anchored to watermains using GCDC-WWS approved restraints, in addition to having concrete thrust block restraints behind them. The auxiliary valve shall be a six inch (6") internal diameter gate valve manufactured in accordance with the most current version of the AWWA C515 standard. The valve box shall be installed over the auxiliary valve and shall be made of good quality ductile iron and be of the sectional type. The lower section of the valve box shall be a minimum of five inches (5") in diameter and enlarged at the base to fit around the bonnet of the valve. The upper section of the valve box shall be arranged to screw down over the adjoining lower section of the valve box and shall be full diameter throughout. Valve boxes shall contain cast iron lids or covers. The lids or covers shall be marked "WATER". The length of valve boxes shall be sufficient to permit the top of the valve box to be installed flush with the final ground surface grade. All valve boxes for fire hydrants shall be East Jordan Iron Works 8500 Series, Tyler 6800 Series or a GCDC-WWS approved alternate.

The maximum space between fire hydrants shall be five hundred feet (500'). Fire hydrants shall be installed on property lines whenever possible.

All fire hydrants shall be East Jordan 5BR 250, American Flow Control Waterous Pacer WB67-250 or a GCDC-WWS approved alternate. Local municipalities may require Storz fittings, and in such event, Contractor shall install such fittings. Contractor shall comply with the Drawings and Standard Details for Storz fittings.

9. Water Service Pipe and Appurtenances

- (a) **Copper Pipe.** All water service pipe shall be type K soft temper copper pipe and shall conform to ASTM B-88-02 and ASTM B-251-02. The copper water service pipe shall contain the manufacturer's name or trademark and an indication of the type of copper pipe. The outside diameter of the water service copper pipe and minimum weight per foot shall not be less than that listed in ASTM B-251-02, Table 11. The water service copper pipe installed from the watermain to the curb stop service box shall have a minimum size of three-quarters inch (3/4") in diameter.
- (b) **Corporation Stops and Curb Stops.** All corporation stops and curb stops shall be fabricated of brass or bronze alloy. Corporation stops shall be used for the connection to ductile iron watermain pipe and contain a taper thread inlet and flared copper outlet connection. All corporation stops shall be Ford Meter Box Co., Model FB700-NL or a GCDC-WWS approved alternate complying

with the most current version of the ANSI/AWWA C800 standard. All curb stops shall be the ball valve and contain copper to copper flared connections. All curb stops shall be Minneapolis Pattern Ford Model B-22-NL or a GCDC-WWS approved alternate complying with the most current version of the ANSI/AWWA C800 standard. All appurtenances that come in contact with potable water must be lead free per NSF/ANSI Standard 372.

- (c) **Curb Stop Service Boxes.** All curb stop service boxes shall be standard ductile iron adjustable arch type capable of extension from a minimum length of fifty-four inches (54") to a maximum length of seventy-eight inches (78"). Curb stop service boxes shall have a minimum internal diameter of two and one-half inches (2½") for curb stops one and one-quarter inch (1¼") and smaller and shall have a minimum internal diameter of three inches (3") for curb stops larger than one and one-quarter inch (1¼"). All curb stop service boxes shall contain ductile iron covers labeled "WATER" and be coated with a corrosion resistant material. All curb stop service boxes shall be A.Y. McDonald Minneapolis Pattern Model 5623 or a GCDC-WWS approved alternate.

- 10. **Steel Casing Pipe.** All steel casing pipe shall meet the requirements of ASTM designation A-139-00, Grade B material and be of sufficient strength to meet the loading conditions of H-20 loading for pavements. Successive lengths of steel casing pipe shall be connected by continuous circumferential welds. Steel casing pipe diameter and wall thickness shall be as determined by the Standard Details.

C. MATERIALS TESTING PRIOR TO INSTALLATION

All Materials used in the installation of watermain pipe and appurtenances shall be subject to inspections and tests as specified by ASTM, ANSI and AWWA regulations. GCDC-WWS may re-test any Materials supplied in connection with the Work by an independent testing laboratory. Such tests, if conducted, shall be paid for by GCDC-WWS. The results of tests conducted by GCDC-WWS shall govern the acceptance of the Materials.

All Materials used in the installation of watermain pipe and appurtenances which are defective, of improper material or rejected by GCDC-WWS or Engineer, shall be marked accordingly by GCDC-WWS or Engineer and shall be promptly removed from the Site by Contractor, at Contractor's sole expense.

D. CONSTRUCTION METHODS

- 1. **General.** The methods of construction shall generally be left to the discretion of Contractor, provided, however, that these Watermain

Specifications are the minimum construction standards. In those municipalities where the municipality performs daily inspections or in those municipalities where GCDC-WWS or Engineer does not perform daily inspections, that municipality shall ensure that these Watermain Specifications are met.

Contractor shall perform the Work to the alignment and grade shown on the Drawings. Contractor shall comply with the Contract Documents for general construction practices. Contractor shall comply with the County Road Commission requirements in the county where the Work is being performed in connection with graveling and re-graveling of contaminated roads.

Contractor shall comply with all applicable Laws and Regulations pertaining to underground construction, particularly the MIOSHA Regulations, P.A. 451 Part 91 Soil Erosion and Sedimentation Control and those acts pertaining to the deposit of excavated materials in low lands, wetlands, inland lakes and streams. Contractor shall also comply with all other Laws and Regulations.

2. **Trench Excavation.** Contractor shall conduct trench excavations in a safe and orderly manner in full compliance with the OSHA Regulations and the MIOSHA Regulations. Contractor shall defend, indemnify and hold harmless GCDC-WWS, Engineer and their designated representatives from and against any and all losses, costs, damages and liabilities due to Contractor's failure to comply with the OSHA Regulations and the MIOSHA Regulations.

Trench excavation shall include clearing of the Site and the excavation to alignment and grade of all Materials necessary for the installation of the watermain pipe. Contractor shall deposit excavated material to minimize damages to trees, shrubs, drives, fences and other property at or adjacent to the Site and so that it may be used as backfill when suitable material is encountered. Contractor shall reimburse the landowner for any damage or destruction to any of the foregoing. Unsuitable and surplus excavated material shall be disposed of by Contractor, at Contractor's sole expense. For excavation on easements or on road right-of-ways adjacent to private land, Contractor shall provide the private landowner with the first option to obtain the excess excavated material and Contractor shall provide GCDC-WWS with the second option to obtain the excess excavated material.

Prior to disposing of excavated material, Contractor shall obtain and pay for the cost of obtaining all necessary permits in connection therewith. Contractor shall comply with all of the requirements of Public Act 451

Part 91 (Soil Erosion and Sedimentation Control) and Public Act 451 Part 301 (Inland Lakes and Streams) and any other Laws and Regulations having application thereto. Contractor shall defend, indemnify and hold harmless GCDC-WWS and Engineer from and against any and all losses, costs, damages and liabilities due to Contractor's failure or the failure of Contractor's Subcontractors or Suppliers to comply with any of the foregoing Laws and Regulations.

Contractor shall incorporate into the Unit Price Work all costs involved in the completion of the Work. Contractor shall not be entitled to additional compensation because of a change in ground conditions, unsuitable ground conditions, minor relocation of alignment, temporary sheeting, dewatering, undercutting of trench excavation or foundation strengthening.

For differing site conditions, refer to Article 4.03 of the General Conditions.

Any additional cost of boring, where noted on the Drawings, shall be included in the Contract Price and the Bid.

The bottom of the trench shall be excavated to a minimum depth of four inches (4") below the bottom of the watermain pipe barrel and this space refilled in accordance with the bedding and trench detail. The refill area shall be rounded to provide the lower one-quarter ($\frac{1}{4}$) of the watermain pipe with a satisfactory bearing area. The material placed under the haunch area shall be shovel sliced so the area is compacted. The cost of this undercutting and refill shall be included in the Unit Price Work for watermain pipe.

When ground water is encountered in the bottom of a trench, Contractor shall either dewater the trench or excavate the trench to a depth of six inches (6") below the bottom of the watermain pipe barrel and refill this area with a graded MDOT 6AA crushed limestone (A1) satisfactory to GCDC-WWS. All watermain pipe shall be installed in the trench only after the ground water has been completely removed to allow for the installation of the watermain pipe in a dry trench. The watermain pipe shall not be installed in water. The cost of the additional excavation, stone backfill, and dewatering shall be included in the Unit Price Work for the watermain pipe. Any excavation that requires well pointing shall have the watermain pipe bedded in six inches (6") or more of graded MDOT 6AA crushed limestone (A1) as required to provide a stable trench bottom.

Contractor shall supply sheeting, shoring or bracing of trenches as necessary to prevent caving or sliding of trench walls. The sheeting shall not be removed below the top of the watermain pipe if the resulting slope

of native soil increases the trench width to such an extent that the load on the watermain pipe exceeds the safe field supporting strength of the watermain pipe and bedding material. Sheeting, shoring or bracing is included in the Work and the Contract Price.

When a trench box is used, the bottom of the trench box shall be installed within two feet (2') of the bottom of the excavation. When a movable trench box is used in place of sheeting or shoring, Contractor shall secure the installed watermain pipe to prevent watermain pipe movement when the trench box is moved.

3. **Over-Excavation.** Whenever the excavation is beyond the alignments and below the grades as shown on the Drawings, Contractor shall refill all such excavated space in accordance with the requirements described in Paragraph 6.d.iv at Contractor's sole expense. The areas beneath and around manholes or other concrete structures excavated below grade shall be refilled and thoroughly compacted by Contractor as determined by GCDC-WWS or Engineer.
4. **Bearing Strengths.** The ground shall be excavated in open trenches with sufficient width to provide room within the excavation to install the watermain pipe to alignment and grade. The width of the trench is the single-most important factor affecting the structural loading on an installed watermain pipe. The width of the trench shall be measured at the top of the watermain pipe and shall not exceed the maximum trench width as set forth below.

<u>Watermain Pipe Size</u>	<u>Maximum Trench Width</u>
8" – 12"	30"
14"- 16"	36"

If the maximum trench width is exceeded, Contractor shall install concrete cradling encasement or other bedding approved by GCDC-WWS or Engineer to support the added load of the backfill, at Contractor's sole expense.

All backfill material shall be assumed to be wet clay with an average weight of one hundred thirty (130) pounds per cubic foot. The factor of safety for all loading shall be 1.4.

5. **Watermain Pipe Installation**

- (a) **General.** All watermain pipe and Materials shall be examined for defects by Contractor prior to being installed. All damaged or defective watermain pipe and Materials shall be removed

immediately from the Site by Contractor, at Contractor's sole expense. The watermain pipe shall be free from all defects and foreign materials before and during installation. All installed watermain pipe shall have a minimum of five feet (5') of cover. Any watermain pipe proposed to be installed with less than five feet (5') of cover shall require GCDC-WWS written approval, and in such event, GCDC-WWS shall determine whether insulation shall be used and the type of insulation to be used, which shall be installed by Contractor, at Contractor's sole expense.

Watermain pipe shall not be installed in water or when trench or weather conditions are unsuitable for installation as determined by GCDC-WWS or Engineer. When the installation of watermain pipe is not in progress, the open ends of the watermain pipe shall be securely closed so that no foreign materials or water can enter the watermain pipe. Any section of watermain pipe found to be damaged or defective, either before, during or after installation, shall be promptly removed and replaced with new watermain pipe by Contractor, at Contractor's sole expense.

Where watermain pipe is installed along road right-of-ways, the alignment of the watermain pipe shall be parallel to the centerline of the roadway and at the distance as indicated on the Drawings. Where watermain pipe is shown crossing private property, the alignment of the watermain pipe shall be located as indicated on the Drawings and the installation of watermain pipe shall be performed within the easements provided to GCDC-WWS.

All watermain pipe shall be secured in place with approved backfill material properly compacted under the haunches. Watermain pipe, which does not allow a sufficient and uniform space for joints, shall be promptly removed and replaced by Contractor with watermain pipe of proper dimensions to ensure such uniform space, at Contractor's sole expense. Contractor shall at all times prevent dirt from entering the joint space.

- (b) **Location of Watermain Pipe and Manholes.** The location of watermain pipe and manhole structures, as shown on the Drawings, has been selected to provide the least possible interference with or the crossing of existing utilities. GCDC-WWS may make minor variations in the location of the watermain pipe and manhole structures to meet any conditions discovered. Contractor shall not receive additional compensation for the cost of such shifts in location.

- (c) **Location of Underground Facilities.** Prior to submitting a Bid, prospective Bidders shall conduct a field survey to verify the location of Underground Facilities. The location of Underground Facilities, as shown on the Drawings, has been determined from the best available information, by surveys or by the project record documents of utility companies. GCDC-WWS and Engineer shall not be liable for the possibility that during the Work, Underground Facilities other than those shown on the Drawings may be encountered or that the actual location of the Underground Facilities shown may be different from the locations provided by GCDC-WWS. At the locations where precise positions of Underground Facilities are integral to the Work, Contractor shall verify the position of the Underground Facilities, at Contractor's sole expense.
- (d) **Protection of Underground Facilities.** Contractor shall give written notice to all persons and entities that own or use any Underground Facilities affected by the Work. Contractor shall maintain and protect the Underground Facilities during the Work and the cost of such protection shall be included in the Contract Price. If any Underground Facilities are blocked or interfered with by the Work, Contractor shall maintain the Underground Facilities in continuous operation and restore the Underground Facilities to at least the same condition as they were prior to the start of the Work, all at Contractor's sole expense. When storm drainage catch basins are located adjacent to a trench, Contractor shall ensure that foreign materials do not enter the drainage system. Contractor shall clean out catch basins and storm sewers during the Work and after completion of the Work.
- (e) **Watermain Pipe and Fittings Installation.** All watermain pipe and fittings shall be handled so as to protect them from damage. Contractor shall carefully inspect all watermain pipe and all fittings before installation. Damaged or defective watermain pipe and fittings shall be promptly removed from the Site by Contractor, at Contractor's sole expense. Contractor shall not connect the watermain pipe with the existing watermain system until Contractor has received written approval from GCDC-WWS.
- (f) **Staking.** Contractor shall hire a land surveyor, licensed in the State of Michigan, to provide alignment, easement &/or ROW limits, grade stakes and cut sheets, at Contractor's sole expense. The licensed surveyor shall provide grade stakes and cut sheets at all structures with a maximum of fifty foot (50') intervals between structures.

- (g) **Watermain Pipe Bedding.** All watermain pipe bedding shall provide uniform and continuous support of the watermain pipe barrel and be installed so that the watermain pipe is true to alignment and grade. In no case shall the field supporting strength be less than the minimum crushing strength, plus a factor of safety of 1.4.

All watermain pipe shall be installed on even firm bedding with recesses in the bedding for the bell of the watermain pipe. All watermain pipe shall be securely connected to ensure passage of a hydrostatic pressure test. The full length of each section of watermain pipe shall rest solidly upon a four inch (4") of MDOT class II Sand (A5) for watermain pipe with recesses only to accommodate pipe bells and joints. Any watermain pipe that has its alignment, grade or joints disturbed or damaged after installation shall be removed and re-installed by Contractor, at Contractor's sole expense.

After all watermain pipe has been brought to final grade and alignment, Contractor shall deposit and shovel slice or spade proper bedding material under the watermain pipe haunches. Crushed stone shall be placed from firm ground to the top of the watermain pipe in areas excavated around manholes, bore pits and other wide trench areas as determined by GCDC-WWS or Engineer.

The bedding class and load factors to be used for situations not described above are as follows:

Class A-1 (Concrete Cradle).....Bedding Factor = 2.8
Crushed Stone Encasement.....Bedding Factor = 2.2

Contractor shall comply with detail sheets for bedding requirements.

6. **Backfilling Trenches.** Unless otherwise directed by GCDC-WWS or Engineer, the trench shall be backfilled promptly after the watermain pipe is installed, provided, however, that the trench shall not be backfilled until GCDC-WWS or Engineer has inspected the grade, alignment and pipe joints. A trench backfilled without the inspection of GCDC-WWS or Engineer shall be promptly re-excavated by Contractor, at Contractor's sole expense. In the case of concrete cradle or concrete encasement bedding, the trench backfilling shall be delayed until the concrete has set sufficiently to support the backfill load.

- (a) **Method and Requirements of Trench Backfilling.** Contractor shall comply with the following methods and requirements of trench backfilling:
- (i) Backfill areas to contours and elevations with unfrozen materials;
 - (ii) Systematically backfill to allow the maximum time for natural settlement;
 - (iii) Do not backfill over porous, wet, frozen or spongy subgrade material;
 - (iv) Place backfill material in continuous layers and compact in accordance with the schedule of backfilling in Paragraph D.6(c) hereof;
 - (v) Place material in continuous layers as follows:
 - Subsoil Backfill: Maximum eight inch (8") compacted depth;
 - Structural Backfill: Maximum eight inch (8") compacted depth; and
 - Granular Backfill: Maximum eight inch (8") compacted depth;
 - (vi) Employ placement methods that do not disturb or damage other portions of the Work;
 - (vii) Maintain optimum moisture content of backfill materials to attain required compaction density;
 - (viii) Place or remove backfill evenly on each side of structures such as vaults, manholes and pump stations to prevent imposing unbalanced forces against the structure;
 - (ix) Create gradual grade changes; and,
 - (x) Blend slope into level areas.
- (b) **Backfill Soil Material and Aggregates.** The analysis of backfill soil material and aggregates shall be performed in accordance with ASTM D2487, ASTM D4318, and ASTM C136.

The testing for non-piping related backfill shall be performed in accordance with ASTM D1557 and ASTM D6938.

The testing for all piping related backfill shall be in accordance with MDOT One Point Michigan Cone Test and MDOT One Point T-99 Test for all piping related backfill.

When the results of the tests indicate the backfill soil material and aggregates do not meet the specified requirements, the backfill soil material and aggregates shall be removed, re-tested and re-deposited, at Contractor's sole expense.

Contractor shall prepare a compaction testing plan ("Compaction Testing Plan") which shall be submitted by Contractor to GCDC-WWS at the pre-construction meeting. The Compaction Testing Plan shall include the Compaction Tests Frequency. The frequency of Compaction Test shall meet the minimum testing requirements of the agency having authority over any roadways and the following requirements:

(i) Ductile Iron Pipe Installation:

(1) Haunch Compaction Verification Testing shall be conducted four times in the first 1000 feet of pipe installation at locations at least 200 feet apart for continuously welded steel and ductile iron pipe. During this initial installation period, the Contractor shall demonstrate use of means and methods that will be consistently used for the full length of the pipe installation to achieve Contract compaction limits. Contractor also shall be responsible for adjusting these means and methods as necessary to achieve Contract compaction limits where different conditions occur.

- Contractor shall use an ASTM accepted compaction testing methodology to perform Haunch Compaction Verification Testing of the area below the springline of the pipe. Testing methodology shall be submitted and approved by Engineer prior to being used in the field. Testing will be conducted by the Contractor's testing agency under the direction and oversight of the Engineer.
- The backfill material for the pipe in the work space area shall be placed and compacted using the same materials, equipment, and compaction effort as will be routinely used on other areas outside of the work space.

- Protective trench boxes, sheeting, bracing, or sloping will be required to comply with the applicable trench safety requirements required on the remainder of the project.
 - The work space may be constructed on either side of the pipe at the discretion of the engineer.
 - The construction of the individual work space on one side of the pipe, including all time and materials and safety provisions, shall be included at no additional cost to the Owner.
 - In addition to initial Haunch Compaction Verification Testing, Engineer may require up to 20 additional Haunch Compaction Verification Tests be conducted at locations of his choosing. Examples of when these additional tests may be required include if, in the sole opinion of the Engineer, the Contractor makes significant changes to the backfill materials, or methods of placement and compaction or if surrounding soil conditions change. The time, materials, and safety provisions required for these Haunch Compaction Verification Tests shall be at no additional cost to the Owner.
 - In the event that Haunch Compaction Verification testing fails, Contractor shall immediately adjust means and methods to achieve required compaction limits, re-compact area tested, and retest. Once revised means and methods are demonstrated to achieve compaction limits, they shall be implemented.
- (2) In Green Belts (90% compaction required to springline, 85% compaction required from springline to surface), provide compaction tests every 1000 linear feet and at locations identified by the Engineer. Perform one compaction test every 4 feet above crown of pipe to surface with a minimum of 2 tests required.
- (3) Within influence of road (95% compaction required), provide compaction tests every 500 linear feet and at locations identified by the Engineer and/or the Road Commission. Perform one compaction test every 2 feet

above crown of pipe to surface with a minimum of 2 tests required.

- (ii) The first set of testing will take place in the initial stages of the project when no more than 200 lf of pipe has been placed. Tests need to be performed as the trench is being backfilled.
- (iii) If compaction tests fail to meet the Contract compaction limit for pipe installation, the Contractor shall perform additional compaction to correct the problem and additional compaction testing as described above every 200 feet until the compaction criteria in Subparagraph 2 above has been satisfied. The Engineer has the right at any time to require compaction testing every 500 feet if he believes it is warranted.

Proof roll compacted fill surfaces under slabs-on-grade, and paving.

Compaction testing shall be performed by a certified materials testing company in the frequency, number and depths required to satisfy GCDC-WWS, Engineer and the agency having authority over the roadways, at Contractor's sole expense. Contractor shall not perform compaction testing after the trench has been backfilled.

Density reports shall be delivered to GCDC-WWS, Engineer and the agency having authority over the roadways by Contractor prior to final compaction testing and approval. In the event that any material testing fails, Contractor shall re-compact and re-test to achieve the required results, at Contractor's sole expense. All material test results shall be promptly delivered in writing to the GCDC-WWS, Engineer and the agency having authority over the roadways. GCDC-WWS at its sole expense may perform or have performed density tests in addition to those provided by Contractor. Upon the request of GCDC-WWS, Engineer or the agency having authority over the roadways, Contractor shall open and provide a safe trench for testing.

- (c) **Types or Classifications of Backfill Material.** The following are the different types or classifications of backfill material which may be used in the Work according to the schedule of backfilling set forth in Paragraph D.6(d) below.

- (i) **S1 (Excavated and Re-Used Material).**
 - (1) Graded.
 - (2) Free of lumps larger than three inches (3"), rocks larger than two inches (2") and debris.
 - (3) Conform to ASTM-D2487.
- (ii) **S2 (Imported Borrow).**
 - (1) Graded.
 - (2) Free of lumps larger than three inches (3"), rocks larger than two inches (2") and debris.
 - (3) Conform to ASTM-D2487.
- (iii) **S3 (Excavated and Re-Used Material).**
 - (1) Graded.
 - (2) Free of roots, rocks larger than one-half inch (½"), subsoil, debris, large weeds and foreign matter.
 - (3) Conform to ASTM-D2487.
- (iv) **S4 (Imported Borrow).**
 - (1) Friable Loam
 - (2) Reasonably free of roots, rocks larger than one-half inch (½"), subsoil, debris, large weeds, and foreign matter.
 - (3) Acidity range (pH) of 5.5 to 7.5.
 - (4) Contain a minimum of four percent (4%) and maximum of twenty-five percent (25%) inorganic matter.
 - (5) Limit decaying matter to ten percent (10%) of total content by volume.
 - (6) Conform to ASTM-D2487.
- (v) **(Topsoil).**
 - (1) Refer to G. RESTORATION 6. Surface Restoration
- (vi) **A1 (Gravel).**
 - (1) Conform to MDOT Series MDOT 6AA Limestone.
- (vii) **A2 (Gravel).**
 - (1) Conform to MDOT Series MDOT 22A Limestone.
- (viii) **A3 (Gravel).**
 - (1) Conform to MDOT 23A limestone and GCRC special provisions for 23A modified limestone.
- (ix) **A4 (Pea Gravel).**

- (1) Natural Stone; free of clay, shale, organic matter; graded in accordance with ASTM C136 to the following limits:

Minimum Size: one-quarter inch (1/4")

Maximum Size: five-eighths inch (5/8")

(x) **A5 (Sand).**

- (1) Conform to MDOT Class II material.

(d) **Schedule of Backfilling.**

- (i) **Under Manholes.** Backfill Type A5 thickness as provided in the Standard Details compacted to ninety-five percent (95%) of the material unit weight by modified proctor.

- (ii) **Outside Paved Areas/Outside Influence of Roadway, Drives, Sidewalks.**

- (1) The trench shall be backfilled with a minimum of four inches (4") of clean low void sand (A5) for the bedding of the watermain pipe. The backfill shall be shovel sliced or compacted under the haunches of the watermain pipe to provide full-length watermain pipe support. Contractor shall comply with the Specifications in connection therewith.

- (2) The remainder of the trench shall be backfilled with material free of debris, organic material and large rocks (S1, S2, or as specified in the Contract Documents placed and compacted in eight inch (8") lifts to ninety percent (90%) of the material unit weight by modified proctor). Excavated material may be used for backfill unless disallowed by GCDC-WWS and Engineer. The trench shall be slightly mounded to allow for settlement.

- (iii) **Under Paved Areas/Within Influence of Roadways, Drives, Sidewalks.**

- (1) The trench shall be backfilled with a minimum of four inches (4") of clean low void sand (A5) for the bedding of the watermain pipe. The backfill shall be shovel sliced or compacted under the haunches of the watermain pipe to provide full-length

watermain pipe support. Contractor shall comply with the Standard Details in connection therewith.

- (2) All trench excavation within a one-on-one influence of a roadway, at all road and drive crossings or as otherwise noted on the Drawings, shall be backfilled and compacted to ninety-five percent (95%) of the material unit weight by modified proctor with MDOT Class II Sand (A5) in eight inch (8") lifts and in accordance with the Compaction Testing Plan. The compaction requirement mentioned above also includes watermain pipe service leads, unless bored.
- (3) Twelve inches (12") of MDOT 21AA limestone (A2) shall be compacted to ninety-five percent (95%) of the material unit weight by modified proctor and shall be placed under areas to be concrete or ninety-eight percent (98%) of the material unit weight by modified proctor under areas to be paved or gravel driveways. Density tests shall be conducted by a certified materials testing company, at Contractor's sole expense. In the event that any material fails the density test, Contractor shall re-compact and re-test to achieve the required results, at Contractor's sole expense.

(iv) Backfill to Correct Over-Excavation.

- (1) Backfill Type A2, to required elevation.
- (2) Place in eight inch (8") lifts, each lift compacted to ninety-five percent (95%) of the material unit weight by modified proctor.

(v) Granular Trench Backfill outside Greenbelt.

- (1) Backfill Type A5, to required elevation.
- (2) Place in maximum eight inch (8") thick lifts, each lift compacted to ninety-five percent (95%) of the material unit weight by modified proctor.

(w) Granular Trench Backfill within Greenbelt:

(1) For Ductile Iron Pipe:

- Fill Type A5 from bottom of trench to springline, compacted in 12-inch lifts to 90 percent Modified Proctor.
- Fill Type S1 or S2 to surface, compacted in 24-inch lifts to 85 percent Modified Proctor.

(x) Fill Under Gravel Drive not associated with water line pipe:

- (1)** Fill Type A1, A5, or RRA, to 12 inches below finish elevation, compacted to 95 percent Modified Proctor.
- (2)** Fill Type A3 to required finished elevation, compacted in 12-inch lifts to 95 percent Modified Proctor.

(y) Granular Bedding Material for Buried Pipe:

- (1)** Fill Type A4 or A5, to required elevation. Each lift shall be loosely placed and tamped with bucket of excavator or similar piece of equipment. The tamping of the bedding material shall result in a bedding material density such when the pipe is placed, the bedding material shall conform to the curvature of the pipe and any associated bells or appurtenances, without adversely affecting the line and grade of the pipe being placed.

(z) Support Bedding Under Existing Utilities:

- (1)** Fill Type A1 or A2, to required elevation as shown on the contract drawings.
- (2)** Place in maximum 8-inch thick lifts, each lift compacted to 95 percent of the maximum dry density as determined by the appropriate MDOT compaction test method.

7. Bore and Jacking

- (a) **General.** All Work under pavements, railroads or where shown on the Drawings, shall be completed in compliance with this Paragraph D.7. Contractor shall comply with the applicable County Road Commission's specifications and requirements, regarding watermain pipe installation within the limits of the county road right-of-ways in the county where the Work is being performed hereunder. For Work under State of Michigan highways jurisdiction, Contractor shall comply with all MDOT requirements and standards.
- (b) **Steel Casing Pipe.** All steel casing pipe shall be of sufficient strength to meet the loading conditions of H-20 loading for pavements, Cooper D-72 loading for railroad crossings and shall meet the minimum required wall thickness as set forth in the Standard Details. Contractor shall comply with the Drawings for areas under railroads and other affected jurisdictions which may have greater thickness.

All Work performed beneath existing structures, across railroad right-of-ways and under pavements shall be performed in accordance with the requirements of the parties and governmental agencies which own or have jurisdiction over these locations. Contractor shall give written notice to the representatives of all affected parties and governmental agencies prior to starting the Work and shall meet all requirements of the parties and governmental agencies in regard to methods of construction and the safety precautions to be taken in performing the Work, all at Contractor's sole expense.

A suitable approach trench shall be opened adjacent to the toe of the slope of the embankment and shall be long enough and wide enough to provide sufficient working room for the steel casing pipe and watermain pipe to be installed. Where the sanitary sewer pipe must cross under a watermain pipe, a vertical separation of eighteen inches (18") between the top of the sanitary sewer pipe and the bottom of the watermain pipe shall be maintained.

Two (2) hydraulic jacks of sufficient power shall be used to apply pushing or jacking pressure to the steel casing pipe. The excavation at the top and sides of the bored area shall be less than one inch (1") greater than the outside periphery of the steel casing pipe. The bored area shall be accurately cut to line and grade of the Drawings. Adjoining sections of steel casing pipe shall be

welded with a continuous weld. Steel casing pipe shall be jacked upgrade where possible. Any undercutting at the bore pit shall be backfilled with MDOT 6AA crushed limestone (A1). MDOT 6AA crushed limestone (A1) shall be placed from the bottom of the bore pit to the top of the steel casing pipe in bore pits. The gradation of the crushed stone shall be approved by GCDC-WWS and Engineer. Concrete bedding or encasement may be required as determined by GCDC-WWS and Engineer at depths requiring special pipe support, at Contractor's sole expense.

Flowable concrete fill shall be pumped between the watermain pipe and the steel casing pipe the entire length of the bore. The flowable concrete fill shall conform to the following mixture or a GCDC-WWS approved alternate.

Sand	1,640 lbs/CY	\	
Geo Foam (W-304)	7.5 CU FT	\	1
Cement	693 lbs/CY	/	CY
Water	45 lbs/CY	/	
Compressive Strength	1,500 psi @ 28 days	/	

The aforementioned materials shall conform to the MDOT Standard Specifications for Construction.

For roadways maintained by MDOT, the steel casing pipe shall begin thirty feet (30') from the edge of pavement in areas where the posted traffic speed is at or above forty-five miles per hour (45 MPH). The steel casing pipe shall begin twenty feet (20') from the edge of the pavement where the posted traffic speed is below forty-five miles per hour (45 MPH). Contractor shall comply with the MDOT Standard Specifications for Construction in connection with installation of steel casing pipe within the MDOT right-of-ways. For all other road right-of-ways, the steel casing pipe shall begin ten feet (10') from the edge of pavement on roads with a shoulder and/or ditch and the steel casing pipe shall begin five feet (5') from the edge of the pavement on roads with curbs and gutters.

After the bore is augured, the grade shall be tested for slope by pouring water through the steel casing pipe. This test shall be performed in the presence of GCDC-WWS. Any steel casing pipe with backfall or not bored at the appropriate depth as determined by GCDC-WWS or Engineer shall be abandoned in place with flowable fill and a new steel casing pipe installed and re-tested until satisfactory test results are achieved as determined by GCDC-WWS, all at Contractor's sole expense.

8. **Surplus and Unsuitable Excavated Material.** All excavated material shall be deposited so that it does not interfere with the Work. Surplus excavated material not used in the Work shall be properly and lawfully disposed of by Contractor, at Contractor's sole expense. The excavated non-contaminated material shall be first offered to adjacent private landowners. If such adjacent private landowners do not accept the excavated non-contaminated material, Contractor shall offer the same to GCDC-WWS. If surplus and unsuitable non-contaminated material is to be deposited onto private land, Contractor shall obtain written consent from the private landowner agreeing to its use for this purpose and Contractor shall provide GCDC-WWS and Engineer with a certified copy of such agreement. Prior to depositing any surplus and non-contaminated excavated material, Contractor shall obtain a Soil Erosion and Sedimentation Control permit. The deposit of surplus excavated material by Contractor shall comply with all Laws and Regulations.
9. **Ground Water Wells and Well Points.** Contractor shall perform all ditching, pumping, well pointing, bailing, build all drains and perform all other activities necessary to keep the trench, bore pit and shaft free and clear of ground water, sewage or storm water at all times during the Work. Where the trench, bore pit and shaft areas are wet and suitable conditions cannot be obtained by other methods, Contractor shall install and operate a pumping system connected with wells and/or well points to effectively drain the same, at Contractor's sole expense. No manholes or watermain pipe shall be installed in water. All water pumped or drained from the Site shall be disposed of in a manner satisfactory to GCDC-WWS and all governmental agencies having jurisdiction, without damage to property or to other portions of the Work. Contractor shall use its best efforts to protect the Site against flooding and in connection therewith Contractor shall defend, indemnify and hold harmless GCDC-WWS and Engineer from and against all losses, costs, damages and expenses for Contractor's failure to use its best efforts to protect the Site against flooding. All wells and/or well points shall be removed after the Work is completed and all abandoned space filled by Contractor in accordance with all Laws and Regulations, at Contractor's sole expense.
10. **Watermain Separation.** The minimum horizontal separation between watermain pipes that carry potable water and sanitary sewer pipes or storm sewer pipes shall be ten feet (10'). The minimum vertical separation between watermain pipes that carry potable water and sanitary sewer pipes or storm sewer pipes shall be eighteen inches (18"). Wherever watermain pipes designated to carry potable water crosses or are installed less than ten feet (10') feet horizontally or eighteen inches (18") vertically from existing or proposed sanitary sewer pipes or storm sewer pipes, Contractor shall take the following special precautions.

- (a) **Horizontal Separation.** If conditions prevail which prevent a horizontal separation of ten feet (10'), watermain pipe may be installed closer than ten feet (10') to a sanitary sewer pipe or storm sewer pipe, provided the watermain pipe is installed in a separate trench and at such an elevation so that the bottom of the watermain pipe is at least eighteen inches (18") above the top of the sanitary sewer pipe or storm sewer pipe and MDEQ and GCDC-WWS written approval is obtained.
- (b) **Vertical Separation.** Where a watermain pipe must cross a storm sewer pipe or a sanitary sewer pipe, a vertical separation of eighteen inches (18") between the two (2) pipes shall be maintained. In making such crossings, a full length of watermain pipe shall be centered over/under the sanitary sewer pipe or storm sewer pipe to be crossed so that the watermain pipe joints shall be equidistant from the centerline of the sanitary sewer pipe or storm sewer pipe. The minimum vertical separation shall be maintained for a distance of eight feet (8') each way of the storm sewer pipe or sanitary sewer pipe being crossed. If a crossing cannot meet the eighteen inch (18") requirement, Contractor shall install a concrete cradle, at Contractor's sole expense.

11. Incidental Work

- (a) **Cutting Ductile Iron Watermain Pipe.** Contractor shall cut the ductile iron watermain pipe in a neat and workmanlike manner without damage to the ductile iron watermain pipe or lining so as to leave a smooth end at the right angle to the axis of the ductile iron watermain pipe. All ductile iron watermain pipe cutting shall be done by a mechanical cutter or saw.
- (b) **Deflecting Ductile Iron Watermain Pipe.** Whenever it is necessary to deflect ductile iron watermain pipe from a straight line, either in the vertical or horizontal plane to avoid obstructions or where long radius curves are permitted, the amount of deflection allowed shall not exceed one-half of the allowable manufacturer's recommendation.
- (c) **Joints.** Before any joints are made or the spigot of watermain pipe placed in the bells, the spigots, bells, gaskets and glands shall be thoroughly cleaned and all foreign material removed from their surfaces by Contractor. Contractor shall provide GCDC-WWS or Engineer with a reasonable opportunity to inspect the joints prior to connecting the watermain pipe.

In connecting watermain pipe and fittings, the gland, followed by the gasket, shall be placed over the plain end of the watermain pipe, the gasket and socket shall be brushed thoroughly with soapy water and the watermain pipe inserted into the bell. The gasket shall then be pushed into position so it is evenly seated in the bell and the gland moved into position against the face of the gasket. Contractor shall provide GCDC-WWS or Engineer with a reasonable opportunity to inspect the position of all gaskets prior to connecting the watermain pipe.

- (d) **Connections to Watermain Pipe.** The connection to the existing watermain pipe shall be accomplished by cutting into the watermain pipe as shown on the Drawings or by performing a pressure tap. For cutting into the watermain pipe, the existing watermain pipe shall be turned off by GCDC-WWS, at its sole discretion (including the timing thereof). Once the existing watermain pipe has been turned off, Contractor shall use its best efforts to expedite the Work so the down time is minimal. Contractor shall give at least forty-eight (48) hours written notice to all parties that may be affected by the turn-off. Contractor shall not operate any existing valves, which shall be exclusively operated by GCDC-WWS.
- (e) **Concrete Encasement.** Concrete encasement for watermain pipe shall be provided at the locations shown on the Drawings or where directed by GCDC-WWS or Engineer. Contractor shall install concrete encasement in conformance with the Standard Details. The concrete used shall have a minimum twenty-eight (28) day compressive strength of three thousand (3,000) pounds per square inch.
- (f) **Anchorage/Restraints.** Contractor shall install concrete thrust blocks and restraints at all tees, bends, stubs, plugs, fire hydrants and other fittings. The thrust block shall be a minimum of two (2) times the diameter of the watermain pipe. All caps and plugs shall be protected prior to the placement of the thrust block. All thrust blocks shall be approved by GCDC-WWS in writing prior to backfilling.

When restraint joints are required to be used, Contractor shall obtain written approval from GCDC-WWS for the method of restraint joints to be used. GCDC-WWS uses pipe restraints as the primary form of restraint. Field Lock, Fast-Grip or a GCDC-WWS approved alternate restrained joint shall be used for all watermain, valves, fittings, etc., for four inches (4") in diameter to twelve

inches (12") in diameter. Flex-Ring, TR Flex or a GCDC-WWS approved alternate restrained joint shall be used for all watermain, fittings, etc., for pipe sixteen inches (16") in diameter. Flex-Ring, TR Flex, or a GCDC-WWS approved alternate restrained joint shall be used for all valves sixteen inches (16") in diameter. The Ductile Iron Pipe Research Association (DIPRA) calculations shall be used by Contractor in determining the length of restraint joint. If pipe restraint is not used, then a thrust restraint design has to be submitted for review and approval by GCDC-WWS.

Unless otherwise approved by GCDC-WWS in writing, Contractor shall install all fire hydrant assemblies using restraint joints and thrust blocks.

E. WATER SERVICE CONNECTIONS

Where water service connections are shown on the Drawings or in the Contract Documents, service connections shall be installed as provided therein.

GCDC-WWS shall be present when Contractor connects each water service pipe to the watermain pipe. Such connection shall be through a brass corporation stop. If water pressure is available, the watermain pipe shall be tapped and corporation stops inserted under water pressure. The watermain pipe shall be drilled and tapped by use of a tapping machine with a combination drill and tap. The size of the water service pipe shall be as shown on the Drawings. All appurtenances that come in contact with potable water shall be lead free according to NSF/ANSI Standard 372.

After tapping the watermain pipe and installing the corporation stop, Contractor shall test the corporation stop to verify that it functions properly. A slack line consisting of eighteen inches (18") shall be left in the service connection at the watermain pipe. The water service pipe shall be installed in the trench to allow not less than one foot (1') extra length in its entire length, as set forth in the Standard Details. After installing the curb stop, Contractor shall test the connection to verify that it functions properly. All joints shall be examined by Contractor, GCDC-WWS and Engineer to ensure that there is no leakage. All joints of copper pipe to fittings shall be flared/union fittings. Contractor shall test the connection to verify that the corporation functions properly.

The location of all curb stop service boxes shall be marked with a three-eighths inch (3/8") by twelve-inch (12") steel rod, one inch (1") below the ground surface, along with witness points supplied by Contractor to GCDC-WWS. Additionally, all curb stop service box locations shall be supplied by Contractor to GCDC-WWS in a GPS format acceptable to GCDC-WWS. The two inch (2") by four

inch (4") by ten foot (10') wood marker shall be extended from the invert of the service connection to a minimum of four feet (4') above the proposed grade.

Where water service connections are made to a watermain pipe, Contractor shall repair any house leads that leak and ensure that the corporation stop is open and the curb stop is closed, at Contractor's sole expense.

F. TESTING WATERMAIN PIPE

1. Hydrostatic Pressure Test

- (a) **General.** All watermain pipe installed shall be promptly subjected to a hydrostatic pressure of one hundred fifty (150) pounds per square inch at the elevation of the highest point in the watermain pipe. Where feasible, the watermain pipe shall be tested in sections of two thousand feet (2,000') to three thousand feet (3,000') in length. However, at the discretion of Contractor, up to, but no more than five thousand feet (5,000') of watermain pipe may be tested at one time. Notwithstanding the foregoing, the maximum allowable leakage shall be that of three thousand feet (3,000') of watermain pipe.

Contractor shall provide all labor, supervision, pumps, measuring devices, power and water necessary for conducting the hydrostatic pressure tests, at Contractor's sole expense. Contractor shall conduct preliminary hydrostatic pressure tests on the watermain pipe to ensure that the watermain pipe sustains the required test pressures as set forth in Paragraph F.1(c) below. All leaks and defects discovered during preliminary testing shall be promptly repaired by Contractor and the watermain pipe shall thereafter be re-tested by Contractor. Immediately after the watermain pipe has passed all preliminary tests, Contractor shall contact GCDC-WWS to schedule the final hydrostatic pressure test which shall be performed in the presence of GCDC-WWS, unless the watermain pipe is operated and maintained by the local municipality.

- (b) **Preparation.** After the watermain pipe has been installed and backfilled, Contractor shall, after receiving GCDC-WWS written approval, fill the watermain pipe or a valve with a portion thereof with water in such a manner as to expel all air from the watermain pipe. The expulsion of air shall be accomplished through fire hydrants or through corporation stops installed by Contractor as is necessary to accomplish the expulsion of all air. A minimum flushing velocity water at a rate of 3 ft/s shall be obtain to flush any debris from the watermain. If a meter is not available to measure

the volume of water to fill the watermain pipe, Contractor shall pay GCDC-WWS for a minimum of five (5) times the volume of the watermain pipe installed or as otherwise determined by GCDC-WWS. Upon completion of a satisfactory test, as determined by GCDC-WWS, all taps shall be **satisfactorily** plugged with tapered bronze plugs by Contractor.

(c) **Test and Leakage**

- (i) **Watermain Pipe.** Leakage is defined as the quantity of water that must be supplied into a newly installed watermain pipe or any valved portion thereof to maintain the pressure of the specified one hundred fifty (150) pounds per square inch test pressure after the watermain pipe has been filled with water and all air has been expelled. No watermain pipe shall be accepted by GCDC-WWS until the total leakage measured over the quantity of watermain pipe installed is below the following table or the most current version of the AWWA C600 standard, whichever is more restrictive.

<u>Watermain Pipe Size</u> <u>(Diameter)</u>	<u>Max. Leakage Allowed</u> <u>(in Gallons)</u>
6"	0.96
8"	1.28
12"	1.94
16"	2.58

This table assumes a test of one thousand feet (1,000') of watermain pipe at one hundred-fifty pounds (150 lbs) of pressure for two (2) hours.

If any hydrostatic pressure test of installed watermain pipe discloses leakage greater than that specified above, Contractor shall promptly locate and repair the watermain pipe or joints and repeat the hydrostatic pressure test until the leakage is within the specified allowance for leakage, at Contractor's sole expense.

All watermain pipe shall be tested at one hundred fifty (150) pounds per square inch for two (2) hours with all fire hydrant valves in the open position. Leakage shall not be measured by a drop in pressure in a test portion over a period of time, but by the amount of water lost during the test. All leaks shall be promptly corrected by Contractor, at Contractor's sole expense.

If the watermain pipe under testing contains sections of various diameters, the allowable leakage shall be the sum of the computed leakage for each watermain pipe size.

Any damaged or defective watermain pipe, fittings, valves or fire hydrants shall be promptly removed and replaced by Contractor with GCDC-WWS approved material in accordance with these Watermain Specifications and the hydrostatic pressure test repeated to the satisfaction of GCDC-WWS and Engineer, at Contractor's sole expense.

- (ii) **Pressure Tapping Sleeves.** All pressure tapping sleeves shall be subjected to a hydrostatic pressure of one hundred fifty (150) pounds per square inch for a minimum of five (5) minutes with no loss of pressure to be deemed to have passed the hydrostatic pressure test. Contractor shall provide and pay for all labor, supervision, pumps, measuring devices, power and water necessary for conducting the hydrostatic pressure tests with respect to the pressure tapping sleeves.

- 2. **Chlorination Test.** After satisfactory hydrostatic pressure tests are obtained, Contractor shall inject chlorine in the watermain pipe in preparation for the chlorination test. A liquid chlorine shall be injected by the Contractor to the watermain pipe by means of a solution-feeding chlorinating device. A corporation stop shall be inserted by the Contractor in the top of the watermain pipe for the purpose of injection of the chlorination solution. This corporation shall be located at the beginning of the watermain extension.

A slow flow of water approved by GCDC-WWS shall be introduced into the watermain pipe near the point of chlorine solution injection at a rate such that the resulting chlorine/water mixture shall be at least fifty (50) parts per million. An open discharge shall be maintained at the far end of the watermain pipe and the injection of chlorine solution and water shall continue at a constant rate until the water discharging at the far end and also at any dead end of the watermain is fifty (50) parts per million. As the watermain pipe is filled with chlorinated water, each available outlet shall be tested to determine if the fifty (50) parts per million is obtained at each outlet. After the chlorine treated water has been in the watermain pipe at least twenty-four (24) hours, the chlorine residual at test points shall be at least ten (10) parts per million. If the chlorine residual at the test points is less than ten (10) parts per

million at the end of twenty-four (24) hours, a further injection of chlorine solution shall be made by Contractor and the retention period repeated until the required ten (10) parts per million residual is obtained, all at Contractor's sole expense. Upon completion of the chlorination test, the watermain pipe shall be thoroughly flushed by the Contractor prior to GCDC-WWS collecting water samples. Before collecting samples outlined in F.3, the heavily chlorinated water shall be flushed from the main and appurtenances until the chlorine measurements in the water leaving the main is absent or no higher than the normally maintained in the distribution system.

The chlorinated water shall be dechlorinated by Contractor prior to being discharged into a lake, stream, ditch or waterway. Contractor shall monitor and test for the level of chlorination in all discharged water and Contractor shall not discharge chlorinated water until the chlorine level is acceptable to GCDC-WWS and Contractor has received a written notification from GCDC-WWS.

3. **Bacteriological Test.** After satisfactory hydrostatic pressure tests and chlorination tests are obtained, GCDC-WWS shall collect water samples in sterile bottles containing sodium thiosulphate for a bacteriological analysis from the end most outlet of each watermain pipe. If the water samples show safe results on two (2) consecutive water samples collected at least twenty-four (24) hours apart, the watermain pipe shall be deemed to be satisfactorily disinfected. GCDC does reserve the right to collect samples (16) hours apart as outlined in the most current version of the AWWA C651 standard under necessary circumstances. The collection at the (16) hour interval shall only be approved by GCDC in writing with notification to the MDEQ.

G. RESTORATION

1. **General.** All disturbed areas on the Site shall be completely and promptly restored by Contractor in strict compliance with the GCDC-WWS Soil Erosion and Sedimentation Specifications and to the reasonable satisfaction of GCDC-WWS, GCDC-SWM, MDOT, the local municipality and the landowner. All ground surfaces shall be restored to at least their original condition prior to final approval, at Contractor's sole expense. All costs for the cleanup, restoration work and other operations including, but not limited to, construction signage, street sweeping and maintaining existing utilities are included in the Contract Price.

2. **Protection and Restoration of Property.** Contractor represents, warrants and covenants to GCDC-WWS that Contractor shall not damage or destroy any trees, fences, culverts, bridges, pavements, driveways, sidewalks, Underground Facilities, electric lines or appurtenances thereof or any public or private property along or adjacent to the Site. Contractor shall give written notice to GCDC-WWS, the authorized representatives of any public service entity or any person at least forty-eight (48) hours prior to beginning any Work that may damage, interfere or affect the operation or use of their property or facilities. Contractor shall be responsible for all damage to property as well as for all damages, losses, costs and expenses arising from any act, omission, neglect or misconduct in the manner of executing the Work, due to the non-execution of the Work or due to defective Work or Materials. When and where any damage is done to public or private property, Contractor shall promptly restore such property to a condition at least as good as existed before such damage or injury was done and Contractor shall repair such damage or injury in an acceptable manner to GCDC-WWS and the injured party, all at Contractor's sole expense.
3. **Driveways and Sidewalks.** All backfill shall be compacted granular material, MDOT Class II (A5) backfill and shall be used at all driveways, parking areas and under sidewalks, placed and compacted in accordance with the Compaction Testing Plan.

Twelve inches (12") of MDOT 21AA limestone (A2) shall be compacted to ninety-five percent (95%) of the material unit weight by modified proctor under areas to be concrete or ninety-eight (98%) of the material unit weight by modified proctor under areas to be paved or gravel driveways. Density tests shall be performed by a certified materials testing company, at Contractor's sole expense. In the event that any material fails the density test, Contractor shall recompact and re-test to achieve the required result, at Contractor's sole expense.

Contractor shall place twelve inches (12") of compacted MDOT 21AA gravel (A2) under areas requiring asphalt. Density tests as required by GCDC-WWS shall be performed by a certified materials testing company, at Contractor's sole expense. In the event that any density test fails, Contractor shall promptly re-compact and re-test to achieve the required standard, at Contractor's sole expense.

All edges broken from driveways and sidewalks shall be sawed or cut off at right angles to the driveway or sidewalk and replaced by Contractor, which shall be approved by GCDC-WWS or Engineer. Paved drives cut or broken within five feet (5') from a joint shall be removed and replaced to the joint by Contractor, at Contractor's sole expense.

Contractor shall provide temporary gravel driveways for those driveways disturbed during the Work, at Contractor's sole expense. Contractor shall ensure that all driveways are accessible during the Work, unless otherwise approved by GCDC-WWS in writing. These temporary gravel driveways shall be maintained by Contractor until the driveways have been paved.

All driveways and sidewalks shall be replaced in full sections and of the same material and thickness as the existing material, except that the minimum depth of compacted gravel in gravel driveways shall be twelve inches (12") over the entire trench area.

4. **Roadways.** If it is determined by the agency having authority over the roadways that gravel roads have become contaminated during the Work, Contractor shall promptly repair the gravel road in accordance with the requirements and specifications of the agency having authority over the roadways, at Contractor's sole expense. For areas where the road gravel is removed because of the Work, all labor and Materials shall meet the requirements and specifications of the agency having authority over the roadways.

For areas where the trench is in the roadway or within a one on one influence, all backfill used shall be MDOT Class II Sand backfill (A5) in accordance with the schedule of backfilling in Paragraph D.6(c), above. The sand backfill shall extend from the foreslope of ditch to foreslope of ditch or for curb and gutter sections shall be extended five feet (5') from the outside edge of the curb. All shoulders shall be re-graveled in accordance with the agency having authority over the roadways.

When open cutting of roadways are part of the Work, Contractor shall obtain the written approval from and comply with all requirements and specifications of the agency having authority over the roadways and GCDC-WWS. Contractor shall replace the roadway surface with approved methods and Materials in accordance with the agency having authority over the roadways, at Contractor's sole expense.

For gravel shoulders contaminated by the Work, Contractor shall remove the contaminated gravel and re-gravel the shoulders in accordance with the agency having authority over the roadways. All labor and Materials shall meet the requirements and specifications of the agency having authority over the roadways. Contractor shall remove, re-gravel and dispose of contaminated gravel shoulders in accordance with all Laws and Regulations, at Contractor's sole expense.

5. **Trees.** Contractor shall give written notice to the all affected private landowners prior to the removal of trees within public right-of-ways or easements. All trees in public right-of-ways or easements that are not to be removed shall be protected by Contractor, including from the operations of its Subcontractors and Suppliers. Contractor shall defend, indemnify and hold harmless the private landowners from and against any damages, losses, costs and expenses in connection with any trees wrongfully removed or damaged by Contractor or its Subcontractors or Suppliers.

The cost of tree removal, tree replacement, or tunnel auger operations shall be included into the Unit Price Work per foot for open cut watermain pipe and shall not be paid for separately, unless otherwise provided for in the Bid.

No trees shall be replaced within the Genesee County Road Commission right-of-way.

6. **Surface Restoration.** The surface shall be rough graded within two hundred feet (200') of the excavation immediately after completion of the Work. The final grade of the surface shall eliminate all uneven or low spots. Contractor shall remove all debris, roots, branches and stones in excess of one-half inch ($\frac{1}{2}$ ") in size. The rough grade shall be scarified to a depth of three inches (3") where the topsoil is scheduled to be placed. The topsoil shall be placed to a nominal depth of four inches (4") and placed during dry weather.

The composition of the topsoil shall be screened, fertile, friable, free draining, loam or silt loam soil. The topsoil shall be free of subsoil or soils of a mixed textural class and shall not contain rocks or stones larger than one-half inch ($\frac{1}{2}$) in diameter. The topsoil shall not contain any contaminated substances or impurities such as roots, brush, weeds, slag, cinders, ash, trash, herbicides or any other substances detrimental to vegetative growth. The topsoil shall be free of contamination by heavy metals, including lead and zinc or any other materials which may be toxic to seedlings or established grass. Notwithstanding anything herein to the contrary, topsoil obtained from a location different from the Site shall be submitted by Contractor to GCDC-WWS for approval prior to application. The moisture content of the topsoil shall not exceed six percent (6%) and topsoil shall conform to the tables on the next sheet.

Topsoil Guidelines

Soluble Salts (DS/m or mmho/cm)	pH	Sand (%)	Silt (%)	Clay (%)	Texture Class*	Organic Matter (%)	% Coarse fragments (>2 mm in diameter)**	Sodium Adsorption Ratio (SAR)
<2	5.5 to 7.5	<70	<70	<30	L, SiL	≥ 2.0	≤ 2	< 3 for any Texture

*L = loam; SiL = Silt Loam

**This guideline also includes no fragments larger than one-half inch (½”) in diameter.

Nutrients

Electrical Conductivity 1:2.5 (w/v) Extract	<1500 us/cm
Nitrogen	>0.2% (w/w)
Extractable Phosphorus	> 45 mg/Kg
Extractable Potassium	> 240 mg/Kg
Extractable Magnesium	> 80 mg/Kg

Contractor shall fine grade the topsoil, maintain the profiles and contours of the rough grade and ensure positive drainage with respect to surface run-off. The final elevation shall be at the proposed grades and cross sections in accordance with the Drawings.

Contractor shall remove all roots weeds, rocks and all foreign material while spreading the topsoil. Contractor shall manually spread the topsoil when close to plants, buildings, fences and other structures to prevent any damage to them. Contractor shall roll the topsoil and any surplus subsoil and topsoil shall be removed from the Site. Contractor shall then rake the topsoil until smooth.

Contractor shall apply fertilizer (12-12-12 or 20-10-10) at the rate of two hundred forty (240) pounds per acre after the topsoil has been raked. The fertilizer shall be mixed thoroughly into the upper two inches (2”) of the topsoil and Contractor shall lightly water the topsoil to aid in the dissipation of the fertilizer.

Contractor shall use its best efforts to match the existing lawn and/or vegetation. Contractor shall seed in accordance with the GCDC-WWS Soil Erosion and Sedimentation Control Specifications.

Notwithstanding the foregoing, Contractor shall complete the final restoration of the Work within three (3) months of completion of the Work and under no circumstances shall Contractor allow more than two thousand (2,000) lineal feet of disturbed area to exist at any time, unless otherwise agreed in writing by GCDC-WWS and subject to best management practices as determined by GCDC-WWS.

H. BARRICADES AND WARNING SIGNS

Barricades and warning signs in connection with the Work shall be provided by Contractor in accordance with the Specifications, the Michigan Manual of Uniform Traffic Control Devices, Part 6 and the requirements and approval of the agency having authority over the roadways.

For excavation in the area of Work, in or adjacent to any public right-of-way or in any areas covered by an easement, Contractor shall protect such areas by barricades, warning signs, snow fences or other appropriate measures, at Contractor's sole expense. Contractor shall take all required and prudent traffic control measures which shall be approved by the agency having authority over the roadways. Warning signs and barricades left in place after dark shall be clearly visible and the barricades shall be lighted at all times with at least one (1) light on each barricade. Contractor shall erect a sufficient number of barricades to keep vehicles from being driven on or into the Site. If Contractor fails to comply with any of the foregoing, GCDC-WWS or the agency having authority over the roadways may immediately secure the Site and order Contractor to discontinue the Work until Contractor has complied therewith, all at the Contractor's sole expense.

In areas of Work where the Contractor's activities may impede, affect or otherwise interrupt normal traffic flow, Contractor shall provide adequate flag persons, at Contractor's sole expense. In the event Contractor blocks off a roadway in accordance with the Drawings and Specifications, Contractor shall provide necessary detour signs to reroute traffic properly in accordance with the agency having authority over the roadways.

Contractor shall be liable for all damage to the Work, to Materials or to injuries to third parties due to failure of barricades, signs, lights and flag persons to protect it, and whenever evidence of such damage is found prior to acceptance of the Work, GCDC-WWS may order the damaged portion of the Work immediately removed and replaced by Contractor at Contractor's sole expense. Contractor shall maintain the barricades, signs, lights and provide flag persons until the Work has been finally accepted by GCDC-WWS.

I. MEASUREMENT AND PAYMENT

- 1. General.** Bids on a Unit Price Work basis shall be paid for on a Unit Price Work basis for the actual number of units installed. The quantities stated in the Bid are for bidding purposes only. On lump sum contracts and lump sum items, no measurements for separate payment shall be made. Items not listed in this section for payment or further defined by the Specifications are included in the Contract Price.

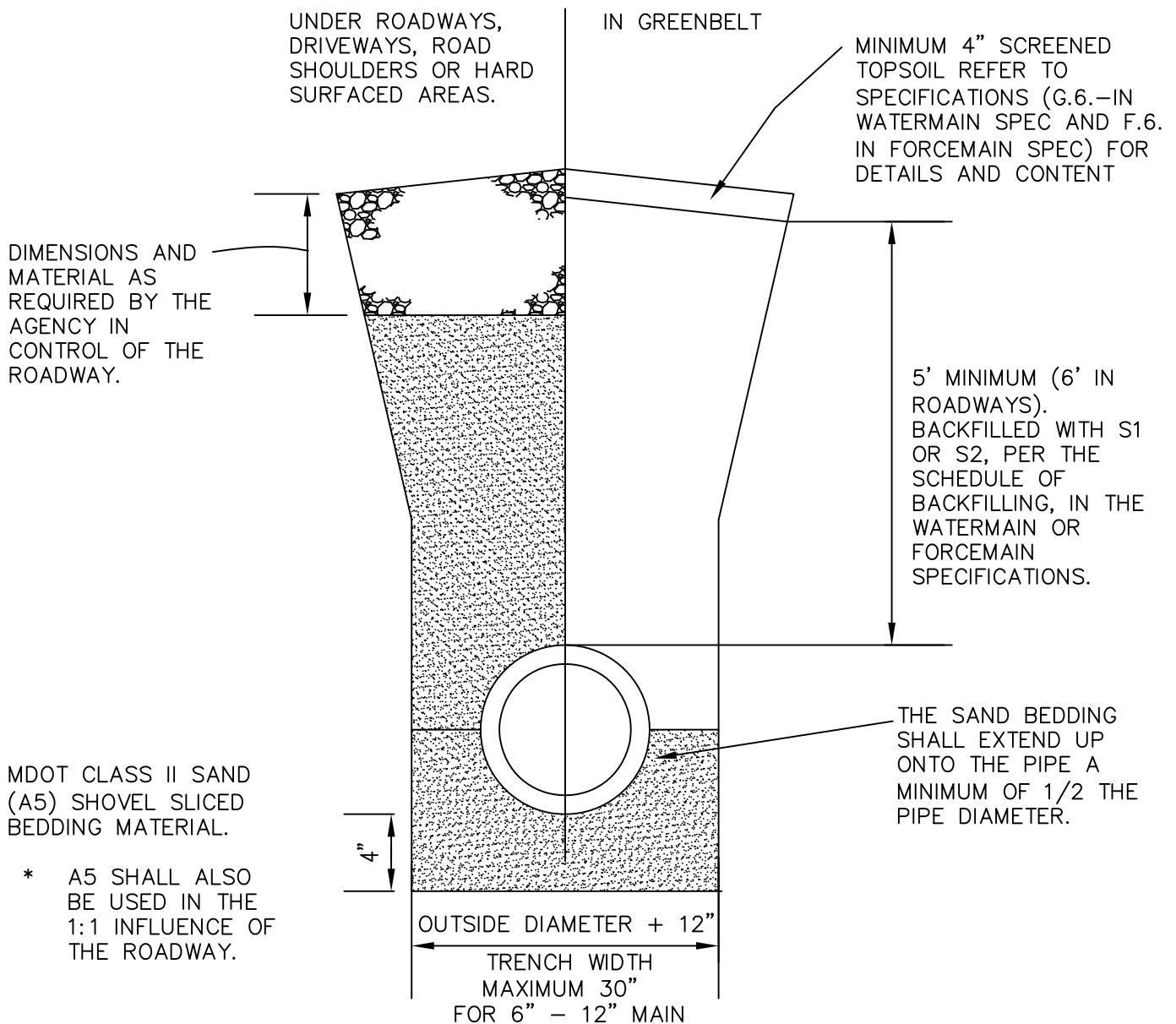
2. **Items for Payment.**

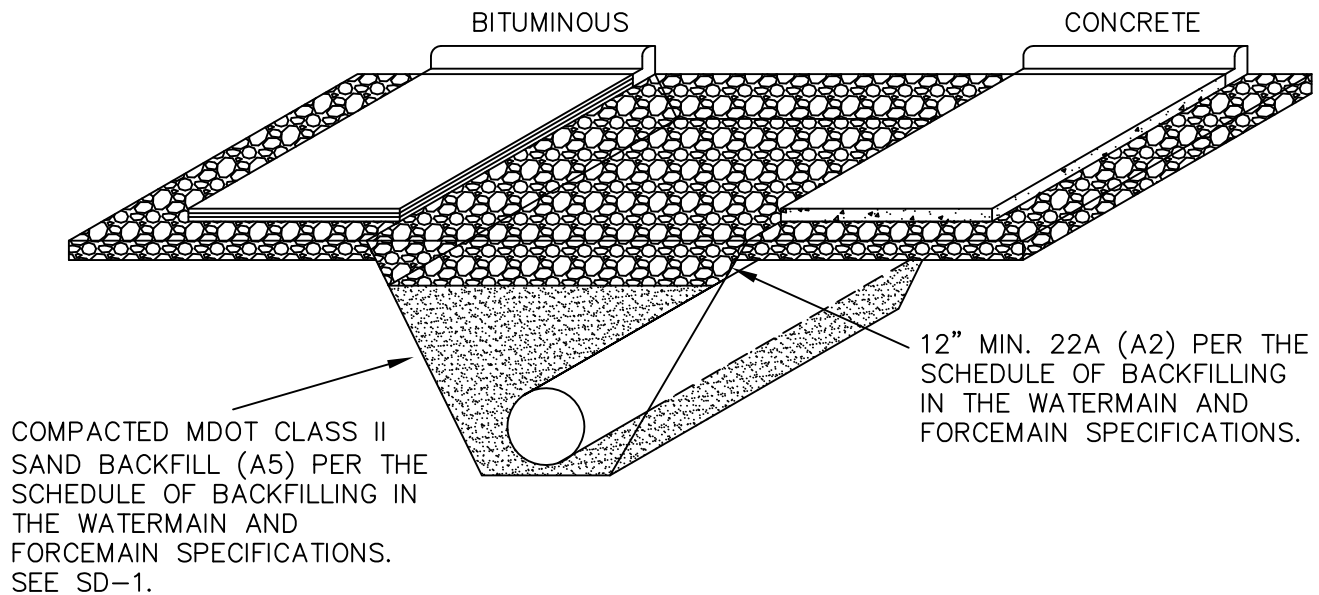
- (a) **Watermain Pipe by Open Cut.** The measurements for watermain pipe shall be made along the centerline of the watermain pipe and shall include the installation length of valves, fittings, and appurtenances. The Unit Price Work shall include concrete cradle, encasement, and sand or gravel backfill as required by these Watermain Specifications.
- (b) **Watermain Pipe in Steel Casing Pipe.** The measurements for watermain pipe encased in a steel casing pipe shall be made along the centerline of the watermain pipe from end of casing to end of the steel casing pipe. Unit Price Work for this item shall include the watermain pipe, steel casing pipe, blocking, banding, required grouting, bulkheads and related appurtenances. In no case shall the length of the steel casing pipe be longer than required for the crossing according to these Watermain Specifications. For cases where Contractor increases the length of a bore to pass by Underground Facilities, fences, sidewalks or other obstructions, Contractor shall not be paid for steel casing pipe, unless prior written approval has been obtained from GCDC-WWS.
- (c) **Fittings.** The cost of furnishing and installing fittings as shown on the Drawings shall be included in the Unit Price Work for watermain pipe and shall not be paid for separately.
- (d) **Valves.** Valves shall be paid for at the Unit Price Work for each unit installed, which shall also include the furnishing and installation of a ductile iron valve box or pre-cast concrete valve manhole, as stipulated on the Drawings and listed in the Bid.
- (e) **Fire Hydrant Assembly.** Fire hydrant assembly shall be paid for at the Unit Price Work for each fire hydrant installed. The fire hydrant Unit Price Work shall include the fire hydrant, the auxiliary valve and box, piping, stone or gravel sub-base and necessary thrust blocks or joint restraints.
- (f) **Water Service Connections.** Water service connections shall be paid for as set up in the Bid and may be either Unit Price Work or a lump sum.

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NOTES

1. PLACE AGGREGATE MATERIAL ON THE COMPACTED SAND BACKFILL (A5) FOR ALL DRIVES, ROAD SHOULDERS, PARKING LOTS OR OTHER HARD SURFACED AREAS PER THE APPROVED PLANS.
2. THE CONTRACTOR SHALL COMPACT THE SAND BACKFILL (A5) TO 95% OF THE MATERIAL UNIT WEIGHT BY MODIFIED PROCTOR ACROSS ALL ROADWAYS AND DRIVES PER THE SCHEDULE OF BACKFILLING IN THE WATERMAIN OR FORCEMAIN SPECIFICATIONS. THIS INCLUDES SERVICE LEADS UNLESS BORED. THE CONTRACTOR SHALL DO THE TESTING WITH THE RESULTS SUBMITTED TO GCDC-WWS PRIOR TO FINAL TESTING.
3. WHERE THE GROUND ELEVATION AT THE TRENCH LINE IS ABOVE THE ELEVATION OF THE CENTERLINE OF THE ROAD, THE CONTRACTOR SHALL INSTALL THE PRESSURE PIPE 6' BELOW THE ELEVATION OF THE ROAD. THE EXTRA DEPTH SHALL BE NOTED ON THE AS-BUILT DRAWINGS.
4. FOR ADDITIONAL CONSIDERATION OF PIPE ZONE EMBEDMENT CONDITIONS, SEE THE MOST CURRENT VERSION OF AWWA C600 STANDARD.
5. THE ENGINEER SHALL REVIEW AND ADJUST PIPE THICKNESS DESIGN RECOMMENDATIONS IN THE MOST CURRENT VERSION OF AWWA C151/A21.51 STANDARD FOR ADDITIONAL DEPTHS OF COVER.
6. STONE BEDDING (A1) IS REQUIRED IN ALL AREAS OF DEWATERING.



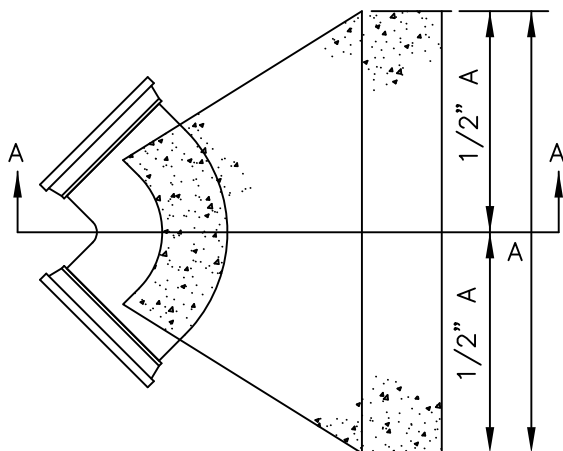


SPECIAL REQUIREMENTS FOR OPEN CUTTING HARD SURFACE AND/OR GRAVEL ROADS

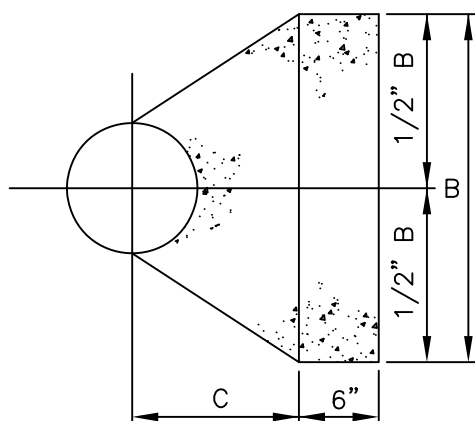
1. THE CONTRACTOR SHALL ACQUIRE A SPECIAL OPEN CUT APPROVAL FROM THE AGENCY HAVING AUTHORITY OVER THE ROADWAYS.
2. THE CONTRACTOR SHALL SUPPLY CONTINGENT LIABILITY INSURANCE FOR THE AGENCY HAVING AUTHORITY OVER THE ROADWAYS.
3. THE PROTECTION OF THE WORK SHALL BE IN ACCORDANCE WITH THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, PART 6. BARRICADES, WARNING AND LIGHTING NECESSARY FOR PUBLIC SAFETY TO BE APPROVED BY THE ENGINEER AND THE AGENCY HAVING AUTHORITY OVER THE ROADWAYS PRIOR TO STARTING CONSTRUCTION.
4. THE CONTRACTOR SHALL EXCAVATE ALL MATERIAL TO PROPOSED GRADE.
5. THE WATERMAIN SHALL BE PLACED ON MDOT CLASS II SAND (A5) BEDDING.
6. ALL BACKFILL SHALL BE MDOT CLASS II SAND (A5), PLACED PER THE SCHEDULE OF BACKFILLING.
7. THE SAND BACKFILL SHALL EXTEND FROM THE OUTSIDE EDGE OF SHOULDER TO OUTSIDE EDGE OF SHOULDER, INCLUDING THE ONE ON ONE INFLUENCE OF THE ROADWAY OR THE SAND BACKFILL SHALL EXTEND FROM THE BACK OF CURB TO BACK OF CURB, INCLUDING THE ONE ON ONE INFLUENCE OF THE ROADWAY.
8. THE FINAL 12" OF ALL BACKFILL SHALL BE MDOT 22A LIMESTONE (A2) SUBBASE MODIFIED PER GCRC SPECIFICATIONS. ALL SHOULDERS SHALL BE REPAIRED PER THE AGENCY HAVING AUTHORITY OVER THE ROADWAYS.
9. THE CONTRACTOR SHALL REPLACE THE ROAD SURFACE WITH THE AGENCY HAVING AUTHORITY OVER THE ROADWAYS APPROVED MATERIAL.
10. THE CONTRACTOR SHALL MAINTAIN TEMPORARY ACCESS TO ALL AREAS DURING CONSTRUCTION. A PUBLIC ROAD MAY BE CLOSED FOR 1/2 WIDTH CONSTRUCTION WITH THE AGENCY HAVING AUTHORITY OVER THE ROADWAYS APPROVAL, BUT THE CLOSING TIME CANNOT EXCEED 8 HOURS. THE CONTRACTOR MAY USE SHOULDERS AND TEMPORARY PATCHES TO KEEP A ROAD OPEN.

TABLE INDICATES MINIMUM BEARING

DIA. OF PIPE OR BRANCH OF TEE	90° BEND OR SMALLER			45° BEND			22 1/2° BEND			PLUGS, HYDRANTS AND TEES		
	A	B	C	A	B	C	A	B	C	A	B	C
6"	2'-0"	2'-0"	0'-9"	2'-0"	1'-0"	0'-9"	2'-0"	1'-0"	0'-9"	2'-0"	2'-0"	1'-0"
8"	3'-0"	2'-0"	1'-0"	2'-0"	2'-0"	1'-3"	2'-0"	1'-0"	1'-0"	3'-0"	2'-0"	1'-9"
12"	4'-0"	3'-0"	1'-6"	3'-0"	3'-0"	1'-6"	2'-0"	2'-0"	1'-6"	4'-0"	3'-0"	2'-0"
16"	6'-0"	4'-0"	1'-6"	4'-0"	4'-0"	1'-6"	3'-0"	3'-0"	1'-6"	5'-0"	4'-0"	2'-0"
24"	8'-0"	6'-6"	2'-0"	5'-0"	5'-0"	2'-0"	4'-0"	4'-0"	2'-0"	8'-0"	6'-0"	2'-6"



BEND — PLAN VIEW

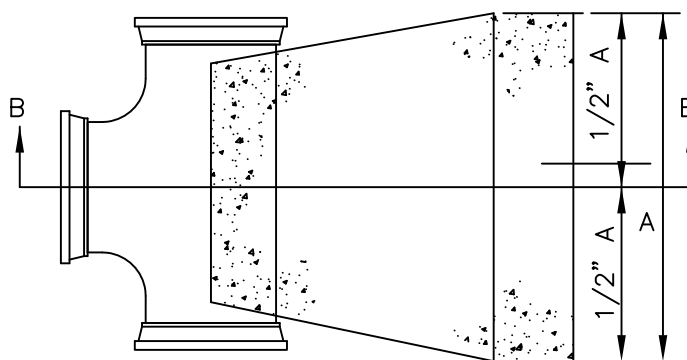


SECTION A-A BEND

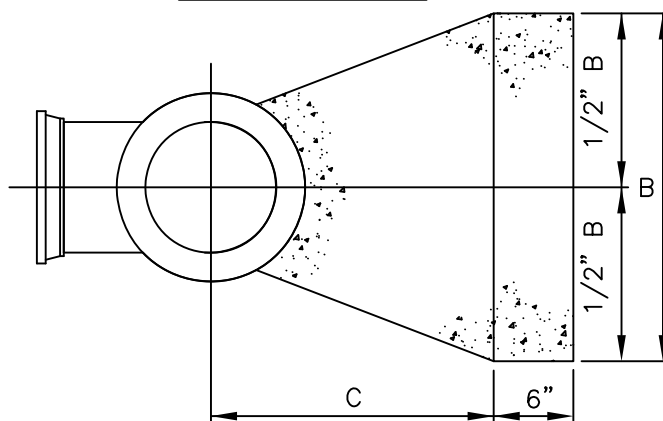
NOTES

1. THE CONTRACTOR SHALL USE GCDC-WWS APPROVED RESTRAINED JOINTS IN ADDITION TO THRUST BLOCKS.
2. USE MIXED (i.e. WITH WATER) 3000 PSI CONCRETE FOR ALL THRUST BLOCKS.
3. POUR AGAINST UNDISTURBED SOIL.
4. KEEP BOLTS, FITTINGS AND JOINTS CLEAR OF CONCRETE.
5. BEARING AREA IS FIGURED ON 2000-PSI SOIL CAPACITY.
6. THE DESIGN ENGINEER SHALL PROVIDE DIMENSIONS OF THRUST BLOCKS FOR PIPE LARGER THAN 24" FOR REVIEW AND APPROVAL.

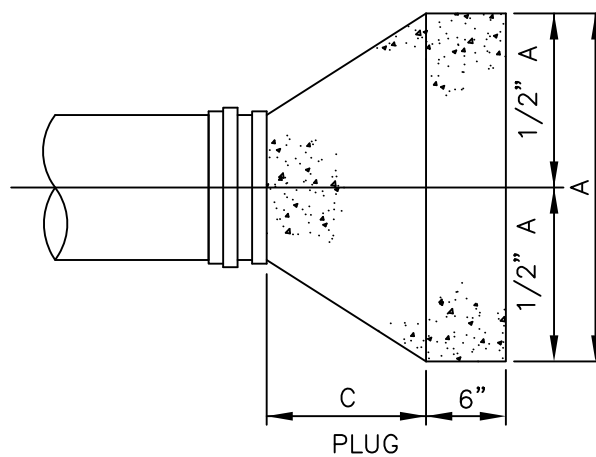
SD-3



TEE — PLAN VIEW



SECTION B-B TEE



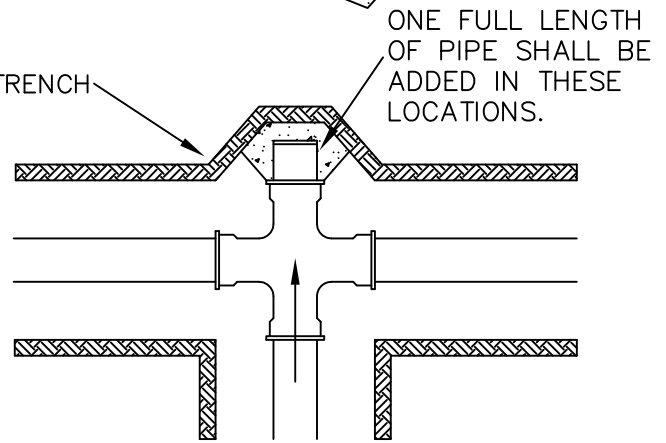
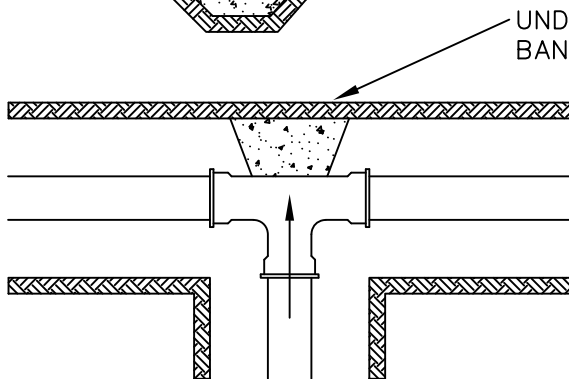
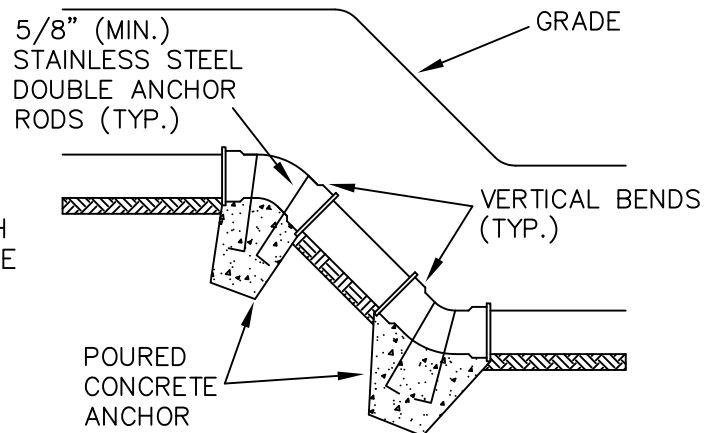
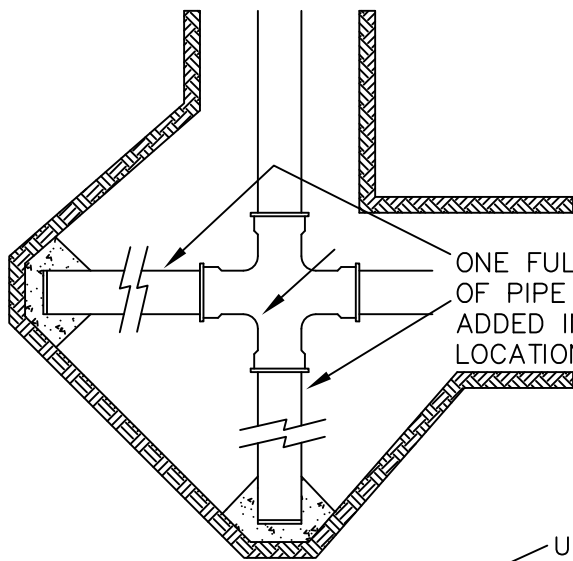
PLUG

MINIMUM PIPE RESTRAINT SCHEDULE FOR
GROUND BURIED PRESSURE PIPES¹

BEND TYPE	22 ½°	33 ¾°	45°	56 ¼°	67 ½°	78 ¾°	90° OR/ DEAD END
	LENGTH (FT) OF RESTRAINT REQUIRED ²						
PIPE SIZE							
6"	3	6	11	16	23	29	37
8"	4	8	15	22	31	41	50
10"	5	11	18	28	38	49	61
12"	6	13	22	33	45	59	73
14"	7	14	25	37	52	68	84
16"	8	16	28	42	59	77	95
18"	8	18	31	47	66	86	107
20"	9	20	35	53	73	95	118
24"	11	23	40	61	85	111	138
30"	13	29	50	75	105	136	170
36"	15	34	59	88	123	160	199
42"	17	39	67	101	141	184	228
48"	19	43	75	113	157	206	255

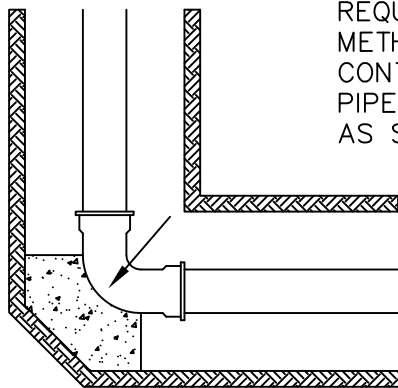
NOTES

1. THIS TABLE IS BASED ON A TEST PRESSURE OF 180 PSI (OPERATING PRESSURE PLUS WATER HAMMER). FOR OTHER TEST PROCEDURES, ALL VALUES ARE TO BE INCREASED OR DECREASED PROPORTIONALLY.
2. IF TIE RODS ARE APPROVED BY GCDC-WWS, THEY MUST BE STAINLESS STEEL GRADE 316 RODS & NUTS. PLACE (2) RODS 5/8 INCH DIAMETER MINIMUM FOR WATERMAIN 6 INCH TO 10 INCH, AND (4) RODS 5/8 INCH DIAMETER MINIMUM FOR 12 INCH AND LARGER.
3. THE CONTRACTOR SHALL USE GCDC-WWS APPROVED RESTRAINED JOINTS.
4. IN-LINE VALVES SHALL BE CONSIDERED DEAD ENDS IN BOTH DIRECTIONS.
5. THIS TABLE IS A MINIMUM REQUIREMENT FOR THRUST RESTRAINT OF GROUND BURIED PRESSURE PIPES AND DOES NOT ALLEVIATE THE ENGINEER OF THE RESPONSIBILITY TO DESIGN PROPER THRUST RESTRAINT SPECIFIC TO THE PROJECT. IN THE CASE OF DUCTILE IRON PIPE, THE ENGINEER SHALL FOLLOW THE APPLICABLE STANDARD AS SET FORTH IN THE LATEST EDITION FOR THRUST RESTRAINT DESIGN FROM THE DUCTILE IRON PIPE RESEARCH ASSOCIATION (DIPRA).
6. REFER TO DIPRA FOR TEES, FITTINGS, ETC. USE DIPRA AT 150% WRAP.
7. THRUST BLOCKS SHALL BE USED IN CONJUNCTION WITH THE RESTRAINT SCHEDULE.

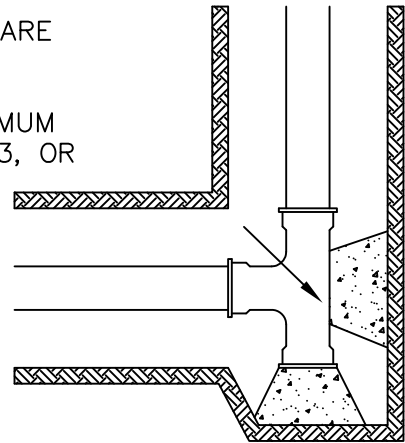


→ = DIRECTION OF THRUST

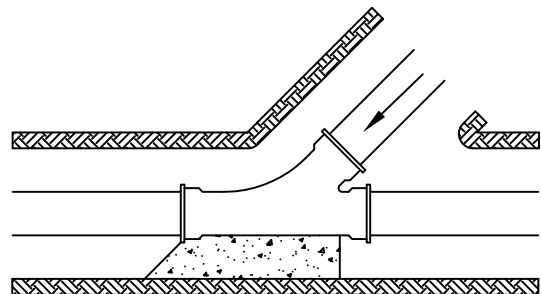
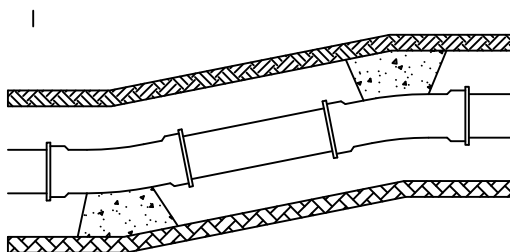
NOTE: THE USE OF THRUST BLOCKS ARE REQUIRED IN ADDITION TO APPROVED METHODS OF RESTRAINT. THE CONTRACTOR MUST FOLLOW THE MINIMUM PIPE RESTRAINT SCHEDULE, SEE SD-3, OR AS SPECIFIED BY THE ENGINEER.



NOTE: CONTRACTOR SHALL HAVE PRIOR APPROVAL OF THE PROPOSED METHOD OF RESTRAINT



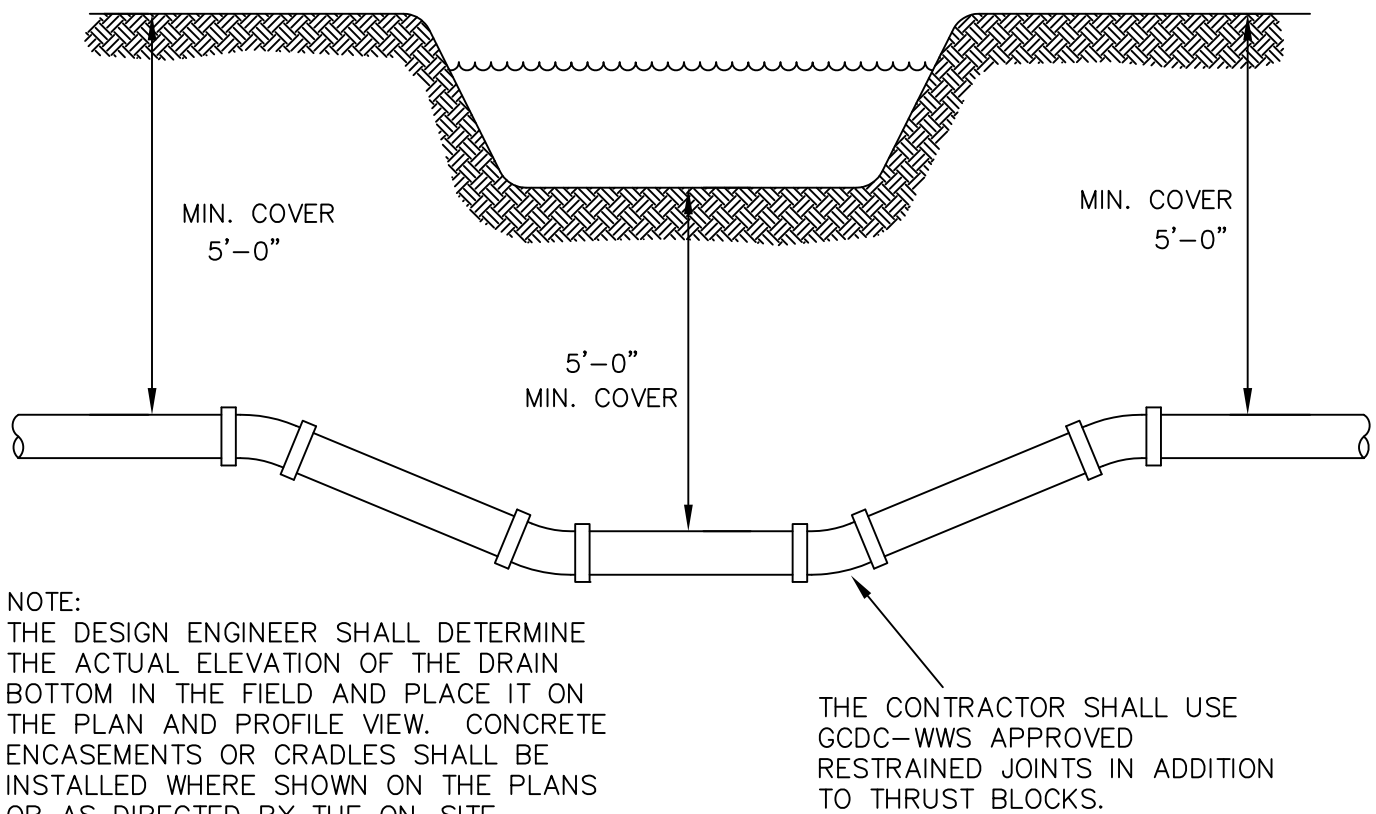
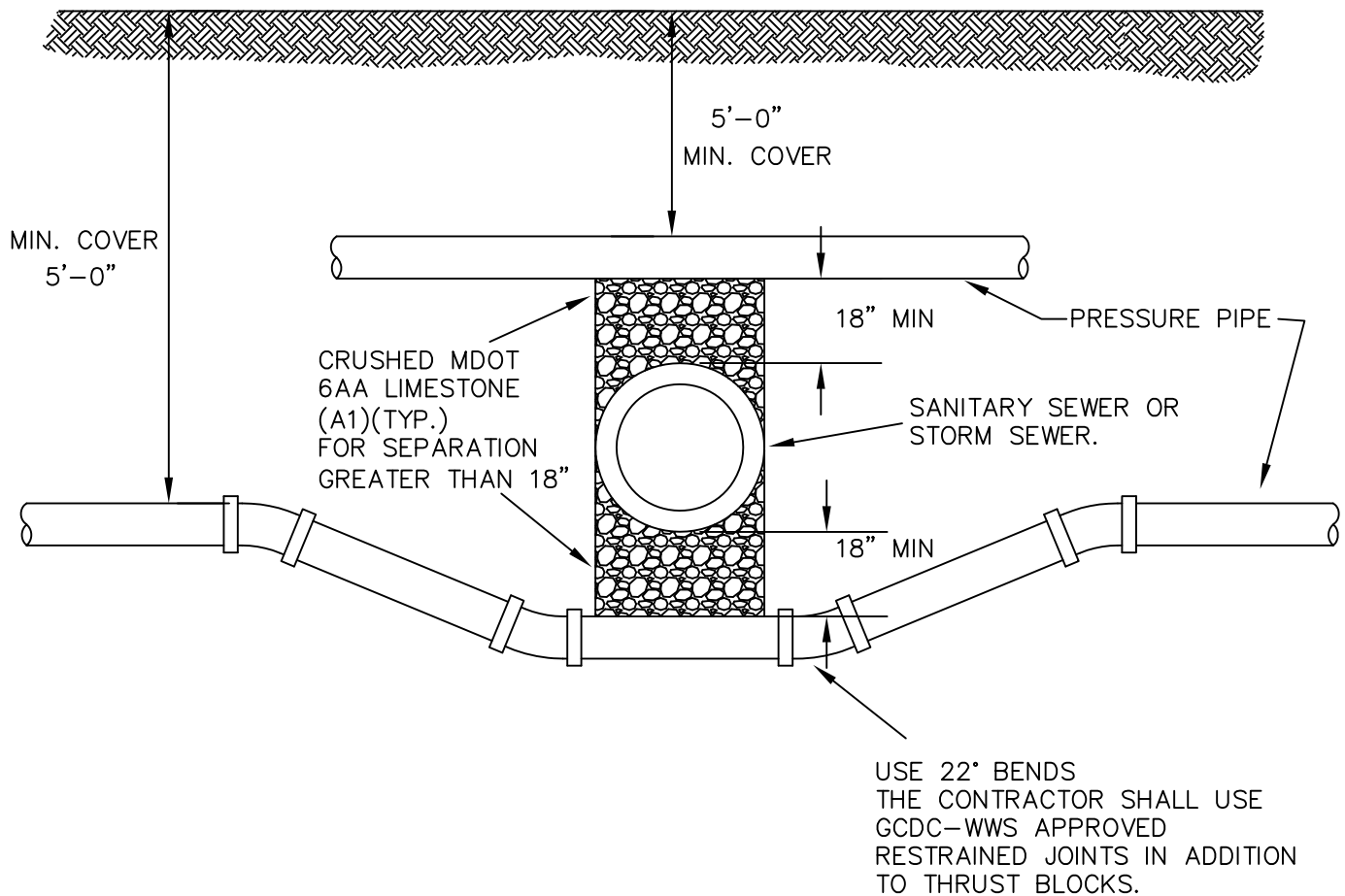
NOTE: HYDRANTS SHALL BE RESTRAINED IN ACCORDANCE WITH SD-16



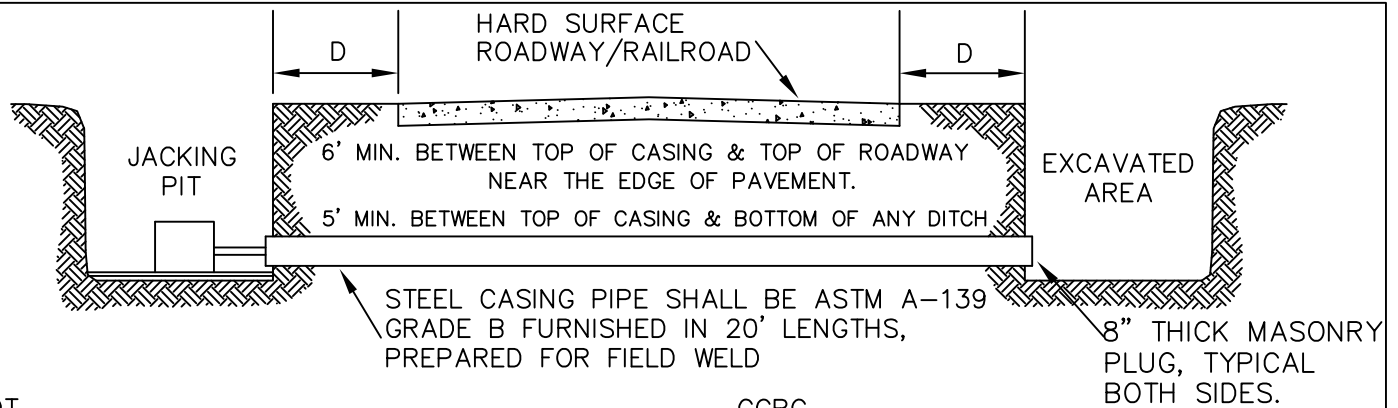
SD-5

LOCATION OF THRUST BLOCK RESTRAINT

PRESSURE PIPE



SD-6
WATERMAIN BURY AT COUNTY DRAIN,
DITCH, OR STREAM



MDOT

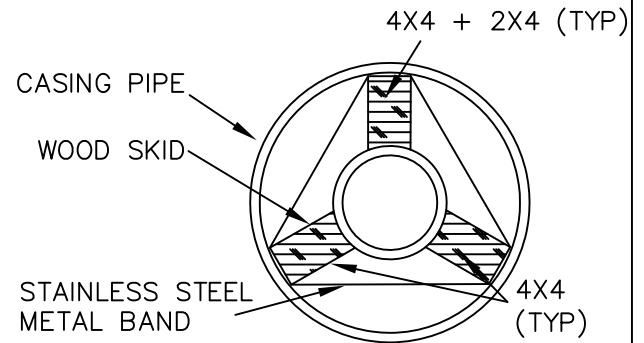
D=30' FOR TRAFFIC OVER 45 MPH
D=20' FOR TRAFFIC UNDER 45 MPH

GCRC

D=10' FOR ROADS WITH SHOULDER/DITCH
D=5' FOR ROADS WITH CURB AND GUTTER

SIZE AND MATERIAL	MIN. CASING DIA. O.D. INCHES *	MIN. WALL THICKNESS INCHES
6" D.I. PRESSURE PIPE**	12.75	0.375
8" D.I. PRESSURE PIPE	20.00	0.375
10"-12" D.I. PRESSURE	20.00	0.375
16" D.I. PRESSURE PIPE	24.00	0.375

**ALLOWED ONLY UNDER ROADS NOT RAILROADS.



1. ALL BORE AND JACK OPERATIONS WITHIN THE ROADWAYS/RAILROADS WILL REQUIRE A PERMIT FROM THE AGENCY HAVING AUTHORITY OVER THE ROADWAYS/RAILROADS.
2. THE CONTRACTOR SHALL ABIDE BY ALL SAFETY PRECAUTIONS INCLUDING THE LATEST EDITION OF THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, PART 6 AS REQUIRED BY THE AGENCY HAVING AUTHORITY OVER THE ROADWAYS/RAILROADS.
3. THE CONTRACTOR SHALL PROTECT AND RESTORE ALL PROPERTY.
4. THE CONTRACTOR SHALL NAME THE AGENCY HAVING AUTHORITY OVER THE ROADWAYS/RAILROADS AS AN ADDITIONAL NAMED INSURED FOR CONTINGENT LIABILITY FOR THE PROPOSED CONSTRUCTION.
5. THE CONTRACTOR SHALL ABIDE BY ALL CONDITIONS STATED IN THE GCRC MEMO OF 9-1-75 LABELED SANITARY SEWER AND WATERMAIN INSTALLATION WITHIN THE LIMITS OF COUNTY HIGHWAYS OR THE REQUIREMENTS OF THE AGENCY HAVING AUTHORITY OVER THE ROADWAYS/RAILROADS.
6. THE SHEETING OF THE FRONT FACE OF THE BORE PIT WILL BE REQUIRED IF UNSTABLE SOIL CONDITIONS ARE ENCOUNTERED.
7. THE AUGER MUST ALWAYS PROCEED THE CASING PIPE HEAD.
8. THE CONTRACTOR SHALL NOTIFY THE AGENCY HAVING AUTHORITY OVER THE ROADWAYS/RAILROADS A MINIMUM OF 72 HOURS PRIOR TO BEGINNING CONSTRUCTION.
9. TREATED WOOD SKIDS AND STAINLESS STEEL METAL BANDS MIN. 5/8" WIDE MUST BE INSTALLED EVERY FOUR FEET ALONG THE ENTIRE LENGTH FOR ALL BORES TO KEEP THE CARRIER PIPE ON LINE AND GRADE. THE WOODEN SKIDS SHALL BE EXTENDED THE WHOLE LENGTH OF THE CASING. THE MAXIMUM DISTANCE FROM THE INSIDE DIAMETER OF THE CASING PIPE TO THE OUTSIDE EDGE OF THE SKID SHALL BE 1".
10. THE ENDS OF THE CASING PIPE SHALL BE BULKHEADED WITH AN 8" WATER TIGHT MASONRY BULKHEAD.
11. CASING SIZES MIGHT NEED TO BE INCREASED IN LOCATIONS USING RESTRAINED JOINTS.
12. ANY ADDITIONAL REQUIREMENTS THAT MAY COME FROM THE AGENCY HAVING AUTHORITY OVER THE ROADWAY/RAILROAD.
13. FLOWABLE CONCRETE FILL SHALL BE PUMPED BETWEEN THE PIPE AND THE CASING PIPE THE ENTIRE LENGTH OF THE BORE.

* WITH DUCTILE IRON BOLTLESS RESTRAINT, CONTRACTOR MUST VERIFY CASING SIZE CAN CARRY PIPE.

SD-7

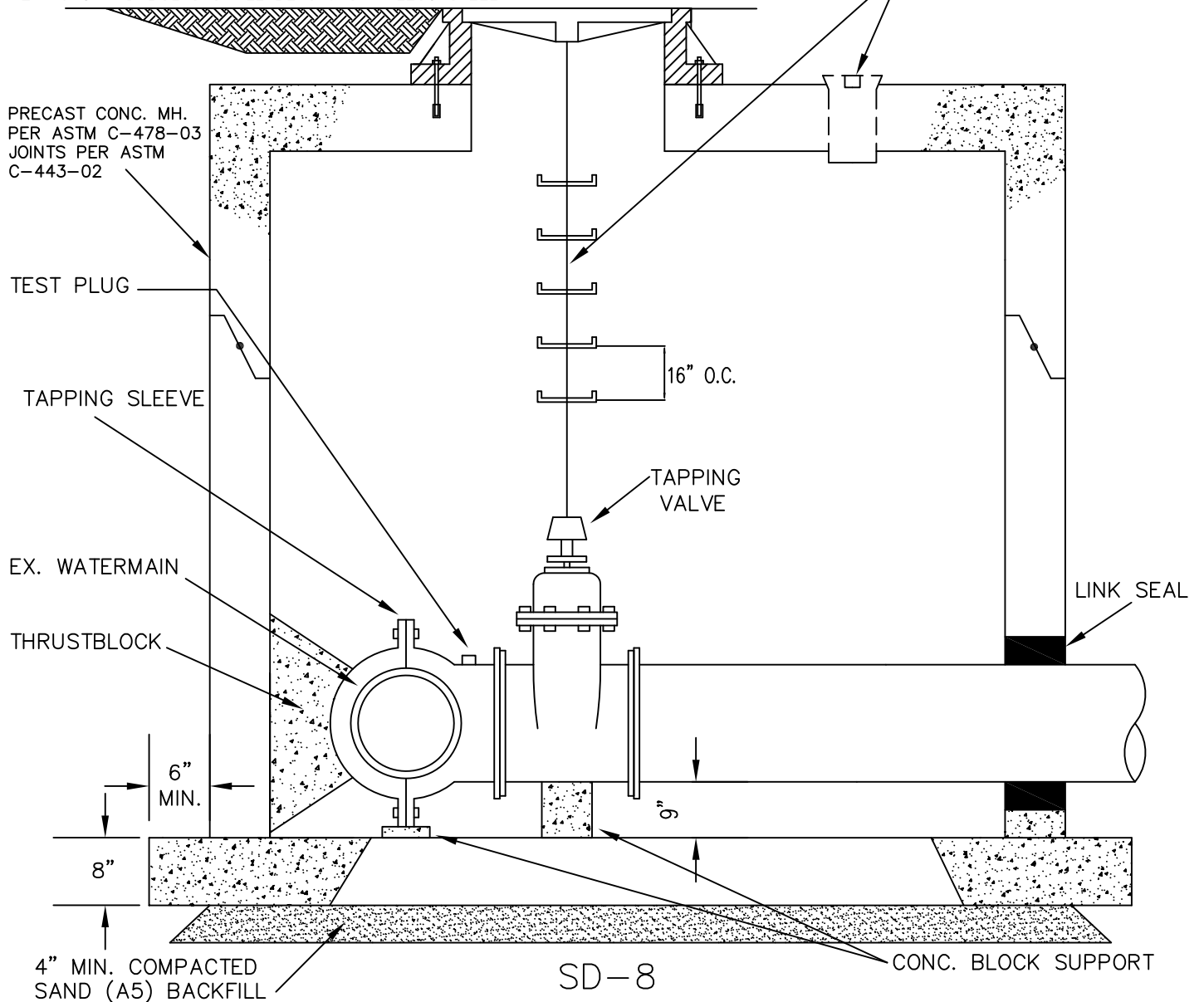
BORE & JACK CONSTRUCTION ON ALL ROADWAYS/RAILROADS

NOTES

1. ALL PRESSURE TAPS MUST BE INSTALLED IN A CONCRETE VALVE MANHOLE.
2. ALL TAPPING SLEEVES SHALL BE MECHANICAL JOINT BY FLANGED OUTLET, ALL STAINLESS STEEL OR CAST IRON, BUILT IN TWO SECTIONS.
3. APPROVED MECHANICAL JOINT SLEEVE; ROMAC 452 ALL 304 STAINLESS STEEL, CLOW F5205, MUELLER H-615, AMERICAN DARLING H-1004, OR GCDC-WWS APPROVED ALTERNATE.
4. THE OUTLET FLANGE IS CLASS 125 ANS/B16.1.
5. THE TAPPING TEE SHALL HAVE A BUILT-IN TEST PLUG.
6. THE GASKET FOR THE MAINLINE SHALL BE MADE FOR THE PIPE MATERIAL IN PLACE, DUCTILE IRON CLASS 52-54.
7. THE VALVE SHALL BE FLANGED BY RESTRAINED JOINT.
8. THE VALVE SHALL HAVE OVERSIZED SEAT RINGS TO PERMIT ENTRY OF THE TAPPING MACHINE CUTTERS.
9. THE VALVE SHALL MEET ALL REQUIREMENTS OF THE MOST CURRENT VERSION OF AWWA C515 STANDARD.
10. THE TOP OPENING SHALL BE CENTERED ON THE VALVE OPERATING NUT. IF THE TOP CANNOT BE CENTERED OVER THE VALVE, THE TOP OF THE MANHOLE CAN BE CORE DRILLED AND A VALVE BOX CAN BE INSTALLED (MIN. 1 SECTION). THE INSTALLATION SHALL BE WATERTIGHT WITH BUTYL INSTALLED AS NEEDED FOR A WATERPROOF SYSTEM.
11. SET MANHOLE FRAME AND COVER ON TOP OF SLAB.
12. NUTS AND BOLTS SHALL BE 316 STAINLESS STEEL.

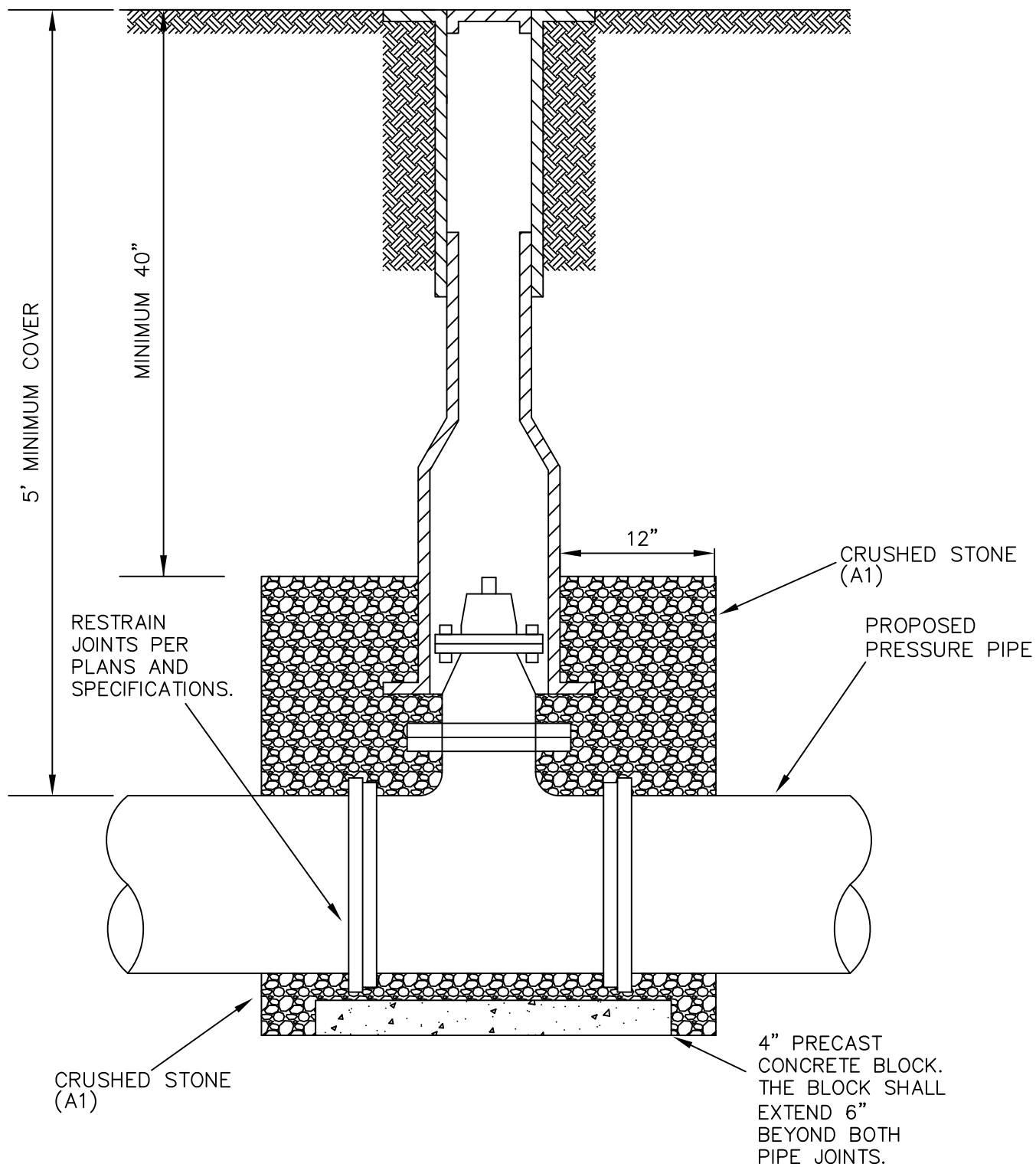
PRESSURE TAPPING & CUT-IN SLEEVES AND VALVES	
SLEEVE SIZE	MIN. BASIN SIZE
12" & SMALLER	5' DIA. MH.
16"	6' DIA. MH.
20" - 24"	8' DIA. MH.
LARGER	CONSULT GCDC-WWS

THE PLUMB LINE TO THE OPERATING NUT MUST NOT BE CLOSER THAN 6" TO THE EDGE OF THE FRAME. IF VALVE IS OUTSIDE THE INFLUENCE OF THE MANHOLE COVER FRAME - MANHOLE TOP CAN CORE DRILL AS APPROVED IN THE FIELD.



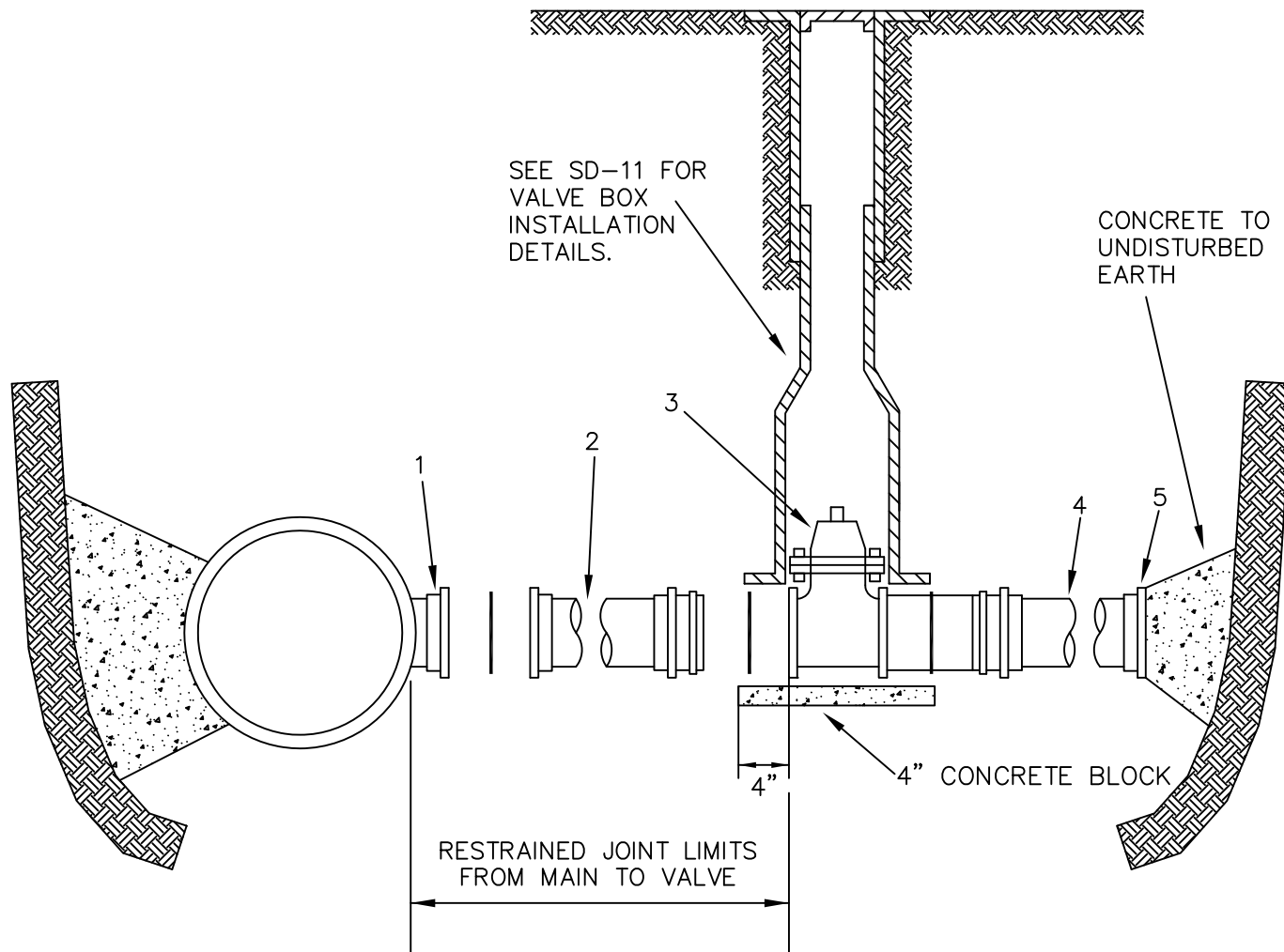
PRESSURE TAPPING SLEEVE AND VALVE

PRESSURE PIPE



1. ALL IN-LINE VALVES SHALL UTILIZE VALVE BOXES. SEE SD-11.

SD-9 IN-LINE GATE VALVES



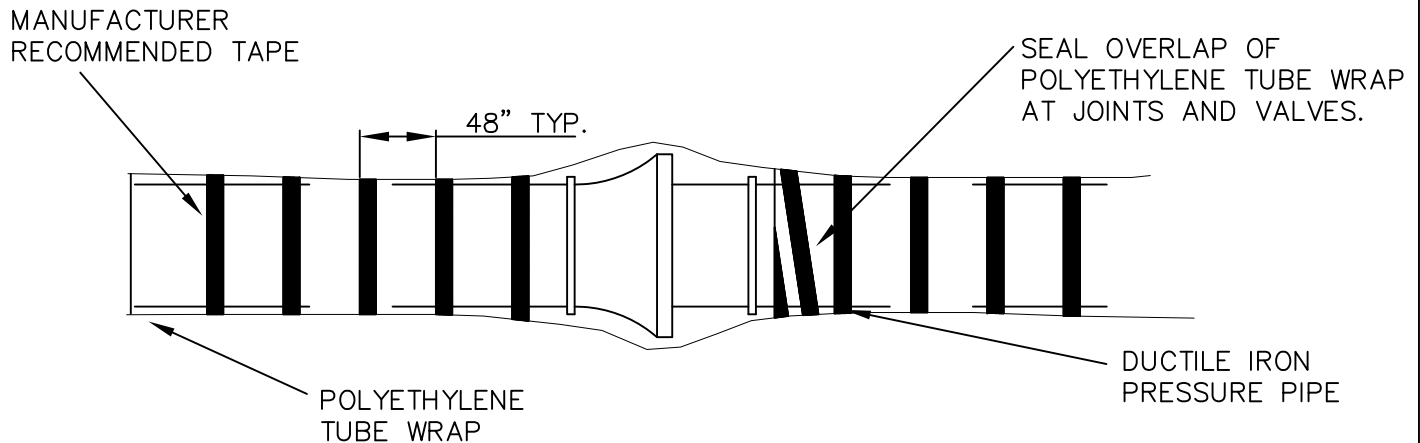
1. RESTRAINED JOINT MAINLINE TEE WITH RESTRAINED JOINT OUTLET.
2. ANCHORING COUPLING.
3. RESILIENT SEATED GATE VALVE.
4. EXTEND A MINIMUM OF ONE FULL PIPE LENGTH AFTER THE VALVE.
5. RESTRAIN AND PLUG. PLACE A CONCRETE BRACE TO UNDISTURBED EARTH. CONCRETE SHALL NOT COVER PLUGS, BOLTS, ETC. A MECHANICAL JOINT MAY BE APPROVED FOR PLUG.
6. ALL FITTINGS SHALL HAVE AN APPROVED METHOD OF RESTRAINT.
7. ALL BURIED VALVES SHALL BE POLYETHYLENE ENCASED ALONG WITH THE MAINLINE AND STUB.

SD-10 FUTURE VALVE

- VALVE BOX LIDS OR COVERS:
CAST IRON LABELED "WATER". LID
SHALL SIT FLUSH WITH GRADE.

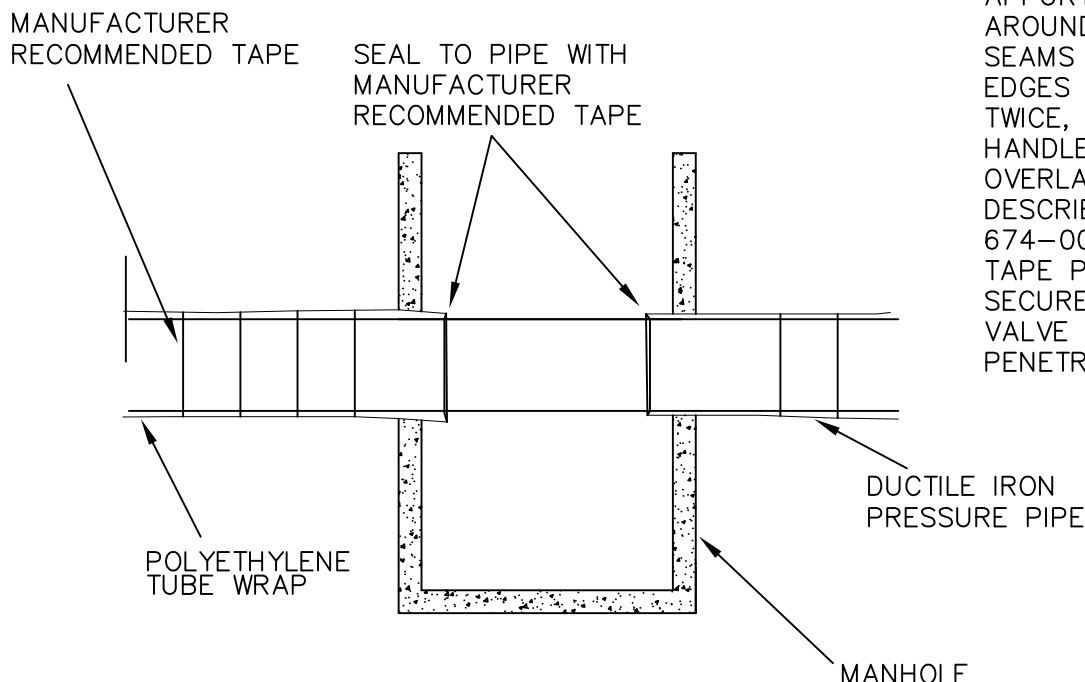


1. ALL DUCTILE IRON PIPE SHALL BE WRAPPED, EXCEPT IN MANHOLES.
2. CIRCUMFERENTIAL WRAPS OF MANUFACTURER RECOMMENDED TAPE SHALL BE PLACED AT NO GREATER THAN FOUR FOOT INTERVALS ALONG THE BARREL OF THE PIPE WITH THE EXCESS FOLDED OVER THE TOP TO TAKE OUT EXCESS SLACK HELPING TO MINIMIZE THE SPACE BETWEEN THE POLYETHYLENE AND THE PIPE. COMPLETE THE INSTALLATION BY OVERLAPPING THE POLYETHYLENE TUBE WRAP AT EACH END AND SEAL ENDS PER THE MOST CURRENT VERSION OF AWWA C105/A21.5 STANDARD.

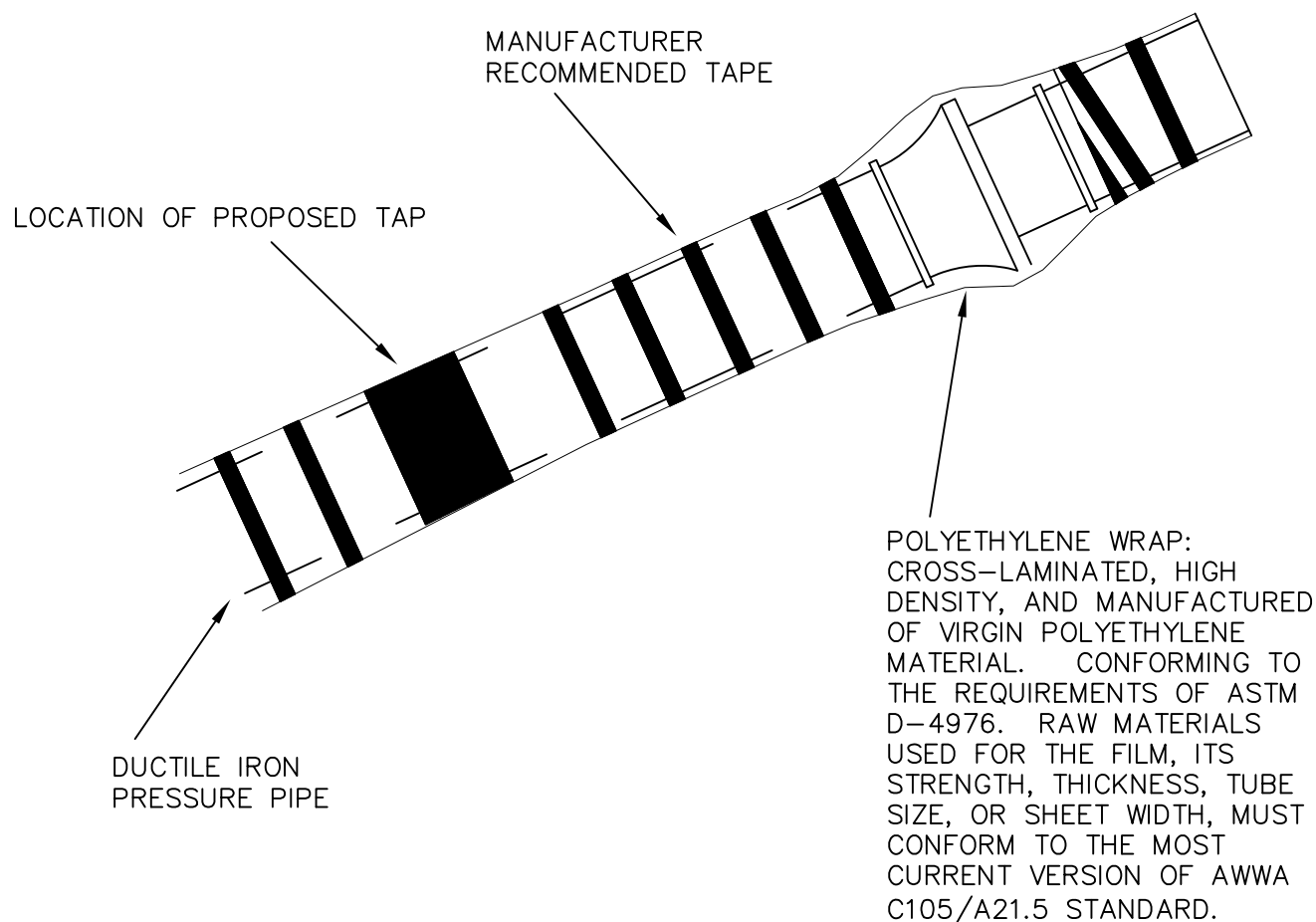


POLYETHYLENE WRAP: CROSS-LAMINATED, HIGH DENSITY, AND MANUFACTURED OF VIRGIN POLYETHYLENE MATERIAL. CONFORMING TO THE REQUIREMENTS OF ASTM D-4976. RAW MATERIALS USED FOR THE FILM, ITS STRENGTH, THICKNESS, TUBE SIZE, OR SHEET WIDTH, MUST CONFORM TO THE MOST CURRENT VERSION OF AWWA C105/A21.5 STANDARD.

FOR ODD-SHAPED APPURTENANCES: WRAP VALVES, TEES, CROSSES, AND OTHER ODD-SHAPED PIECES WHICH CANNOT BE PRACTICALLY WRAPPED IN A TUBE, WITH A FLAT SHEET OR SPLIT LENGTH OF POLYETHYLENE TUBE. PASS THE SHEET UNDER THE APPURTENANCE AND BRING AROUND THE BODY. MAKE SEAMS BY BRINGING THE EDGES TOGETHER, FOLDING TWICE, AND TAPING DOWN. HANDLE SLACK WIDTH AND OVERLAP AT JOINTS AS DESCRIBED IN ASTM A 674-00 SECTION 5.2.1. TAPE POLYETHYLENE SECURELY IN PLACE AT VALVE STEM AND OTHER PENETRATIONS.



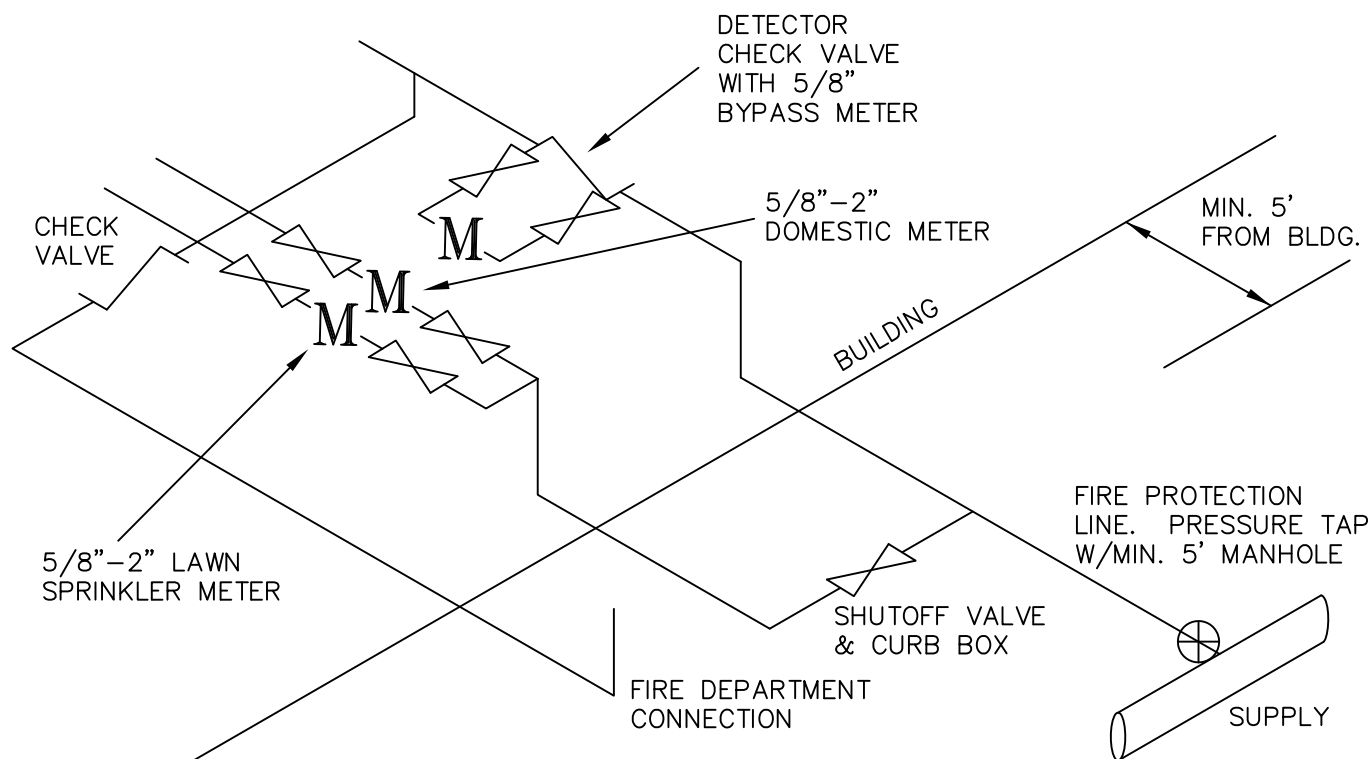
SD-12 POLYETHYLENE TUBE WRAP FOR DUCTILE IRON PIPE



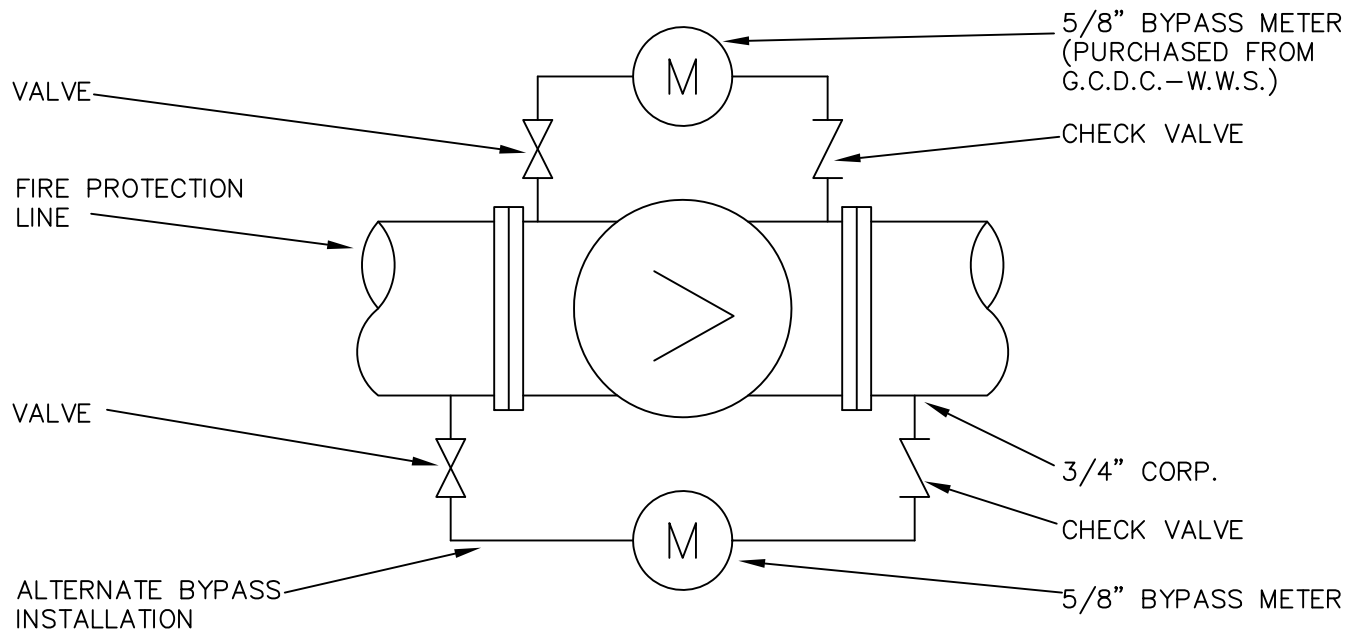
1. WRAP THREE LAYERS OF POLYETHYLENE ADHESIVE TAPE COMPLETELY AROUND THE PIPE TO COVER THE AREA WHERE THE TAPPING MACHINE AND CHAIN WILL BE MOUNTED.
2. MOUNT THE TAPPING MACHINE ON THE PIPE AREA COVERED BY THE POLYETHYLENE TAPE. THEN MAKE THE TAP AND INSTALL THE CORPORATION STOP DIRECTLY THROUGH THE TAPE AND POLYETHYLENE.
3. AFTER MAKING THE DIRECT SERVICE CONNECTION, INSPECT THE ENTIRE CIRCUMFERENTIAL AREA FOR DAMAGE AND MAKE ANY NECESSARY REPAIRS.

SD-13
SERVICE CONNECTIONS ON
POLYETHYLENE WRAPPED PIPE

(WATERMAIN ONLY)
PRESSURE PIPE



FIRE PROTECTION LINE
VALVE & METER INSTALLATION



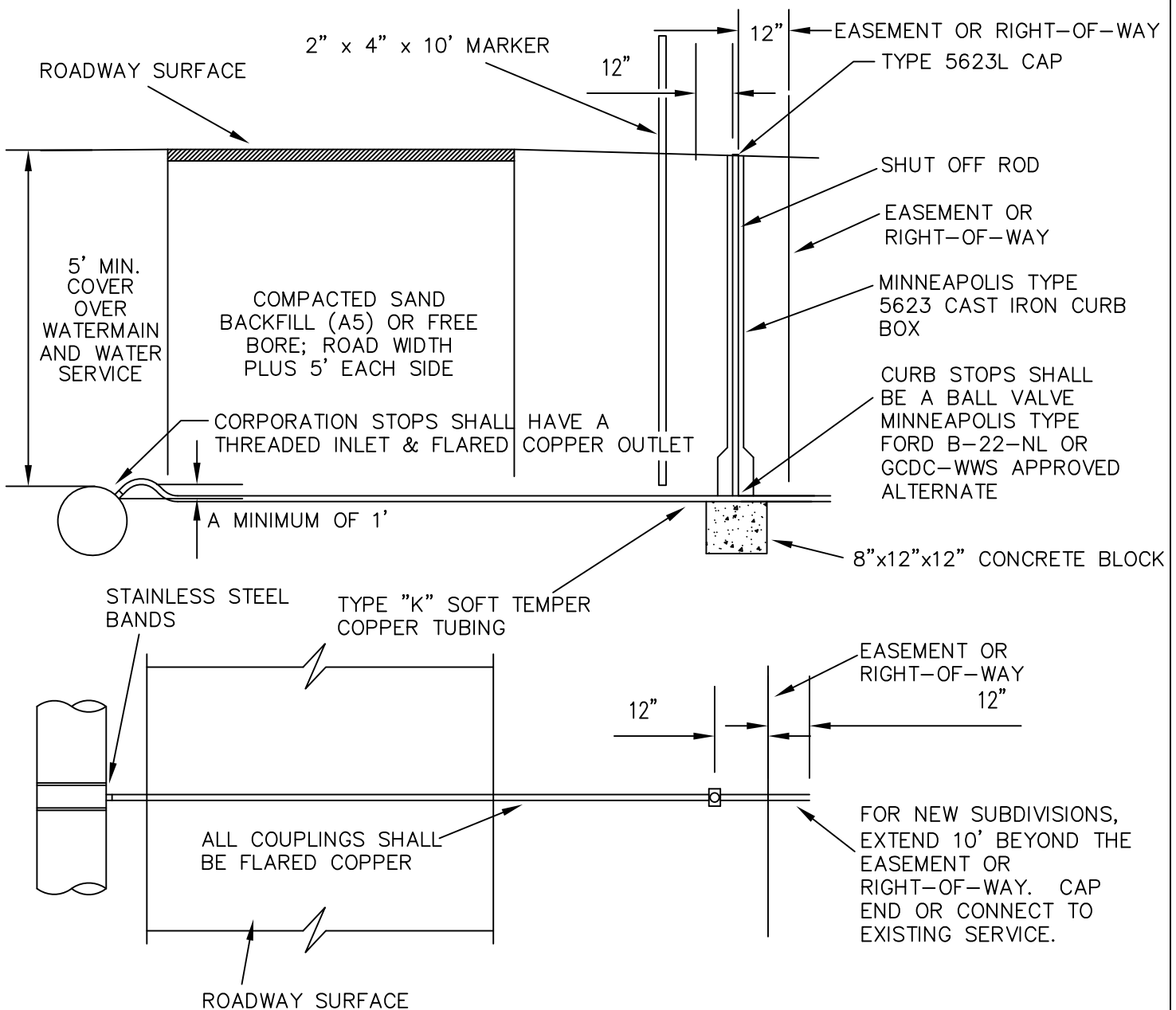
DETECTOR CHECK VALVE DETAIL

NOTE

DETECTOR CHECK VALVE SHALL BE TAPPED AT
FACTORY FOR BYPASS METER.

NOTES

1. WATER SERVICE LEADS SHALL BE TUNNELED UNDER EXISTING PAVEMENTS.
2. THE LOCATION OF ALL SERVICE CURB BOXES SHALL BE MARKED WITH A 3/8" X 12" STEEL ROD PLACED 1' BELOW THE GROUND SURFACE ALONG WITH WITNESS POINTS SUPPLIED BY GCDC-WWS. THE 2" X 4" X 10' MARKER SHALL BE EXTENDED FROM THE INVERT OF THE SERVICE CONNECTION TO A MINIMUM OF 4' ABOVE THE PROPOSED GRADE.
3. THE VALVE BOX SHALL BE EITHER DUCTILE IRON OR CAST IRON AND A MINIMUM OF 6' IN LENGTH. NO PLASTIC CURB BOXES SHALL BE ALLOWED.
4. CURB STOPS SHALL BE BALL VALVES FOR 3/4", 1", 1-1/2", AND 2" DIAMETERS WITH COPPER TO COPPER CONNECTIONS AND LEAD FREE ACCORDING TO NSF/ANSI STANDARD 372.
5. THE CORPORATION SHALL BE FORD FB700-NL OR GCDC-WWS APPROVED ALTERNATE. USE BRASS DOUBLE SADDLES WITH STAINLESS STEEL BANDS FOR 1-1/2" AND 2" TAPS. SADDLES SHALL BE FORD 202B OR GCDC-WWS APPROVED ALTERNATE. ALL APPURTENANCES THAT COME IN CONTACT WITH POTABLE WATER SHALL BE LEAD FREE ACCORDING TO NSF/ANSI STANDARD 372.
6. IF THE PUBLIC WATERMAIN IS ON AN EASEMENT, THE CURB STOP SHALL BE PLACED AT THE EDGE OF THE EASEMENT CLOSEST TO THE BUILDING TO BE SERVED.
7. WATER SERVICE IS TO BE PLACED AT THE CENTER OF FRONTAGE, WITH SANITARY SERVICE.

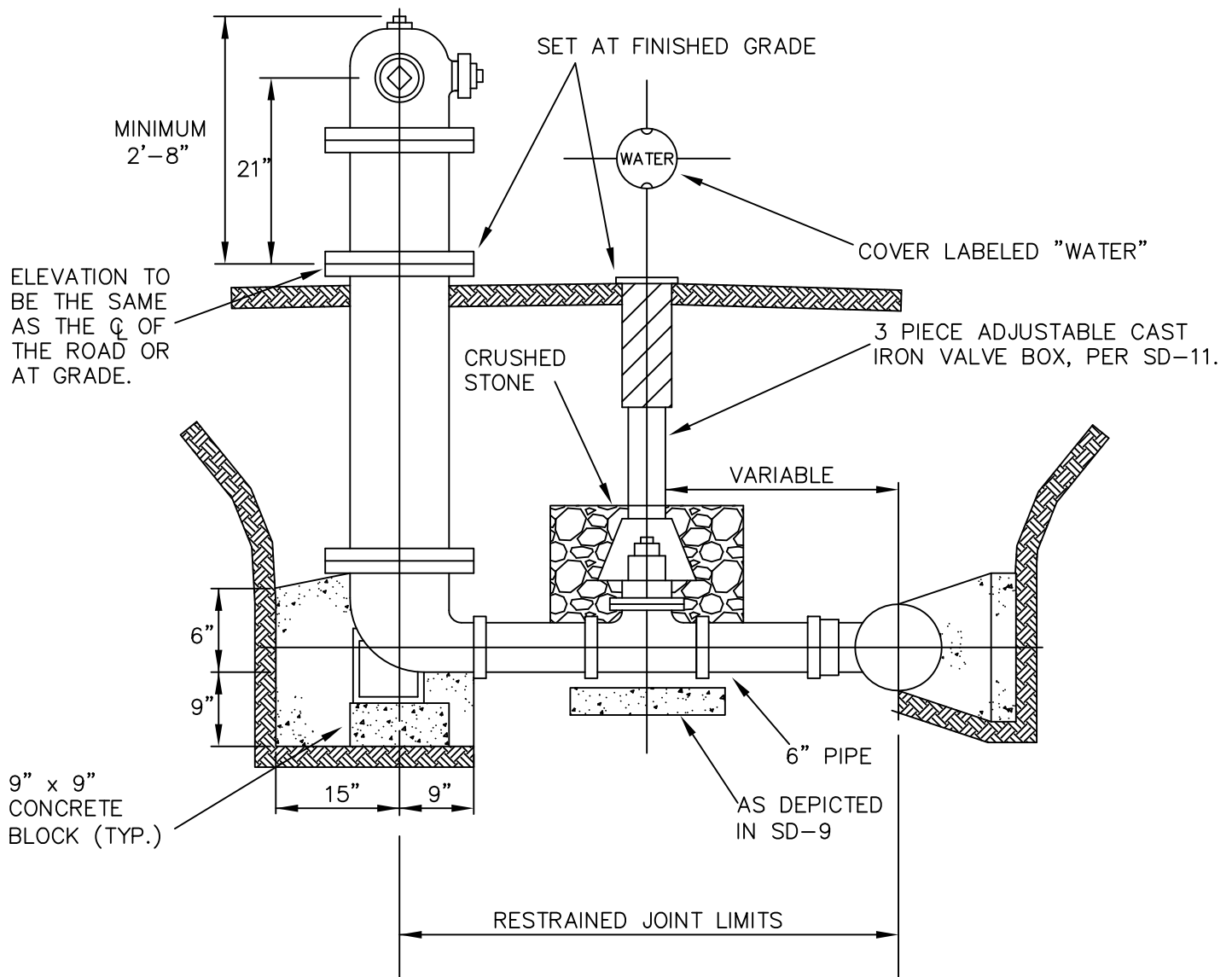


SD-15
3/4" TO 2" WATER
SERVICE CONNECTIONS

(WATERMAIN ONLY)
PRESSURE PIPE

NOTES

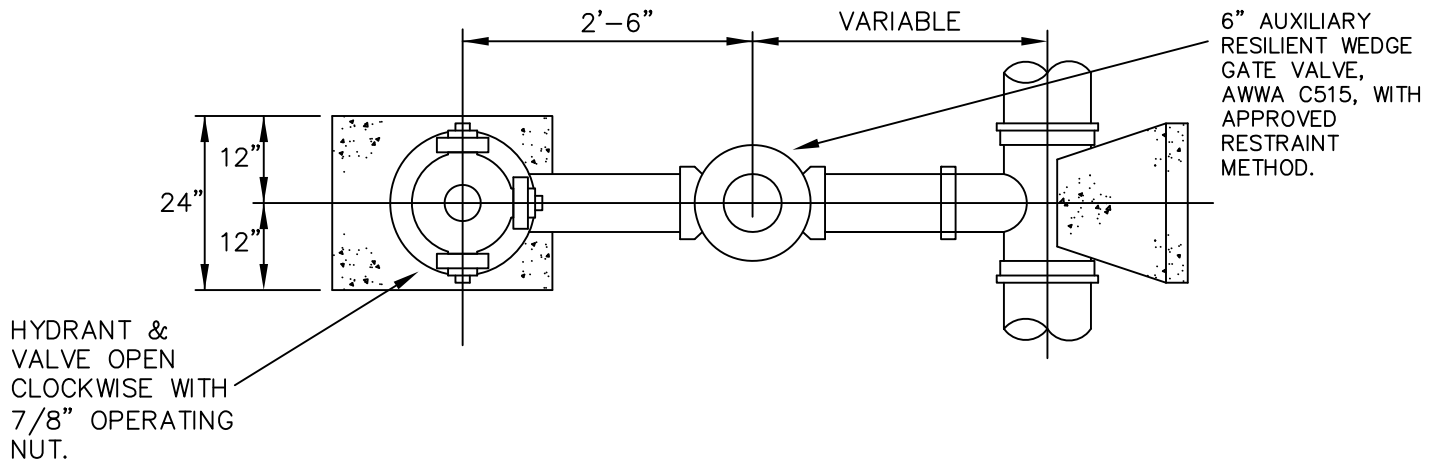
1. THE PUMPER NOZZLE SHALL FACE THE STREET AND PROVIDE A MINIMUM OF 7.5 FEET, MEASURED FROM THE NOZZLE, CLEAR OF ANY OBSTRUCTIONS.
2. SET THE HYDRANT GRADE LINE AT PROPOSED GRADE OR AS FIELD DIRECTED.
3. SET THE VALVE BOX COVER FLUSH WITH THE EXISTING/PROPOSED GRADE LEVEL.
4. ALL WORK FROM THE CENTERLINE OF THE MAIN, TO AND INCLUDING THE HYDRANT, SHALL BE PAID FOR BY THE UNIT PRICE BID ITEM FOR HYDRANTS.
5. ALL JOINTS SHALL BE RESTRAINED BY GCDC-WWS APPROVED RESTRAINED JOINTS IN ADDITION TO THRUST BLOCKS.
6. HYDRANT BARRELS ARE TO BE PAINTED YELLOW. CAPS WILL BE COLOR CODED TO MAIN SIZE: 6"—FIRE ENGINE RED, 8"—ALLAS CHALMERS ORANGE, 10" AND 12"—JOHN DEERE GREEN, 16" AND 20"—UPS BROWN, 24" AND GREATER—ROYAL BLUE. THE PAINT SHALL BE BRUSHED, NOT SPRAYED.
7. 90 DEGREE HYDRANT TEES ARE APPROVED WHERE SPACE REQUIREMENTS ARE LIMITED.
8. HYDRANT DRAIN SHALL BE PERMANENTLY SEALED AT THE FACTORY WITH A BRONZE PLUG.
9. HYDRANTS SHOULD BE PLACED AT PROPERTY CORNERS AND WITHIN THE R.O.W. WHEN POSSIBLE.
10. LOCAL MUNICIPALITIES MAY REQUIRE STORZ FITTINGS. REFER TO PROJECT PLANS AND SPECIFICATIONS FOR SIZE AND TYPE.
11. ALL JOINTS SHALL BE RESTRAINED.
12. THE HEIGHT ADJUSTMENTS SHALL NOT EXCEED ONE FOOT.



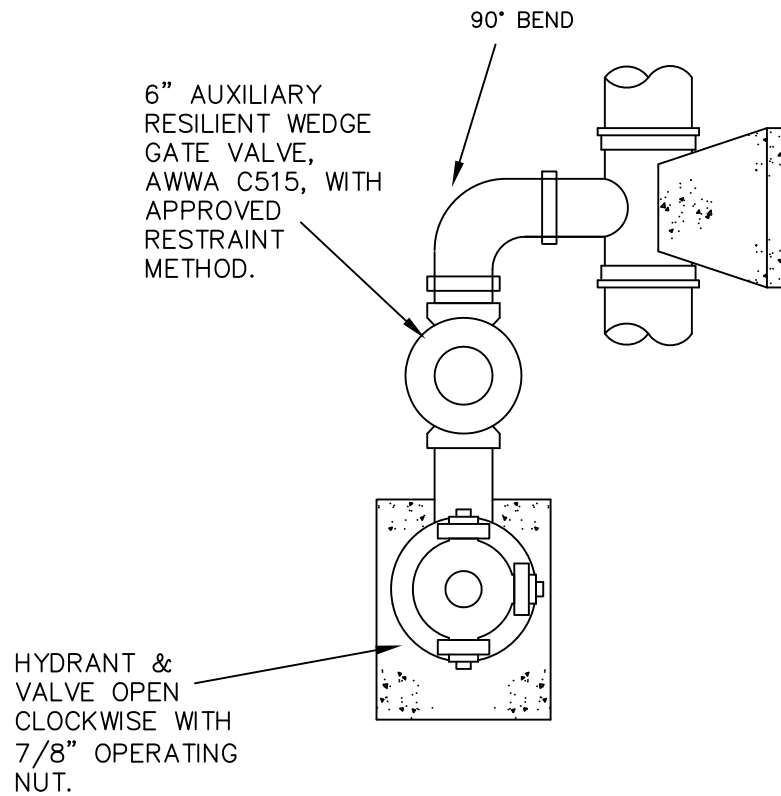
SD-16
FIRE HYDRANT DETAIL

(WATERMAIN ONLY)
PRESSURE PIPE

OPTION A



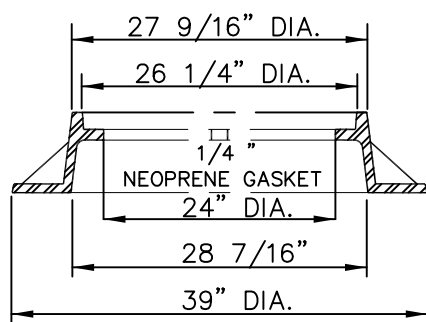
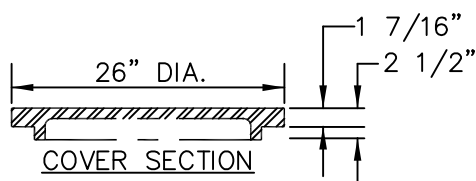
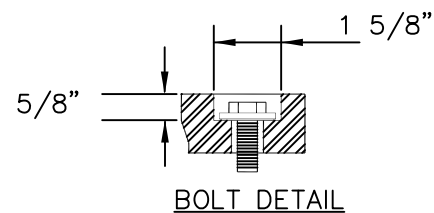
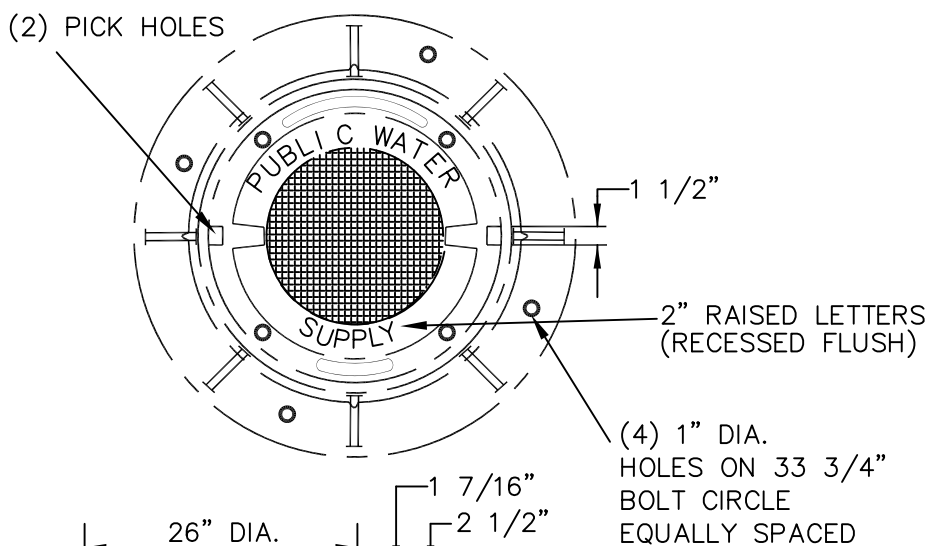
OPTION B



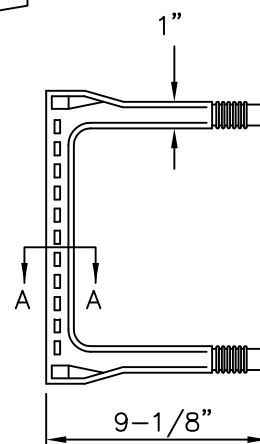
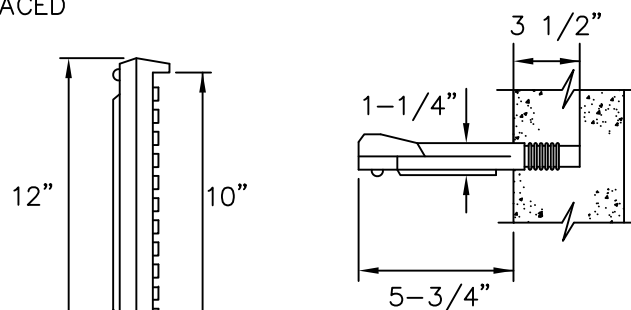
SD-17

HYDRANT INSTALLATION LAYOUT

(WATERMAIN ONLY)
PRESSURE PIPE



FRAME SECTION



MANHOLE FRAME NOTES

1. THE MANHOLE FRAME SHALL HAVE FOUR 7/8" ANCHOR BASE FLANGE HOLES WITH BOLT CIRCLE TO MATCH MANHOLE CONE.
2. ALL BEARING SURFACES SHALL BE MACHINED.
3. MANHOLE FRAMES AND COVERS SHALL BE BOLT DOWN WATER TIGHT: EAST JORDAN IRON WORKS, INC. #1040 TYPE A SOLID, NEENAH FOUNDRY CO. #R-1916-F, OR GCDC-WWS APPROVED ALTERNATE.
4. THE WORD "PUBLIC WATER SUPPLY" SHALL BE CAST IN THE CENTER OF THE COVER.
5. MANHOLE COVERS SHALL BE BOLTED TO THE FRAME WITH FOUR 1/2"-13 NC HEX HEAD STAINLESS STEEL BOLTS AND WASHERS WITH RUBBER GASKETS

MANHOLE STEP NOTES

1. MANHOLE STEPS SHALL BE CAST INTEGRALLY WITH PRECAST MANHOLE.
2. MANHOLE STEPS SHALL BE COPOLYMER POLYPROPYLENE PLASTIC WITH 1/2" STEEL REINFORCEMENT.
3. MANHOLE STEPS SHALL BE M.A. INDUSTRIES PS-1-PF, AMERICAN STEP CO. ML-10, OR GCDC-WWS APPROVED ALTERNATE.

SD-18

MANHOLE FRAME, COVER & STEP

FORCEMAIN TECHNICAL SPECIFICATIONS

A. GENERAL AND ADMINISTRATIVE

- 1. Scope of Work.** These Forcemain Technical Specifications (“Forcemain Specifications”) are a supplement to and form a part of the Contract Documents and technically describe the nature of the Materials and the workmanship required to complete the Project. These Forcemain Specifications require that all forcemain pipe be installed complete and ready in every respect for immediate use by GCDC-WWS. Any items not specifically required by or included in these Forcemain Specifications, but which are clearly necessary, are deemed to be included herein at no increase in the Contract Price.

In resolving inconsistencies in two or more provisions in the Contract Documents, preference shall be given in the following order of priority with subparagraph (i) given the highest priority and subparagraph (vii) given the lowest priority, so that, for example, if there are conflicting provisions in subparagraph (i) and subparagraph (iv) below, the provision in subparagraph (i) shall control: (i) Agreement and any amendments thereto; (ii) Bid; (iii) Supplementary Conditions; (iv) Instructions to Bidders; (v) General Conditions; (vi) Standard Specifications; (vii) Standard Details; and (viii) Drawings.

Contractor shall give written notice to the Operation and Maintenance Department and Permits and Construction Group of GCDC-WWS at least forty-eight (48) hours in advance for the opening or closing of existing valves. Under no circumstances may Contractor operate any existing valves.

- 2. Shop Drawings.** Contractor shall deliver to GCDC-WWS and Engineer Shop Drawings or a material certification as set forth in Paragraph 6.17 of the General Conditions. The Engineer approved Shop Drawings shall be delivered to Contractor, GCDC-WWS and Engineer. Contractor shall ensure that the manufacturer shall not ship any Materials until written approval of the Shop Drawings has been received from Engineer.

The following Materials require written approval of GCDC-WWS and Engineer prior to their installation: (i) forcemain pipe; (ii) joint materials; (iii) valve manholes including manhole frames, manhole covers, and manhole steps; (iv) air release valves; (v) meters, couplings and appurtenances; and (vi) reinforcing steel layout bars for all structures.

Where Materials are listed as being in conformance with these Forcemain Specifications, it shall mean the latest edition of the Genesee County Standard Specifications.

Contractor shall also deliver to GCDC-WWS and Engineer an installation schedule for the forcemain pipe at or before the pre-construction meeting. The installation schedule shall include the location of all restraint joints.

B. CONSTRUCTION MATERIALS

- 1. General.** All Materials and equipment supplied by Contractor shall be new and of first class ingredients and construction, designed, manufactured and guaranteed to comply with these Forcemain Specifications. Contractor shall deliver to GCDC-WWS a certificate of testing or actual test results certifying that the Materials to be used hereunder are in conformance with these Forcemain Specifications prior to using any Materials in the Work. All forcemain pipe shall be clearly marked with the size and grade or class.

The Materials and the labor shall be furnished and performed in accordance with customary and established construction practices and standards recognized by architects, engineers and similar professions and trades.

All Materials used in the installation of forcemain pipe shall be subject to inspections and tests as specified by ASTM, ANSI and AWWA regulations and these Forcemain Specifications. These tests and inspections shall be completed and paid for by Contractor. GCDC-WWS may subject any Materials supplied to tests by an independent testing laboratory. Such tests, if conducted, shall be paid for by GCDC-WWS. The results of tests conducted by GCDC-WWS shall govern the acceptance of the Materials.

- 2. Ductile Iron Forcemain Pipe.** Except for ductile iron river crossing pipe described in Paragraph B.4 below, all ductile iron forcemain pipe shall conform to ANSI/AWWA C151/A21.51-09 and contain a cement lining which shall conform to ANSI/AWWA C104/A21-13. All ductile iron forcemain pipe with a nominal inside diameter of sixteen inches (16") or smaller shall be pressure class or thickness class pipe with a minimum wall thickness of 0.33 inches. Ductile iron forcemain pipe joints shall be the push-on type consisting of a single molded rubber gasket and shall conform to ANSI/AWWA C111/A21.11-12. The type of restraint ductile iron joint utilized shall be approved in writing by GCDC-WWS. All ductile iron forcemain pipe shall have a minimum working pressure of two hundred fifty (250) pounds per square inch.

The ductile iron forcemain pipe fabricators shall be the ductile iron forcemain pipe manufacturer unless otherwise approved by GCDC-WWS in writing. All ductile iron pipe shall be manufactured in the United States

of America. All ductile iron pipe shall be cast, cleaned, cement-lined, coated, tested, and certified at a single manufacturing facility with all manufactured units contiguous to one another.

Polyethylene wrap shall be installed on all ductile iron forcemain pipe, except for those located in manholes. The polyethylene wrap shall be cross-laminated, high density and manufactured of virgin polyethylene material and shall conform to the requirements of ASTM A-674-00. Raw materials used for the film, its strength, thickness, tube size or sheet width shall conform to ANSI/AWWA C105/A21.5.10.

3. **PVC Forcemain Pipe.** Polyvinyl chloride (“PVC”) forcemain pipe may be used on forcemain pipe less than four inches (4”) in diameter. All PVC forcemain pipe shall be SDR-21 PVC, shall conform to AWWA C900 and shall meet the requirements of ASTM-2241-00 and ASTM D1784-03 for PVC forcemain pipe. Pipe joints shall meet the requirements of ASTM D-3212-9 for push-on joints and gaskets shall meet the requirements of ASTM F-477-02 regarding elastomeric seals for joining plastic pipe. All PVC forcemain pipe shall have a minimum working pressure of two hundred (200) pounds per square inch and shall have the same outside diameter as ductile iron forcemain pipe. All bends, wyes and other fittings for PVC forcemain pipe shall be ductile iron.
4. **Ductile Iron River Crossing Pipe.** All ductile iron river crossing pipe shall conform to ANSI/AWWA C151/ A21.51-09 and contain a cement mortar lining which shall conform to ANSI/AWWA C104/ A21.4-13. Ductile iron river crossing pipe joints shall be boltless ball and socket flexible type which shall permit a deflection of fifteen degrees (15°) without leakage. The bell, ball and retainer ring shall be ductile iron and manufactured in accordance with the applicable requirements of ASTM A536 and shall be threaded onto the ductile iron pipe barrel with threads which conform to ANSI B2.1 adapted to standard ductile iron pipe diameters. The nominal ductile iron river crossing pipe size and wall thickness class number shall be approved by GCDC-WWS:

The ductile iron river crossing pipe fabricators shall be the ductile iron river crossing pipe manufacturer unless otherwise approved in writing by GCDC-WWS.

5. **Fittings.** All bends, tees, wyes and other special fittings used on forcemain pipe shall be ductile iron Class 350, shall conform to AWWA C153/A21.53-11 and contain a cement mortar lining which conform to ANSI/AWWA C104/A21.4-13. All forcemain pipe fitting joints shall be the push-on type and shall conform to ANSI/AWWA C111/A21.11-12 and contain the required conductivity devices. GCDC-WWS approved

restraints as set forth in Paragraph D.11(f) below shall be utilized when restraining fittings and joints.

6. **Gate Valves.** Gate valves shall be ductile iron resilient wedge valves for forcemain pipe sixteen inches (16") and smaller in diameter. Resilient seat gate valves shall conform to AWWA C515-09 and contain a two hundred fifty (250) pound working pressure. Gate valve stems shall be high tensile strength, non-rising type with double O-Ring stem seals. The gate valve wedge shall be ductile iron encased in an EPDM rubber covering which shall form the sealing surface and provide sealing in either direction. All gate valves shall open with a "CLOCKWISE ROTATION" of the standard two inch (2") operating nut. Resilient wedge gate valves shall be American Flow Control Series 2500, East Jordan Iron Works Flowmaster Series, Mueller 2360 Series or a GCDC-WWS approved alternate.

All gate valves installed on forcemain pipe shall be installed in the vertical position.

Contractor shall ensure that all gate valves for forcemain pipe are tested for leakage by the gate valve manufacturer, at Contractor's sole expense. Contractor shall deliver to GCDC-WWS a written certificate (with the Drawings) from the gate valve manufacturer certifying that its gate valves have passed the above-mentioned leakage tests. All gate valves shall contain the name of the gate valve manufacturer. Any gate valves which leak or which show any defects shall be promptly replaced by Contractor, at Contractor's sole expense.

Contractor shall comply with the Drawings for the required gate valve type to be installed.

7. **Automatic Air Release Valves.** Air release valves installed on forcemain pipe shall be the automatic type with a working pressure range of zero (0) to three hundred (300) pounds per square inch and a venting capacity range of two hundred (200) to two hundred-fifty (250) S.C.F.A.M (standard cubic feet of air per minute). The air release device shall be preceded by a two inch (2") corporation stop and shall be equipped with suitable flushing connections. Automatic air release valves shall be installed in all four foot (4') diameter pre-cast forcemain manholes.
8. **Pre-cast Forcemain Manholes.** Pre-cast forcemain manholes shall conform to ASTM C478-03 and contain a modified joint and premium rubber joint which shall conform to ASTM C443-02. The pre-cast forcemain manhole sections shall be set on an eight inch (8") pre-cast slab.

Manhole steps shall be copolymer polypropylene plastic and installed in all forcemain manholes. Copolymer Polypropylene steps shall be M.A. Industries PS-1-PF or American Step Co. ML-10 with one-half inch (½") grade 60 steel reinforcement or a GCDC-WWS approved alternate. Manhole steps shall be embedded in the rider and conical top section wall a minimum distance of three inches (3") from the wall. The minimum clear distance of four inches (4") from the wall shall be measured from the point of embedment. Manhole steps from adjoining manhole barrel sections shall be spaced not more than sixteen inches (16") apart.

Manhole frames and manhole covers shall be East Jordan Iron Works, Inc., No. 1040ZPT Type A solid cover, Neenah Foundry Company No. R-1916-F or a GCDC-WWS approved alternate.

All manhole frames shall contain anchor base flange holes for bolting the frames to the cone section. All manhole covers shall be equipped with four (4) stainless steel cap screws countersunk flush with the manhole cover. The manhole frame and manhole cover shall be connected to the cone section by use of four (4) chromite coated five-eighths inch (5/8") thread studs with washers and nuts. Contractor shall field cut bolts to the proper length, a maximum of one-half inch (1/2") above the nut. All manhole covers shall be stamped "SANITARY SEWER" and contain two inch (2") raised letters.

Pre-cast concrete grade rings shall be used to bring all manhole covers to grade. The final adjustment shall be as determined by GCDC-WWS, provided, however, that the maximum adjustment allowed shall be nine inches (9"). Contractor shall not use block or brick in connection with the final adjustment. Permissible grade ring sizes for manhole adjustments shall be three inches (3"), four inches (4") or six inches (6") as required to finish grade. Contractor may use only two (2) grade rings.

An exterior seal of Wrapid Seal or a GCDC-WWS approved alternate shall be installed to seal all manholes. Within road right-of-ways, Contractor shall use mortar between grade rings, manhole frames and manhole sections. Outside of road right-of-ways, Contractor shall use a GCDC-WWS or Engineer approved one and one quarter inch (1¼") pre-formed butyl rubber sealant between grade rings, manhole frames and manhole sections.

9. **Steel Casing Pipe.** All steel casing pipe shall meet the requirements of ASTM designation A-139-00, Grade B material and shall be of sufficient strength to meet the loading conditions of H-20 loading for pavements and

Cooper E-72 loading for railroad crossings. Successive lengths of steel casing pipe shall be connected by continuous circumferential welds. The steel casing pipe diameter and wall thickness shall be determined by the Standard Details.

C. MATERIALS TESTING PRIOR TO INSTALLATION

All Materials used in the installation of forcemain pipe and appurtenances shall be subject to inspections and tests as specified by ASTM, ANSI and AWWA regulations. GCDC-WWS may re-test any Materials supplied in connection with the Work by an independent testing laboratory. Such tests, if conducted, shall be paid for by GCDC-WWS. The results of tests conducted by GCDC-WWS shall govern the acceptance of the Materials.

All Materials used in the installation of forcemain pipe and appurtenances which are defective, of improper material or rejected by GCDC-WWS or Engineer shall be marked accordingly by GCDC-WWS or Engineer and promptly removed from the Site by Contractor, at Contractor's sole expense.

D. CONSTRUCTION METHODS

- 1. General.** The methods of construction shall generally be left to the discretion of Contractor, provided, however, that these Forcemain Specifications are the minimum construction standards. In those municipalities where the municipality performs daily inspections or where GCDC-WWS or Engineer does not perform daily inspections, that municipality shall ensure that these Forcemain Specifications are met.

Contractor shall perform the Work to the alignment and grade shown on the Drawings. Contractor shall comply with the Contract Documents for general construction practices. Contractor shall comply with the County Road Commission requirements in the county where the Work is being performed in connection with graveling or re-graveling of contaminated roads.

Contractor shall comply with all applicable Laws and Regulations pertaining to underground construction, particularly MIOSHA Regulations, P.A. 451 Part 91 Soil Erosion and Sedimentation Control and those Laws and Regulations pertaining to the depositing of excavated Materials in low lands, wetlands, inland lakes and streams. Contractor shall also comply with all other Laws and Regulations.

The forcemain pipe shall have a minimum of five feet (5') of cover as measured from final grade.

2. **Trench Excavation.** Contractor shall conduct trench excavations in a safe and orderly manner in full compliance with the OSHA Regulations and the MIOSHA Regulations. Contractor shall defend, indemnify and hold harmless GCDC-WWS, Engineer and their designated representatives from and against any and all losses, costs, damages and liabilities due to Contractor's failure to comply with the OSHA Regulations and the MIOSHA Regulations.

Trench excavation shall include clearing of the Site and the excavation to alignment and grade of all Materials necessary for the installation of the forcemain pipe. Contractor shall deposit all excavated material to minimize damages to trees, shrubs, drives, fences and other property at or adjacent to the Site and so that it may be used as backfill when suitable material is encountered. Contractor shall reimburse the landowner for any damage to or destruction of any of the foregoing. Unsuitable and surplus excavated material shall be disposed of by Contractor, at Contractor's expense. For excavation on easements or on road right-of-ways adjacent to private land, Contractor shall provide the private landowner with the first option to obtain the excess excavated material and Contractor shall provide GCDC-WWC with the second option to obtain the excess excavated material.

Prior to disposing of excavated material, Contractor shall obtain and pay for the cost of obtaining all necessary permits in connection therewith. Contractor shall comply with all of the requirements of Public Act 451 Part 91 (Soil Erosion and Sedimentation Control) and Public Act 451 Part 301 (Inland Lakes and Streams) and any other Laws and Regulations having application thereto. Contractor shall defend, indemnify and hold harmless GCDC-WWS and Engineer from and against any and all losses, costs, damages or liabilities due to Contractor's failure or the failure of Contractor's Subcontractors or Suppliers to comply with any of the foregoing Laws and Regulations.

Contractor shall include into the Unit Price Work all costs involved in the completion of the Work. Contractor shall not be entitled to additional compensation because of a change in ground conditions, unsuitable ground conditions, minor relocation of alignment, temporary sheeting, dewatering, undercutting of trench excavation or foundation strengthening.

For differing site conditions refer to Article 4.03 of the General Conditions.

Any additional cost of boring, where noted on the Drawings, shall be included in the Contract Price and the Bid.

The bottom of the trench shall be excavated to a minimum depth of four inches (4") below the bottom of the forcemain pipe barrel and this space refilled in accordance with the bedding and trench detail. The refill area shall be rounded to provide the lower one-third (1/3) of the forcemain pipe with a satisfactory bearing area. The material placed under the haunch area shall be shovel sliced so the area is compacted. The cost of this undercutting and refill shall be included in the Unit Price Work for forcemain pipe.

When ground water is encountered in the bottom of a trench, Contractor shall either dewater the trench or excavate the trench to a depth of six inches (6") below the bottom of the forcemain pipe barrel and refill this area with a graded MDOT 6AA crushed limestone (A1) satisfactory to GCDC-WWS. All forcemain pipe shall be installed in the trench only after the ground water has been completely removed to allow for the installation of the forcemain pipe in a dry trench. The forcemain pipe shall not be installed in water. The cost of the additional excavation, stone backfill and dewatering shall be included in the Unit Price Work for the forcemain pipe. Any excavation that requires well pointing shall have the forcemain pipe bedded in at least six inches (6") or more of graded MDOT 6AA crushed limestone (A1) to provide a stable trench bottom.

Contractor shall supply sheeting, shoring or bracing of trenches as necessary to prevent caving or sliding of trench walls. The sheeting shall not be removed below the top of the forcemain pipe if the resulting slope of native soil increases the trench width to such an extent the load on the forcemain pipe exceeds the safe field supporting strength of the forcemain pipe and bedding material. Sheeting, shoring or bracing is included in the Work and the Contract Price.

When a trench box is used, the bottom of the trench box shall be installed within two feet (2') of the bottom of the excavation. When a movable trench box is used in place of sheeting or shoring, Contractor shall secure the installed forcemain pipe to prevent forcemain pipe movement when the trench box is moved.

3. **Over-Excavation.** Whenever the excavation is carried beyond the alignments and below the grades as shown on the Drawings, Contractor shall refill all excavated space with MDOT 6AA crushed limestone (A1) as determined by GCDC-WWS or Engineer, at Contractor's sole expense. The areas beneath and around manholes or other concrete structures space excavated below grade shall be refilled and thoroughly compacted as determined by GCDC-WWS or Engineer.

4. **Bearing Strengths.** The ground shall be excavated in open trenches with sufficient width to provide room within the excavation to install the forcemain pipe to alignment and grade. The width of the trench is the single most important factor affecting the structural loading on an installed forcemain pipe. The width of the trench shall be measured at the top of the forcemain pipe and shall not exceed the maximum trench width as set forth below.

Forcemain Pipe Size	Maximum Trench Width
8" – 12"	30"
15"- 16"	36"

If the maximum trench width is exceeded, Contractor shall install concrete cradling encasement or other bedding approved by GCDC-WWS or Engineer to support the added load of the backfill, at Contractor's sole expense.

All backfill material shall be assumed to be wet clay with an average weight of one hundred thirty (130) pounds per cubic foot. The factor of safety for all loading shall be 1.4.

5. **Forcemain Pipe Installation**

- (a) **General.** All forcemain pipe and Materials shall be examined for defects by Contractor prior to being installed. All damaged or defective forcemain pipe and Materials shall be removed immediately from the Site by Contractor, at Contractor's sole expense. The forcemain pipe shall be free from all defects and foreign materials before and during installation. All installed forcemain pipe shall have a minimum of five feet (5') of cover. Any forcemain pipe proposed to be installed with less than five feet (5') of cover shall require GCDC-WWS written approval, and in such event, GCDC-WWS shall determine whether insulation shall be used and the type of insulation to be used, which shall be installed by Contractor, at Contractor's sole expense.

Forcemain pipe shall not be installed in water or when trench or weather conditions are unsuitable for the installation as determined by GCDC-WWS or Engineer. When the installation of forcemain pipe is not in progress, open ends of the forcemain pipe shall be securely closed so that no foreign materials or water can enter the forcemain pipe. Any section of forcemain pipe found to be defective, either before or after installation, shall be promptly removed and replaced with new forcemain pipe by Contractor, at Contractor's sole expense.

Where a forcemain pipe is routed along road right-of-ways, the alignment of the forcemain pipe shall be parallel to the centerline of the roadway and at a distance as indicated on the Drawings. Where forcemain pipe is shown crossing private property, the alignment of the forcemain pipe shall be located as indicated on the Drawings and the installation of forcemain pipe shall be performed within the easements provided to GCDC-WWS.

All forcemain pipe shall be secured in place with approved backfill material properly compacted under the haunches. Forcemain pipe, which does not allow a sufficient and uniform space for joints, shall be promptly removed and replaced by Contractor with forcemain pipe of proper dimensions to ensure such uniform space, at Contractor's sole expense. Contractor shall at all times prevent dirt from entering the joint space.

- (b) **Location of Forcemain Pipe and Manholes.** The location of forcemain pipe and manhole structures, as shown on the Drawings, have been selected to provide the least possible interference with or the crossing of existing utilities. GCDC-WWS may make minor variations in the location of the forcemain pipe and manhole structures to meet any conditions discovered. Contractor shall not receive additional compensation for the cost of such shifts in location.
- (c) **Location of Underground Facilities.** Prior to submitting a Bid, prospective Bidders shall make a field survey to verify the location of Underground Facilities. The location of Underground Facilities, as shown on the Drawings, have been determined from the best available information, by surveys or by project record documents of utility companies. GCDC-WWS or Engineer shall not be liable for the possibility that during the Work, Underground Facilities other than those shown on the Drawings may be encountered or that the actual location of Underground Facilities shown may be different from the locations provided by GCDC-WWS. At the locations where precise positions of Underground Facilities are integral to the Work, Contractor shall verify the position of the Underground Facilities, at Contractor's sole expense.
- (d) **Protection of Underground Facilities.** Contractor shall give written notice to all persons or entities that own or are any Underground Facilities affected by the Work. Contractor shall maintain and protect all Underground Facilities during the Work and the cost of such protection shall be included in the Contract Price. If any Underground Facilities are blocked or interfered with

by the Work, Contractor shall maintain the Underground Facilities in continuous operation and restore them to at least the same condition as they were prior to the start of the Work, all at Contractor's sole expense. When storm drainage catch basins are located adjacent to a trench, Contractor shall ensure that foreign materials do not enter the drainage system. Contractor shall clean out catch basins and storm sewers during the Work and after completion of the Work.

- (e) **Forcemain Pipe and Fittings Installation.** All forcemain pipe and fittings shall be handled so as to protect them from damage. Contractor shall carefully inspect all forcemain pipe and all fittings before installation. Damaged or defective forcemain pipe and fittings shall be promptly removed from the Site by Contractor, at Contractor's sole expense. Contractor shall not connect the forcemain pipe with the existing forcemain system until Contractor has received written approval from GCDC-WWS.
- (f) **Pipe Separation/Forcemain Separation.** Wherever forcemain pipes cross or are installed less than ten feet (10') feet horizontally from existing or proposed watermain pipes, special precautions shall be taken by Contractor as follows.
 - (i) **Horizontal Separation.** If conditions prevail which prevent a lateral separation of ten feet (10'), a forcemain pipe may be installed closer than ten feet (10') to a watermain pipe, provided the forcemain pipe is installed in a separate trench and at such an elevation so that the bottom of the forcemain pipe is at least eighteen inches (18") below the bottom of the watermain pipe and MDEQ and GCDC-WWS written approval is obtained.
 - (ii) **Vertical Separation.** Where a forcemain pipe must cross a watermain pipe, the vertical separation of eighteen inches (18") between the two (2) pipes shall be maintained. In making such crossings, a full length of forcemain pipe shall be centered under the watermain pipe to be crossed so the pipe joints shall be equidistant from the centerline of the watermain pipe. The minimum vertical separation shall be maintained for a distance of eight feet (8') each way of the watermain pipe being crossed. If a crossing cannot meet the eighteen inch (18") requirement, Contractor shall install a concrete cradle, at Contractor's sole expense.

- (g) **Staking.** Contractor shall hire a land surveyor, licensed in the State of Michigan, to provide alignment, grade stakes and cut sheets, at Contractor's sole expense. The licensed surveyor shall provide grade stakes and cut sheets at all structures with a maximum of fifty foot (50') intervals between structures.
- (h) **Forcemain Pipe Bedding.** All forcemain pipe bedding shall provide uniform and continuous support of the forcemain pipe barrel and be installed so that the forcemain pipe is true to alignment and grade. In no case shall the field supporting strength be less than the minimum crushing strength, plus a factor of safety of 1.4.

All forcemain pipe shall be installed on even firm bedding with recesses in the pipe bedding for the bell of the forcemain pipe. All forcemain pipe shall be securely connected to ensure passage of a hydrostatic pressure test. The full length of each section of forcemain pipe shall rest solidly upon a four inch (4") cushion of MDOT 6AA crushed stone (A1) for PVC or four inches (4") of MDOT Class II Sand (A5) for forcemain pipe with recesses only to accommodate pipe bells and joints. Any forcemain pipe that has its alignment, grade, or joints disturbed or damaged after installation shall be removed and re-installed by Contractor, at Contractor's sole expense.

After all forcemain pipe has been brought to final grade and alignment, Contractor shall deposit and shovel slice or spade proper bedding material under the forcemain pipe haunches. Crushed stone shall be placed from firm ground to the top of the forcemain pipe in areas excavated around manholes, bore pits and other wide trench areas as determined by GCDC-WWS or Engineer.

The bedding class and load factors to be used for situations not above described are as follows:

Class A-1 (Concrete Cradle).....Bedding Factor = 2.8
Crushed Stone Encasement.....Bedding Factor = 2.2

Contractor shall comply with the detail sheets for bedding requirement.

6. **Backfilling Trenches.** Unless otherwise directed by GCDC-WWS or Engineer, the trench shall be backfilled promptly after the forcemain pipe is installed, provided, however, that the trench shall not be backfilled until

GCDC-WWS or Engineer has inspected the grade, alignment and pipe joints. A trench backfilled without the inspection of GCDC-WWS or Engineer shall be promptly re-excavated by Contractor, at Contractor's sole expense. In the case of concrete cradle or concrete encasement bedding, the trench backfilling shall be delayed until the concrete has set sufficiently to support the backfill load

(a) Method and Requirements of Backfilling. Contractor shall comply with the following methods and requirements of trench backfilling:

- (i) Backfill areas to contours and elevations with unfrozen materials;
- (ii) Systematically backfill to allow the maximum time for natural settlement;
- (ii) Do not backfill over porous, wet, frozen or spongy subgrade material;
- (iv) Place backfill material in continuous layers and compact in accordance with the schedule of backfilling in Paragraph D.6(c) hereof;
- (v) Place backfill material in continuous layers as follows:
Subsoil Backfill: Maximum eight inch (8") compacted depth;
Structural Backfill: Maximum eight inch (8") compacted depth; and
Granular Backfill: Maximum eight inch (8") compacted depth.
- (vi) Employ placement or installment methods that do not disturb or damage other portions of the Work;
- (vii) Maintain optimum moisture content of backfill materials to attain required compaction density;
- (viii) Place or remove backfill evenly on each side of structures, such as vaults, manholes and pump stations to prevent imposing unbalanced forces against the structure;
- (ix) Create gradual grade changes; and,
- (x) Blend slope into level areas.

- (b) **Backfill Soil Material and Aggregates.** The analysis of backfill soil material and aggregates shall be performed in accordance with ASTM D2487, ASTM D4318 and ASTM C136.

The testing for non-piping related backfill shall be performed in accordance with ASTM D6938, ASTM D1557 and ASTM D6938.

The testing for all piping related backfill shall be in accordance with MDOT One Point Michigan Cone Test and MDOT One Point T-99 Test for all piping related backfill.

When the results of the tests indicate that backfill soil material and aggregates do not meet the specified requirements, the backfill soil material and aggregates shall be removed, re-tested and re-deposited, at Contractor's sole expense.

Contractor shall prepare a Compaction Testing Plan ("Compaction Testing Plan") which shall be submitted by Contractor to GCDC-WWS at the pre-construction meeting. The Compaction Testing Plan shall include the Compaction Tests Frequency. The frequency of Compaction Test shall meet the minimum testing requirements of the agency having authority over any roadways and the following requirements:

- (i) Haunch Compaction Verification Testing shall be conducted four times in the first 1000 feet of pipe installation at locations at least 200 feet apart. During this initial installation period, the Contractor shall demonstrate use of means and methods that will be consistently used for the full length of the pipe installation to achieve Contract compaction limits. Contractor also shall be responsible for adjusting these means and methods as necessary to achieve Contract compaction limits where different conditions occur.
 - (1) Contractor shall use an ASTM accepted compaction testing methodology to perform Haunch Compaction Verification Testing of the area below the springline of the pipe. Testing methodology shall be submitted and approved by Engineer prior to being used in the field. Testing will be conducted by the Contractor's testing agency under the direction and oversight of the Engineer.
 - (2) The backfill material for the pipe in the work space area shall be placed and compacted using the same materials, equipment, and compaction effort as will be routinely used on other areas outside of the work space.

- (3) Protective trench boxes, sheeting, bracing, or sloping will be required to comply with the applicable trench safety requirements required on the remainder of the project.
 - (4) The work space may be constructed on either side of the pipe at the discretion of the engineer.
 - (5) The construction of the individual work space on one side of the pipe, including all time and materials and safety provisions, shall be included at no additional cost to the Owner.
 - (6) In addition to initial Haunch Compaction Verification Testing, Engineer may require up to 20 additional Haunch Compaction Verification Tests be conducted at locations of his choosing. Examples of when these additional tests may be required include if, in the sole opinion of the Engineer, the Contractor makes significant changes to the backfill materials, or methods of placement and compaction or if surrounding soil conditions change. The time, materials, and safety provisions required for these Haunch Compaction Verification Tests shall be at no additional cost to the Owner.
 - (7) In the event that Haunch Compaction Verification testing fails, Contractor shall immediately adjust means and methods to achieve required compaction limits, re-compact area tested, and retest. Once revised means and methods are demonstrated to achieve compaction limits, they shall be implemented.
- (ii) In Green Belts (90% compaction required to springline, 85% compaction required from springline to surface), provide compaction tests every 1000 linear feet and at locations identified by the Engineer. Perform one compaction test every 2 feet above crown of pipe to surface with a minimum of 2 tests required.
 - (iii) Within influence of road (95% compaction required), provide compaction tests every 500 linear feet and at locations identified by the Engineer and/or the Road Commission. Perform one compaction test every 2 feet above crown of pipe to surface with a minimum of 2 tests required.
 - (iv) The first set of testing will take place in the initial stages of the project when no more than 200 lf of pipe has been placed. Tests need to be performed as the trench is being backfilled.

- (v) If compaction tests fail to meet the Contract compaction limit for pipe installation, the Contractor shall perform additional compaction to correct the problem and additional compaction testing as described above every 200 feet until the compaction criteria in Subparagraph 2 above has been satisfied. The Engineer has the right at any time to require compaction testing every 500 feet if he believes it is warranted.

Proof roll compacted fill surfaces under slabs-on-grade, and paving.

Compaction testing shall be performed by a certified materials testing company in the frequency, number and depths required to satisfy GCDC-WWS, Engineer and the agency having authority over the roadways, at Contractor's sole expense. Contractor shall not perform compaction testing after the trench has been backfilled.

Density reports shall be delivered to GCDC-WWS, Engineer and the agency having authority over the roadways by Contractor prior to final compaction testing and approval. In the event that any material testing fails, Contractor shall recompact and re-test to achieve the required results, at Contractor's sole expense. All material test results shall be promptly delivered in writing to GCDC-WWS, Engineer and the agency having authority over the roadways in writing. GCDC-WWS at its sole expense may perform or have performed density tests in addition to those provided by Contractor. Upon the request of GCDC-WWS, Engineer or the agency having authority over the roadways, Contractor shall open and provide a safe trench for testing.

- (c) **Types or Classifications of Backfill Material.** The following are the different types or classifications of backfill material which may be used in the Work according to the schedule of backfilling in Paragraph D.6(d) below.

- (i) **S1 (Excavated and Re-Used Material).**

- (1) Graded.
 - (2) Free of lumps larger than three inches (3"), rocks larger than two inches (2") and debris.
 - (3) Conform to ASTM-D2487.

- (ii) **S2 (Imported Borrow).**

- (1) Graded.

- (2) Free of lumps larger than three inches (3"), rocks larger than two inches (2") and debris.
 - (3) Conform to ASTM-D2487.
- (iii) S3 (Excavated and Re-Used Material).**
 - (1) Graded.
 - (2) Free of roots, rocks larger than one-half inch (1/2"), subsoil, debris, large weeds and foreign matter.
 - (3) Conform to ASTM-D2487.
- (iv) S4 (Imported Borrow).**
 - (1) Friable Loam.
 - (2) Reasonably free of roots, rocks larger than one half-inch (1/2"), subsoil, debris, large weeds and foreign matter.
 - (3) Acidity range (pH) of 5.5 to 7.5.
 - (4) Contain a minimum of four percent (4%) and maximum of twenty-five percent (25%) inorganic matter.
 - (5) Limit decaying matter to ten percent (10%) of total content by volume.
 - (6) Conform to ASTM-D2487.
- (v) (Topsoil).**
 - (1) Refer to F. RESTORATION 6. Surface Restoration
- (vi) A1 (Gravel).**
 - (1) Conform to MDOT Series 6AA Limestone.
- (vii) A2 (Gravel).**
 - (1) Conform to MDOT Series 22A Limestone.
- (viii) A3 (Gravel).**
 - (1) Conform to MDOT 23A limestone and GCRC special provisions for 23A modified limestone.
- (ix) A4 (Pea Gravel).**
 - (1) Natural Stone; free of clay, shale, organic matter; graded in accordance with ASTM C136 to the following limits:
Minimum Size: one-quarter inch (1/4")
Maximum Size: five-eighths inch (5/8")
- (x) A5 (Sand).**
 - (1) Conform to MDOT Class II material.

(d) Schedule of Backfilling.

- (i) Under Manholes. Backfill type A5, thickness as noted on the Standard Details compacted to ninety-five percent (95%) of the material unit weight by modified proctor.
- (ii) Outside Paved Areas/Outside Influence of Roadways, Drives, Sidewalks.
 - (1) The trench shall be backfilled with a minimum of four inches (4") of clean low void sand (A5) for the bedding of the forcemain pipe. The backfill shall be shovel sliced or compacted under the haunches of the forcemain pipe to provide full-length forcemain pipe support. Contractor shall comply with the Specifications in connection therewith.
 - (2) The remainder of the trench shall be backfilled with material free of debris, organic material and large rocks (S1, S2, or as specified in the Contract Documents placed and compacted in eight inch (8") lifts to ninety percent (90%) of the material unit weight by modified proctor). Excavated material may be used for backfilling unless disallowed by GCDC-WWS and Engineer. The trench shall be slightly mounded to allow for settlement.
- (iii) Under Paved Areas/Within Influence of Roadways, Drives, Sidewalks.
 - (1) The trench shall be backfilled with a minimum of four inches (4") of clean low void sand (A5) for the bedding of the forcemain pipe. The backfill shall be shovel sliced or compacted under the haunches of the forcemain pipe to provide full-length forcemain pipe support. Contractor shall comply with the Standard Details in connection therewith.
 - (2) All trench excavation within a one-on-one influence of a roadway, at all road and drive crossings or as otherwise noted on the Drawings shall be backfilled and compacted to ninety-five percent (95%) of the material unit weight by modified proctor with MDOT Class II Sand (A5) in eight inch (8") lifts and in accordance with the Compaction Testing

Plan. The compaction requirement also includes service leads unless bored.

- (3) Twelve inches (12") of MDOT 21AA limestone (A2) shall be compacted to ninety-five percent (95%) of the material unit weight by modified proctor and shall be placed under areas to be concrete or ninety-eight percent (98%) of the material unit weight by modified proctor under areas to be paved or gravel driveways. Density tests shall be conducted by a certified materials testing company, at Contractor's sole expense. In the event that any material fails the density test, Contractor shall re-compact and re-test to achieve the required results, at Contractor's sole expense.
- (iv) Backfill to Correct Over-Excavation.
 - (1) Backfill Type A1 to required elevation
 - (2) Place in eight inch (8") lifts, each lift compacted to ninety-five percent (95%) of the material unit weight by modified proctor.
- (v) Granular Trench Backfill.
 - (1) Backfill Type A5 to required elevation.
 - (2) Place in maximum eight inch (8") thick lifts, each lift compacted to ninety-five percent (95%) of the material unit weight by modified proctor.

7. Bore and Jacking.

- (a) **General.** All Work under pavements, railroads or where shown on the Drawings, shall be completed in compliance with this Paragraph D.7. Contractor shall comply with the applicable County Road Commission Specifications regarding forcemain pipe installation within the limits of county road right-of-ways in the county where the Work is being performed hereunder. For Work under the State of Michigan highway jurisdiction, Contractor shall comply with all MDOT requirements and standards.
- (b) **Steel Casing Pipe.** All steel casing pipe shall be of sufficient strength to meet the loading conditions of H-20 loading for pavements, Cooper D-72 loading for railroad crossings and shall meet the following minimum required wall thickness as set forth in the Standard Details. Contractor shall comply with the Drawings

for areas under railroads and other affected jurisdictions which may have greater thickness.

All Work performed beneath existing structures, across railroad right-of-ways, and under pavements shall be performed in accordance with the requirements of the parties and governmental agencies which own or have jurisdiction over these locations. Contractor shall give written notice to the representatives of all affected parties and governmental agencies prior to starting the Work and shall meet all requirements of the parties and the governmental agencies in regard to methods of construction and the safety precautions to be taken in performing the Work, all at Contractor's sole expense.

A suitable approach trench shall be opened adjacent to the toe of the slope of the embankment and shall be long enough and wide enough to provide sufficient working room for the steel casing pipe and forcemain pipe to be installed. Guide timbers or rails shall be installed in the bottom of the trench to keep the installation of the steel casing pipe online. Heavy timber backstop supports shall be installed at the rear of the trench "pushing frame" and furnished to fit or match the end of the steel casing pipe to be jacked so the pressure of the jacks will be evenly distributed over the end of the steel casing pipe.

Two (2) hydraulic jacks of sufficient power shall be used to apply pushing or jacking pressure to the steel casing pipe. The excavation at the top and sides of the bored area shall be less than one inch (1") greater than the outside periphery of the steel casing pipe. The bored area shall be accurately cut to line and grade of the Drawings. Adjoining sections of steel casing pipe shall be welded with a continuous weld. Steel casing pipe shall be jacked upgrade where possible. Any undercutting at the bore pit shall be backfilled with MDOT 6AA crushed limestone (A1). MDOT 6AA crushed limestone (A1) shall be placed from the bottom of the bore pit to the top of the steel casing pipe in bore pits. The gradation of the crushed stone shall be approved by GCDC-WWS and Engineer. Concrete bedding or encasement may be required as determined by GCDC-WWS and Engineer at depths requiring special pipe support, at Contractor's sole expense.

Flowable concrete fill shall be pumped between the forcemain pipe and the steel casing pipe the entire length of the bore. The flowable fill shall conform to the following mixture or a GCDC-WWS approved alternate.

Sand	1,640 lbs/CY	\	
Geo Foam (W-304)	7.5 CU FT	\	1
Cement	693 lbs/CY	/	CY
Water	45 lbs/CY	/	
Compressive Strength	1,500 psi @ 28 days	/	

The aforementioned material shall conform to the MDOT Standard Specifications for Construction.

For roadways maintained by MDOT, the steel casing pipe shall begin thirty feet (30') from the edge of pavement in areas where the posted traffic speed is at or above forty-five miles per hour (45 MPH). The steel casing pipe shall begin twenty feet (20') from the edge of the pavement in areas where the posted traffic speed is below forty-five miles per hour (45 MPH). Contractor shall comply with MDOT Standard Specifications for Construction in connection with the installation of steel casing pipe within the MDOT right-of-ways. For all other road right-of-ways, the steel casing pipe shall begin ten feet (10') from the edge of pavement on roadways with a shoulder and/or ditch and the steel casing pipe shall begin five feet (5') from the edge of the pavement on roadways with curbs and gutters.

After the bore is augured, the grade shall be tested for slope by pouring water through the steel casing pipe. This test shall be performed in the presence of GCDC-WWS. Any steel casing pipe with backfall or not bored at the appropriate depth, as determined by GCDC-WWS or Engineer shall be removed and steel casing pipe installed and re-tested until satisfactory test results are achieved as determined by GCDC-WWS, all at Contractor's sole expense.

8. **Surplus and Unsuitable Excavated Material.** All excavated material shall be deposited so that it does not interfere with the Work. Surplus excavated material not used in the Work shall be properly and lawfully disposed of by Contractor, at Contractor's sole expense. The excavated non-contaminated material shall be first offered to adjacent private landowners. If such private landowners do not accept the excavated non-contaminated material, Contractor shall offer the same to GCDC-WWS. If surplus and unsuitable non-contaminated material is to be deposited onto private land, Contractor shall obtain written consent from the private landowner agreeing to its use for this purpose and Contractor shall provide GCDC-WWS and Engineer with a certified copy of such agreement. Prior to depositing any surplus and non-contaminated excavated material, Contractor shall obtain a Soil Erosion and Sedimentation Control permit.

The deposit of surplus excavated material shall comply with all Laws and Regulations.

9. **Ground Water Wells and Well Points.** Contractor shall perform all ditching, pumping, well pointing, bailing, build all drains and perform all other activities necessary to keep the trench, bore pit and shaft clear of ground water, sewage or storm water at all times during the Work. Where the trench, bore pit and shaft areas are wet and suitable construction conditions cannot be obtained by other methods, Contractor shall install and operate a pumping system connected with wells and/or well points so as to effectively drain the same, at Contractor's sole expense. No manholes or forcemain pipe shall be installed in water. All water pumped or drained from the Site shall be disposed of in a manner satisfactory to GCDC-WWS and all governmental agencies having jurisdiction, without damage to property or to other portions of the Work. Contractor shall use its best efforts to protect the Site against flooding and in connection therewith, Contractor shall defend, indemnify and hold harmless GCDC-WWS and Engineer from and against all losses, costs, damages and expenses for Contractor's failure to use its best efforts to protect the Site against flooding. All wells and/or well points shall be removed after the Work is completed and all abandoned space shall be filled by Contractor in accordance with all Laws and Regulations, at Contractor's sole expense.

10. **Incidental Work**

- (a) **Cutting Ductile Iron Forcemain Pipe.** Contractor shall cut the ductile iron forcemain pipe in a neat and workmanlike manner without damage to the ductile iron forcemain pipe or lining so as to leave a smooth end at the right angle to the axis of the ductile iron forcemain pipe. All ductile iron forcemain pipe cutting shall be done by a mechanical cutter or saw.
- (b) **Deflecting Ductile Iron Forcemain Pipe.** Whenever it is necessary to deflect ductile iron pipe from a straight line, either in the vertical or horizontal plane to avoid obstructions or where long radius curves are permitted, the amount of deflection allowed shall not exceed one-half of the allowable manufacturer's recommendation.
- (c) **Joints.** Before any joints are made or the spigot of forcemain pipe placed in the bells, the spigots, bells, gaskets and glands shall be thoroughly cleaned and all foreign material removed from their surfaces by Contractor. Contractor shall provide GCDC-WWS or Engineer with a reasonable opportunity to inspect the joints prior to connecting the forcemain pipe.

In connecting forcemain pipe and fittings, the gland, followed by the gasket, shall be placed over the plain end of the forcemain pipe, the gasket and socket shall be brushed thoroughly with soapy water and the forcemain pipe inserted into the bell. The gasket shall then be pushed into position so it is evenly seated in the bell and the gland moved into position against the face of the gasket. Contractor shall provide GCDC-WWS or Engineer with a reasonable opportunity to inspect the position of all gaskets prior to connecting the forcemain pipe.

- (d) **Connections to Existing System.** The connection to the existing sanitary sewer pipe shall be accomplished by cutting into the sanitary sewer manhole as shown on the Specifications. Contractor shall ensure that GCDC-WWS is present for the excavation and connection to the existing sanitary sewer pipe.
- (e) **Concrete Encasement.** Concrete encasement for forcemain pipe shall be provided at the locations shown on the Drawings or where directed by the GCDC-WWS or Engineer. Contractor shall install a concrete encasement in accordance with the Standard Details. All concrete used shall have a minimum twenty-eight (28) day compressive strength of three thousand (3,000) pounds per square inch.
- (f) **Anchoring/Restraints.** Contractor shall install concrete thrust blocks and restraints at all tees, bends, stubs, plugs and other fittings. The thrust block shall be a minimum of two (2) times the diameter of the forcemain pipe. All thrust blocks shall be approved by GCDC-WWS in writing prior to backfilling.

When restraint joints are required to be used, Contractor shall obtain written approval from GCDC-WWS for the method of restraint joints to be used. GCDC-WWS uses pipe restraints as the primary form of restraint. If pipe restraint is not used, then a thrust restraint design has to be submitted for review and approval by GCDC-WWS.

E. TESTING FORCEMAIN PIPE

1. Hydrostatic Pressure Test

- (a) **General.** All forcemain pipe installed shall be promptly subjected to a hydrostatic pressure test of one hundred fifty (150) pounds per square inch at the elevation of the highest point in the forcemain pipe. Where feasible, the forcemain pipe shall be tested in sections

of two thousand feet (2,000') to three thousand feet (3,000') in length. However, at the discretion of Contractor, up to but no more than five thousand feet (5,000') of forcemain pipe may be tested at one time. Notwithstanding the foregoing, the maximum allowable leakage shall be that of three thousand feet (3,000') of forcemain pipe.

Contractor shall provide all labor, supervision, pumps, measuring devices, power and water necessary for conducting the hydrostatic pressure tests, at Contractor's sole expense. Contractor shall conduct preliminary hydrostatic pressure tests on the forcemain pipe to ensure that the forcemain pipe sustains the required test pressures as set forth in Paragraph E.1(c) below. All leaks and defects discovered during preliminary testing shall be promptly repaired by Contractor and the forcemain pipe shall thereafter be re-tested by Contractor. Immediately after the forcemain pipe has passed all preliminary tests, Contractor shall contact GCDC-WWS to schedule the final hydrostatic pressure test which shall be performed in the presence of GCDC-WWS, unless the forcemain pipe is operated and maintained by the local municipality.

- (b) **Preparation.** After the forcemain pipe has been installed and backfilled, Contractor shall, after receiving GCDC-WWS written approval, fill the forcemain pipe with water in such a manner as to expel all air from the forcemain pipe. The expulsion of the air shall be accomplished through air release valves or through corporation stops installed by Contractor as is necessary to accomplish the expulsion of all air. If a meter is not available to measure the volume of water required to fill the forcemain pipe, Contractor shall pay GCDC-WWS a minimum of five (5) times the volume of the forcemain pipe installed or as otherwise determined by GCDC-WWS. Upon completion of a satisfactory test, as determined by GCDC-WWS, all taps shall be plugged with bronze plugs by Contractor.
- (c) **Test and Leakage.** Leakage is defined as the quantity of water which must be supplied into a newly installed forcemain pipe in order to maintain the specified hydrostatic test pressure after the forcemain pipe has been filled with water and all air has been expelled. No forcemain pipe shall be accepted by GCDC-WWS until the total leakage measured over the quantity of forcemain pipe installed is in accordance with AWWA C600-10.

<u>Forcemain Pipe Size (Diameter)</u>	<u>Max. Leakage Allowed (in Gallons)</u>
6"	1.00
8"	1.32
12"	1.98
16"	2.64

This table assumes a test of one thousand feet (1,000') of forcemain pipe at one hundred-fifty pounds (150 lb) of pressure to two (2) hours. If any hydrostatic pressure test of installed forcemain pipe discloses leakage greater than specified above, Contractor shall promptly locate and repair the forcemain pipe or joints and repeat the hydrostatic pressure test until the leakage is within the specified allowance for leakage, at Contractor's sole expense.

Any damaged or defective forcemain pipe shall be promptly removed and replaced by Contractor with GCDC-WWS approved forcemain pipe and the hydrostatic pressure test repeated to the satisfaction of the GCDC-WWS and Engineer, at Contractor's sole expense.

F. RESTORATION

- 1. General.** All disturbed areas on the Site shall be promptly restored by Contractor in strict compliance with the GCDC-WWS Soil Erosion and Sedimentation Specifications and to the reasonable satisfaction of the GCDC-WWS, GCDC-SWM, the County Road Commission, MDOT, the local municipality and the landowner. All ground surfaces shall be restored to their original condition or better prior to final approval. All costs for the cleanup, restoration work and other operations including, but not limited to, construction signage, street sweeping and maintaining existing utilities are included in the Contract Price.
- 2. Protection and Restoration of Property.** Contractor represents, warrants and covenants to GCDC-WWS that Contractor shall not damage or destroy any trees, fences, culverts, bridges, pavements, driveways, sidewalks, Underground Facilities, electric lines or appurtenances thereof or any public or private property along or adjacent to the Site. Contractor shall give written notice to GCDC-WWS, the authorized representatives of any public service entity and any person, at least forty-eight (48) hours prior to beginning any Work that may damage, interfere or affect the operation or use of their property or facilities. Contractor shall be responsible for all damage to property resulting from any act, omission, neglect or misconduct in the manner of executing the Work, due to the

non-execution of the Work or due to defective Work or Materials. When and where any damage is done to public or private property, Contractor shall promptly restore such property to a condition at least as good as existed before such damage or injury was done and Contractor shall repair such damage or injury in an acceptable manner to GCDC-WWS and any injured party, all at Contractor's sole expense.

3. **Driveways and Sidewalks.** All backfill shall be compacted granular material, MDOT Class II (A5) backfill and shall be used at all driveways, parking areas and under sidewalks, placed and compacted in accordance with the Compaction Testing Plan.

Contractor shall place twelve inches (12") of compacted MDOT 22A limestone (A2) under areas requiring asphalt. Density tests, as required by GCDC-WWS, shall be performed by a certified materials testing company, at Contractor's sole expense. In the event that any density test fails, Contractor shall promptly recompact and re-test to achieve the required standard, at Contractor's sole expense.

All edges broken from driveways and sidewalks shall be sawed or cut off at right angles to the driveway or sidewalk and replaced by Contractor, which shall be approved by GCDC-WWS or Engineer. Paved drives cut or broken within five feet (5') from a joint shall be removed and replaced to the joint by Contractor, at Contractor's sole expense.

Contractor shall provide temporary gravel driveways for those driveways disturbed during the Work, at Contractor's sole expense. Contractor shall ensure that driveways shall be accessible during the Work, unless otherwise approved by GCDC-WWS in writing. These temporary gravel driveways shall be maintained by Contractor until the driveways have been paved.

All driveways and sidewalks shall be replaced in full sections and of the same material and thickness as the existing material, except that the minimum depth of compacted gravel in gravel driveways shall be twelve inches (12") over the entire trench area.

4. **Roadways.** If it is determined by the agency having authority over the roadways that gravel roads have become contaminated during the Work, Contractor shall promptly repair the roadway in accordance with the requirements of the agency having authority over the roadways, at Contractor's sole expense. For areas where the road gravel is removed because of the Work, all labor and Materials shall meet the requirements and specifications of the agency having authority over the roadways.

For areas where the trench is in the roadway or within a one on one influence, all backfill shall be MDOT Class II Sand backfill (A5), in accordance with the schedule of backfilling in Paragraph D.6(d) above. The sand backfill shall extend from the foreslope of ditch to foreslope of ditch or for curb and gutter sections shall be extended five feet (5') from the outside edge of the curb. All shoulders shall be re-graveled in accordance with the agency having authority over the roadways.

When the open cutting of roadways are a part of the Work, Contractor shall obtain the written approval from and comply with all the requirements and specifications of the agency having authority over the roadways and GCDC-WWS. Contractor shall replace the roadway surface with approved methods and Materials in accordance with the agency having authority over the roadways, at Contractor's sole expense.

For gravel shoulders contaminated by the Work, Contractor shall remove the contaminated gravel and re-gravel the shoulders in accordance with the agency having authority over the roadways. All labor and Materials shall meet the requirements and specifications of the agency having authority over the roadways. Contractor shall remove, re-gravel and dispose of contaminated gravel shoulders in accordance with all Laws and Regulations, at Contractor's sole expense.

5. **Trees.** Contractor shall give written notice to all affected private landowners prior to the removal of trees within the public right-of-way or in an easement. All trees in the public right-of-way or an easement that are not removed shall be protected by Contractor, including from the operations of its Subcontractors and Suppliers. Contractor shall defend, indemnify and hold harmless the private landowners from and against any damages, losses, costs and expenses in connection with any trees wrongfully removed or damaged by Contractor or its Subcontractors or Suppliers.

The cost of tree removal, tree replacement or tunnel auger operation shall be included in the Unit Price Work per foot for open cut forcemain pipe and shall not be paid for separately, unless otherwise provided for in the Bid.

No trees shall be replaced within the Genesee County Road Commission right-of-way.

6. **Surface Restoration.** The surface shall be rough graded within two hundred feet (200') of the excavation immediately after completion of the Work. The final grade of the surface shall eliminate all uneven or low spots. Contractor shall remove all debris, roots, branches and stones in

excess of one-half inch (½”) in size. The rough grade shall be scarified to a depth of three inches (3”) where the topsoil is scheduled to be placed. The topsoil shall be placed to a greater depth of four inches (4”) and placed during dry weather.

The composition of the topsoil shall be screened, fertile, friable, free draining, loam or silt loam soil. All topsoil shall be free of subsoil or soils of a mixed textural class and shall not contain rocks or stones larger than one-half inch (½) inch in diameter. The topsoil shall not contain any contaminated substances, impurities such as roots, brush, weeds, slag, cinders, ash, trash, herbicides or any other substances detrimental to the development of vegetative growth. The topsoil shall be free of contamination by heavy metals, including lead and zinc or any other materials which may be toxic to seedlings or established grass. Notwithstanding anything herein to the contrary, topsoil obtained from a location different from the Site shall be submitted by Contractor to GCDC-WWS for approval prior to application. The moisture content of the topsoil shall not exceed six percent (6%) and topsoil shall conform to the following tables.

Topsoil Guidelines

Soluble Salts (DS/m or mmho/cm)	pH	Sand (%)	Silt (%)	Clay (%)	Texture Class*	Organic Matter (%)	% Coarse fragments (>2 mm in diameter)**	Sodium Adsorption Ratio (SAR)
<2	5.5 to 7.5	<70	<70	<30	L, SiL	≥ 2.0	≤ 2	< 3 for any Texture

*L = loam; SiL = Silt Loam

**This guideline also includes no fragments larger than one half inch (½ “) in diameter.

Nutrients

Electrical Conductivity 1:2.5 (w/v) Extract	<1500 us/cm
Nitrogen	>0.2% (w/w)
Extractable Phosphorus	> 45 mg/Kg
Extractable Potassium	> 240 mg/Kg
Extractable Magnesium	> 80 mg/Kg

Contractor shall fine grade the topsoil, maintain the profiles and contours of the rough grade and insure positive drainage with respect to surface run-off. The final elevation shall be at the proposed grades and cross sections in accordance with the Drawings.

Contractor shall remove all roots, weeds, rocks and all foreign material while spreading the topsoil. Contractor shall manually spread the topsoil when close to plants, buildings, fences and other structures to prevent any damage to them. Contractor shall roll the topsoil and any surplus subsoil

and topsoil shall be removed from the Site. Contractor shall then rake the topsoil until smooth.

Contractor shall apply fertilizer (12-12-12 or 20-10-10) at the rate of two hundred forty (240) pounds per acre after the topsoil has been raked. The fertilizer shall be mixed thoroughly into the upper two inches (2") of the topsoil and Contractor shall lightly water the topsoil to aid in the dissipation of the fertilizer.

Contractor shall use its best efforts to match the existing lawn and/or vegetation. Contractor shall seed per GCDC-WWS Soil Erosion and Sedimentation Control Specifications.

Notwithstanding the foregoing, Contractor shall complete the final restoration of the Work within three (3) months of completion of the Work and under no circumstances shall Contractor allow more than two thousand (2,000) lineal feet of disturbed area to exist at any time, unless otherwise agreed in writing by GCDC-WWS and subject to best management practices as determined by GCDC-WWS.

G. BARRICADES AND WARNING SIGNS

Barricades and warning signs in connection with the Work shall be provided by Contractor in accordance with the Specifications, the Michigan Manual of Uniform Traffic Control Devices, Part 6 and the requirements and approval of the agency having authority over the roadways.

For excavation in the area of the Work, in or adjacent to any public right-of-way or any areas covered by an easement, Contractor shall protect such areas by barricades, warning signs, snow fences or other appropriate measures, at Contractor's sole expense. Contractor shall take all required and prudent traffic control measures which shall be approved by the agency having authority over the roadways. Warning signs and barricades left in place after dark shall be clearly visible and the barricades shall be lighted at all times with a minimum of at least one (1) light on each barricade. Contractor shall erect a sufficient number of barricades to keep vehicles from being driven on or into the Site. If Contractor fails to comply with any of the foregoing, GCDC-WWS or the agency having authority over the roadways may immediately secure the Site at the Contractor's sole expense and order Contractor to discontinue the Work until Contractor has complied therewith.

In areas of Work where Contractor's activities may impede, affect or otherwise interrupt normal traffic flow, Contractor shall provide adequate flag persons, at Contractor's sole expense. In the event that Contractor blocks off a road in accordance with the Drawings and Specifications, Contractor shall provide

necessary detour signs to reroute traffic properly and in accordance with the agency having authority over the roadways.

Contractor shall be liable for all damage to the Work, to Materials or injuries to third parties due to the failure of barricades, signs, lights and flag persons, and whenever evidence of such damage is found prior to acceptance of the Work, GCDC-WWS may order the damaged portion of the Work immediately removed and replaced by Contractor, at Contractor's sole expense. Contractor shall maintain the barricades, signs, lights and provide flag persons until the Work has been finally accepted by GCDC-WWS.

H. MEASUREMENT AND PAYMENT

- 1. General.** Bids on a Unit Price Work basis shall be paid for on a Unit Price Work basis for the actual number of units installed. The quantities stated in the Bid are for bidding purposes only. On lump sum contracts and lump sum items, no measurements for separate payment shall be made. Items not listed in this section for payment or further defined by the Specifications are included in the Contract Price.
- 2. Forcemain Pipe or PVC Forcemain Pipe by Open Cut.** The measurements for forcemain pipe shall be made along the centerline of the forcemain pipe and shall include the installation length of the valves, fittings and appurtenances. The Unit Price Work shall include the concrete cradle or encasement and sand or gravel backfill as required by these Forcemain Specifications.
- 3. Forcemain Pipe or PVC Forcemain Pipe in Steel Casing Pipe.** The measurements for forcemain pipe encased in steel casing pipe shall be made along the centerline of the forcemain pipe from end of casing of the steel casing pipe. Unit Price Work for this item shall include the forcemain pipe or PVC forcemain pipe, steel casing pipe, blocking and banding, bulkheads and related appurtenances. In no case shall the length of the steel casing pipe be longer than required for the crossing according to these Forcemain Specifications. For cases where Contractor increases the length of a bore to pass by Underground Facilities, fences, sidewalks or other obstructions, Contractor shall not be paid for steel encased pipe, unless prior written approval has been obtained from GCDC-WWS.
- 4. Fittings and Appurtenances.** The cost of furnishing and installing fittings and appurtenances as shown on the Drawings shall be included in the Unit Price Work for forcemain pipe or PVC forcemain pipe and shall not be paid for separately.

5. **Air Release Manholes.** Forcemain manholes shall be paid for on a Unit Price Work basis for each manhole completed, including the manhole frame and manhole cover, steps, air release valve and appurtenances.

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SUBMERSIBLE SEWAGE **PUMP STATION TECHNICAL SPECIFICATIONS**

A. GENERAL AND ADMINISTRATIVE

These Submersible Sewage Pump Station Technical Specifications (“SSPS Specifications”) cover the furnishing, installation and placing in satisfactory operation, of a factory built (with a minimum of two (2) pumps to achieve firm capacity), automatic sewage pump station, complete with all mechanical equipment, wet well, pipe, wiring and appurtenances as shown on the Drawings and as set forth in these SSPS Specifications. Each pump station shall contain appurtenant equipment, access steps and all safety equipment and devices as described in these SSPS Specifications and as required by OSHA and MIOSHA. The Work in connection with the pump station shall include all required excavation and backfilling, the disposal of excavated materials, the construction of a base slab and mud mat, the connection of suction and discharge pipe, electrical work, clean-up and other related construction activities.

The principal items of equipment in connection with the pump station are two (2) or more motor driven non-clog sewage pumps, a mixed flush system, valves, internal and external pipe, a central control panel, internal wiring, a monitoring system, wet wells, valve vaults and all Materials necessary to put the pump station in operation.

1. **Scope of Work.** Contractor shall furnish all labor, Materials, equipment and incidentals to provide two (2) or more non-clog submersible centrifugal sewage pumps with a mixed flush system as specified herein.
2. **Shop Drawings.** Contractor shall deliver to GCDC-WWS and Engineer Shop Drawings or a material certification as set forth in Paragraph 6.17 of the General Conditions. The Engineer approved Shop Drawings shall be sent to Contractor, GCDC-WWS and Engineer. Contractor shall ensure that the manufacturer of pump stations shall not ship any pump stations and appurtenant equipment until written approval of the Shop Drawings has been received from Engineer.

The following Materials require written approval of GCDC-WWS and Engineer prior to their installation: (i) pumps and seals; (ii) control panels; (iii) wet wells; (iv) valve vaults; (v) dialer systems; (vi) valves; and (vii) single vane design impellers

3. **Operating Conditions.** All pumps shall be capable of delivering a specified discharge of unscreened sewage against a total dynamic head as specified. All openings within the pumps shall be capable of handling a three inch (3”) spherical solid object. The pumps shall be non-overloading throughout the entire range of operation without employing a service

factor. The pumps shall contain a minimum service factor of 1.20. The performance curve of the pump manufacturer shall be submitted for written approval to GCDC-WWS and Engineer by Contractor and shall include, head, capacity performance, pump efficiency, solid handling capacity, reflect motor service factor and contain the system head curve for the Work, along with the NPSH-R and NPSH-A curves.

B. PUMPS

- 1. General.** All pumps shall be of the centrifugal, non-clog, solids handling, submersible, wastewater type. Each pump shall be automatically and firmly attached to the discharge pipe when installed on its mating discharge connection and permanently installed in the wet well. The pumps shall be easily removable for inspection or service, requiring no bolts, nuts or other fastenings to be disconnected. All pumps shall be fitted with a minimum of three-eighths inch (3/8") stainless steel lifting cable of adequate length to permit the raising and lowering of the pump for inspection or removal. The pump volute, motor and seal housing shall be high quality gray cast iron, ASTM A-48, Class 30. All pump surfaces which contact sewage shall contain a coating resistant to sewage. The pump discharge shall be fitted with a standard ANSI one hundred twenty-five (125) pound 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 304 series stainless steel. The pumps shall be manufactured by Flygt, ABS or KSB.
- 2. Bearings and Shaft.** An upper radial bearing and a lower thrust bearing shall be required in all pumps. The bearings shall be filled in the motor housing. Double row, sealed grease packed bearings shall not be used in any pumps. Bearings, which require lubrication according to a prescribed schedule shall not be used in any pumps. The upper radial bearing and lower thrust bearing shall have a minimum B-10 life at the specified condition of one hundred thousand (100,000) hours. All bearings utilized shall be able to be obtained by GCDC-WWS locally and within six (6) hours of a submission of an order by GCDC-WWS.
- 3. Seals**
 - (a)** All pumps shall have two (2) mechanical seals, mounted in tandem and contain an oil chamber between the seals. The seals shall contain carbon rotating seal faces and ceramic stationary seal faces. Pumps, which require the use of tungsten-carbide seals, shall not be used. The lower seal shall be replaceable without disassembly of the seal chamber and without the use of special tools. Pump-out vanes shall be present on the backside of the impeller to keep contaminants out of the seal area. All pumps and

seals shall be approved by GCDC-WWS in writing prior to installation. All seals utilized shall be able to be obtained by GCDC-WWS locally and within six (6) hours of a submission of an order by GCDC-WWS.

- (b) All pumps shall be equipped with a seal leak detection probe and a warning system as set forth in the Drawings. In all pumps there shall be access for checking the seal chamber oil level and consistency.
- (c) There shall be an electric probe or seal failure sensor installed in the seal chamber between the two (2) tandem mechanical seals in all pumps. All pumps shall contain a mechanism so that if the lower seal fails, contaminants which enter the seal chamber shall be detected by the sensor and send a signal to operate the warning device as specified on the Drawings.
- (d) Pumps equipped with opposed mechanical seals shall not be used.
- (e) All seal lubricants used in pumps shall be FDA approved and non-toxic.

4. Impellers

- (a) All impellers shall be of the non-clogging design and contain pump-out vanes on the front and the backside of the impeller to prevent grit and other materials from collecting in the seal area. Single vane design impellers shall not be used without the written consent of GCDC-WWS or Engineer.
- (b) All impellers shall be dynamically balanced. The tolerance values listed in the table below are according to the International Standard Organization grade 6.3 for rotors in rigid frames. The tolerance shall be split equally between the two (2) balance planes which are the two (2) impeller shrouds.

RPM	Tolerance
3500	.01 in. - oz./lb. of impeller weight
1750	.02 in. - oz./lb/ of impeller weight
1150	.026 in. - oz./lb. of impeller weight
870	.03 in. - oz./lb of impeller weight

- (c) All impellers shall be slip fit to a tapered shaft and key driven. A 304 series stainless steel washer and impeller bolt shall be used to fasten the impeller to the shaft. Straight end shafts and/or threaded shafts for attachment of the impeller shall not be used.

5. Wear Rings

- (a) A wear ring system shall be used to provide efficient sealing between the volute and suction inlet of the impellers. The wear ring shall be stationary and made of brass which is drive fitted to the volute inlet. Wear rings of any other material shall not be used.
 - (b) All pump volutes shall be single-piece gray cast iron, Class 35, non-concentric design, with smooth passages large enough to pass any three inch (3") solids that may enter the impeller. The minimum inlet and discharge size shall be as specified on the Drawings or the Shop Drawings. The pump volutes shall be of the end suction volute type having sufficient strength and thickness to withstand all stress and strain from service at full operating pressure and load. The pump volutes shall be the centerline discharge type equipped with an automatic pipe coupling arrangement for ease of installation and piping alignment. The design shall be such that the pumps will be automatically connected to the discharge piping when lowered into position with the guide rails. The casing shall be accurately machined and bored for register fits with the suction and casing covers.
 - (c) A volute case wearing ring shall be provided to minimize impeller series stainless steel fasteners. The wear ring utilized shall be easily replaceable in the field and shall be able to be obtained by GCDC-WWS locally and within six (6) hours of submission of an order by GCDC-WWS.
- 6. Pump/Motor Start-Up.** Contractor shall deliver to GCDC-WWS a "start-up" report that contains a quality control check sheet verifying that the pump manufacturer has performed the following inspections and tests as a routine quality check on each pump prior to delivering the pump to Contractor: (i) test for the proper impeller size, motor rating, voltage and phase to ensure that it is in compliance with the customer purchase order, these SSPS Specifications and Shop Drawings; (ii) inspection of the motor and cable insulation for any defects; (iii) pressurize the motor with an environmentally safe gas and then use a sniffer device to test for leaks at all joints and seals; and (iv) dry run the pump to test for proper amp readings.
- 7. Documentation.** Contractor shall deliver to GCDC-WWS a minimum of five (5) sets of Submittal Drawings, GCDC-WWS approved Operating and Maintenance Manuals and Parts Lists for the pumps. This delivery shall include the following items and tests: (i) pump curve per A.3 (to include the system head curve); (ii) complete technical data showing materials of construction, moments of inertia, weight, type and length of

cable; (iii) complete motor data including input KW, shaft BHP, full load amps, locked rotor amps, NEMA code letter, motor efficiency, power factor and moment of inertia; (iv) dimensional prints; (v) control data (if supplied by pump manufacturer); (vi) gate valves and detailed Drawings; (vii) detailed information regarding the accessories being supplied; (viii) installation guides; (ix) technical manuals; (x) parts list; (xi) check valves; (xii) swing check valves; and (xiii) any other relevant documentation requested by GCDC-WWS

8. **Coating.** The pump shall be coated after assembly, but before manufacturer testing as set forth in Paragraph B.6 above and contain a zinc chromate base enamel. The coating shall be applied in one coat (3-4 millimeters thick). The coating shall be air dried prior to testing.
9. **Serviceability.** The complete rotating assembly of the pump shall be capable of being removed from the volute without disturbing the suction pipe discharge pipe and volute. The motor housing, seal housing with seal plate and impeller still attached to the shaft shall be capable of being lifted out the volute case from the top as one assembly.
10. **Warranty.** Contractor shall ensure that GCDC-WWS shall receive a warranty which provides, at a minimum, that the pump unit and appurtenant parts thereof shall be free from defects in material and workmanship for two (2) years from final acceptance by GCDC-WWS. Contractor shall also ensure that the pump unit manufacturer shall furnish to GCDC-WWS new replacement parts, including but not limited to the pump unit and appurtenant parts during the warranty period.

C. ELECTRICAL POWER CORD

All electrical power cords from the pump to the power source shall comply with the following requirements.

1. The electrical power cord shall be UL and CSA approved and installed dependent on amp draw for size.
2. The pump shall be triple protected with a compression fitting and two (2) epoxy potted areas at the power cord entry to the pump. A separation between the junction box area of the pump and the motor by a stator lead sealing gland or terminal board shall not be used.
3. The power cable entry into the cord cap assemble 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 shall 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.
5. The connection box wiring shall be separated from the motor housing wiring by stripping each lead down to bare wire at staggered intervals and by separating each strand. This area shall be filled with an epoxy compound potting. Fiberglass terminal boards shall not be used.
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.

D. PUMP MOTOR

All pump motors shall comply with the following requirements.

1. The stator, rotor and bearings shall be mounted in a sealed submersible type housing. The stator windings shall have Class F insulation, (one hundred fifty-five degrees centigrade (155° C) or three hundred eleven degrees centigrade (311° C)) and a dielectric oil filled motor, NEMA B design. Air-filled designs shall not be used.
2. The pump and motor shall be specifically designed so they may be operated partially or completely submerged in the liquid being pumped. The pump shall not require cooling water jackets.
3. Stators shall be securely held in place with a removable end ring and threaded fasteners so they may be easily removed in the field without the use of heat or a press. Stators held by a heat shrink fit shall not be used. Stators shall be capable of being repaired or rewound by a local motor service station. Pumps which require service only by the manufacturer shall not be used. No special tools shall be required for pump and motor disassembly.
4. Pumps shall be equipped with heat sensors. The heat sensors shall be a low resistance, bi-metal disc that is temperature sensitive. Heat sensors shall be mounted directly on the stator windings and sized to open at one hundred twenty degrees centigrade (120° C) and automatically reset at thirty to thirty-five degrees centigrade (30-35° C). The heat sensors shall be connected in series with a motor starter coil and with a starter that shall

be equipped with three (3) leg overload heaters so that all normal overloads are protected by the starter.

E. CONTROL PANEL

- 1. General.** The control panel shall be contained in a common NEMA 4X enclosure and shall be lockable. The control panel shall be the product of a manufacturer approved by GCDC-WWS in writing. Control panels shall be as described in these SSPS Specifications and Drawings.

The control panel shall include, but not be limited to, the following items: (i) duplex pump control module; (ii) NEMA 4X Enclosure; (iii) line terminal block; (iv) motor circuit breaker; (v) motor starter; (vi) transformer primary circuit breaker; (vii) control circuit transformer; (viii) control terminal block; (ix) ground lug; (x) generator connection; and (xi) any other items as determined by GCDC-WWS.

- 2. Pump Control Module.** The pump control module shall be operated by a microprocessor and shall include the features most commonly required for submersible sewage pumps, grinder pumps and effluent pumps. The microprocessor circuitry shall contain power on reset and oscillator start-up timers as well as an independent watchdog timer to insure reliable operation.

The pump control module shall provide the following functions: (i) low voltage to all float switch leads; (ii) hand-off-auto switch for each pump; (iii) pump called LED for each pump; (iv) overtemp shutdown & LED Indicator for each pump; (v) float switch status LEDs; (vi) duplex alternator; (vii) 1 Lead-Alt-2 lead selector switch; (viii) alarm test/silence push-button; (ix) alarm test/silence terminals for remote push-button connection; (x) redundant off/low level alarm circuit; (xi) high level alarm circuit; (xii) N.O. & N.C. auxiliary contacts for both low & high level alarms; (xiii) pump start time delays; and (xiv) any other functions as determined by GCDC-WWS.

- 3. Enclosure.** The enclosure shall be a NEMA 4X and shall be of a suitable size to house all components. A locking hasp shall be provided by Contractor. The inner panel shall be made of twelve (12) gauge steel and painted white.
- 4. Line Terminal Block.** A three (3) pole line terminal block rated for six hundred (600) volt use shall be provided by Contractor. Blocks shall be constructed of nylon, have insulating walls on all sides of the lug and be UL approved.

5. **Motor Circuit Breaker.** A three (3) pole circuit breaker shall be supplied by Contractor for each pump motor and be of adequate size to allow starting of the motor without nuisance tripping and shall provide short circuit and branch circuit protection. The motor circuit breaker shall have a minimum interrupt rating of one hundred eighty thousand (180,000) RMS symmetrical AMPS at four hundred eighty (480) volts. The motor circuit breaker shall have line and load lugs and be attached directly to the electric control panel.
6. **Motor Starter.** A NEMA rated magnetic motor starter shall be provided for each motor by Contractor. Each motor starter shall be equipped with a three (3) leg, ambient compensated overload relay. Each leg shall be provided with a replaceable heater element to provide class 10 overload protection.
7. **Transformer Primary Circuit Breaker.** A two (2) pole transformer primary circuit breaker with a minimum interrupt rating of eighteen thousand (18,000) RMS symmetrical amps at four hundred eighty (480) volts shall be supplied by Contractor. The transformer primary circuit breaker shall have line and load lugs and be attached directly to the control panel.
8. **Control Circuit Transformer.** A machine tooled transformer shall be furnished by Contractor to provide one hundred twenty (120) VAC control voltage to the control panel. The transformer shall be protected by fuses on the primary power supply. Control circuit wiring shall be protected by use of a fuse mounted on the secondary power supply of the transformer. Fuses shall be sized and applied in accordance with the requirements of the National Electrical Code (“NEC”), the ICC Electrical Code, NFPA 820 or other electrical code as determined by the agency having jurisdiction regarding electrical inspections.
9. **Control Terminal Blocks.** Control terminals shall be provided by Contractor for connecting level control switch leads. Terminal blocks shall be rated for six hundred (600) volt use and accept a wire range of #8-#22. Blocks shall be constructed of nylon, have insulating walls on all sides of the lug and be UL approved.
10. **Ground Lug.** An equipment ground lug shall be provided by Contractor for grounding the enclosure. The enclosure shall be adequately grounded per Article 250 of the NEC, the ICC Electrical Code, NFPA 820 or other electrical code as determined by the agency having jurisdiction regarding electrical inspections.

11. **Alarm Battery Back-Up.** The alarm light and horn shall be powered by a twelve (12) VDC battery backup unit. The battery backup unit shall consist of a properly sized battery and automatic charging unit, all panel mounted. A twelve (12) VDC disconnect device shall be furnished by Contractor.
12. **High-Water Alarm Light.** A twelve (12) VDC high-water alarm light shall be mounted on the top of the control panel. The lens shall be made of red lexan, mounted with screws from the inside of the control panel enclosure and be watertight. The bulb shall be easily replaced from within the control panel.
13. **High-Water Alarm Horn.** A high-water alarm horn shall be mounted on the control panel. The alarm horn shall operate on twelve (12) VDC and shall have a minimum decibel rating of eighty (80). Pushbuttons shall be furnished for testing the alarm circuit and to silence the horn when an alarm exists.
14. **Pump Running Time Meter.** A six (6) digit non-resettable time meter shall be connected to each motor starter to record the total running time of each pump motor in hours and tenths of hours.
15. **Anti-Condensation Heater.** A cabinet heater and thermostat shall be provided by Contractor to prevent condensation from occurring in the control enclosure. The heater shall be rated at fifty (50) watts and shall operate on one hundred twenty (120) VAC. An adjustable thermostat shall be provided by Contractor.
16. **High Temperature Pump Circuit.** The control panel shall be equipped by Contractor with necessary terminals for connection of a high temperature pump sensor in the pump. When sensor contacts open, control power shall be disconnected from the coil of the contactor or starter for that pump. When the pump stator temperature has returned to a satisfactory level and the contacts close, the power shall be restored.
17. **Pump Seal Failure Alarm Circuit.** The control panel shall be equipped with necessary circuitry and relays to sense resistance that is caused by the entry of moisture into the pump seal chamber. When moisture is detected, a detection light shall illuminate in the electric control panel. Contractor shall ensure that all necessary components and wiring shall be furnished by the control panel manufacturer, except seal probes installed in the pumps.
18. **Telemetry/Data Logger.** Contractor shall leave space in the control panel for a "Telemetry/Data Logger". Contractor shall contact GCDC-WWS for requirements in connection with the same.

- 19. Pump Station Start-Up.** Contractor shall ensure that the manufacturer's representative shall perform all start-up procedures and test for proper installations of pumps and all appurtenances and set floats for pumps on, pumps off and high and low level water alarms. Contractor shall ensure that GCDC-WWS Operations & Maintenance, GCDC-WWS Construction Superintendent and the local municipality shall have a reasonable opportunity to witness the start-up by Contractor. Contractor shall deliver a copy of the start up report to GCDC-WWS.

Draw down tests shall be performed by Contractor who shall provide written documentation to GCDC-WWS of the pumping rate.

- 20. Warranty.** Contractor shall ensure that GCDC-WWS shall receive a warranty from the manufacturer of the control panel which provides, at a minimum, that the control panel and parts thereof shall be free from defects in material and workmanship for two (2) years from final acceptance by GCDC-WWS. Contractor shall also ensure that the control panel manufacturer shall furnish to GCDC-WWS new replacement parts for any component proved defective, whether of its component or that of any other manufacturer, during the warranty period, except only those items which are normally consumed in service including, for example, light bulbs, oil, grease and packing.

F. PIPE

- 1. Discharge Pipe.** Discharge pipe shall be a minimum of Class 53 ductile iron for 8" and Class 54 ductile for 12" and larger (refer to Forcemain Specifications) and shall conform to ANSI/AWWA C151/A21.51-09. Ductile iron pipe shall be cement-lined and shall conform to ANSI/AWWA C104/A21.4-13.

Pipe joints outside of structures shall be push-on type and shall conform to ANSI/AWWA C111/A21.10-12. Restrained joints shall be installed as specified in the Forcemain Specifications.

Pipe joints within structures shall be flanged type and shall conform to ANSI/AWWA C115/A21.11.

- 2. Drain Pipe, Vents.** Pipe and fittings shall be PVC plastic and shall conform to ASTM D-1795, Schedule 80. The joints shall be solvent welded.

G. WET WELL AND VALVE VAULT

1. **Wet Well.** The wet well shall be constructed with pre-cast concrete manhole sections with premium rubber joints and shall conform to ASTM C478-03 and C443-02. The bottom wall section of the wet well shall be cast integrally with the wet well bottom.

The wet well shall have a one-quarter inch (1/4") thick aluminum access cover with stainless steel hardware, locks and spring-loaded hinges to be placed on top of the wet well. The size of the cover shall be a minimum of forty-eight inches (48") by forty-eight inches (48"), dependent on the pump size and the wet well diameter as determined by GCDC-WWS and Engineer.

The vent pipe shall be placed through the top of the wet well. The vent shall have a bird screen attached.

The final elevation of the top of the wet well shall be the same elevation as the top of the valve vault. The final elevation of the existing ground surrounding the pump station shall provide a positive slope to insure that water does not pool around the station. In no case shall the elevation of the top of the wet well be less than one (1) foot above the one hundred (100) year flood plain elevation, as defined by FEMA.

2. **Valve Vault.** The valve vault shall be constructed with pre-cast concrete manhole sections with premium rubber joints and shall conform to ASTM C478-03 and C443-02. The bottom wall section of the valve vault shall be cast integrally with the valve vault bottom. A sump pump crock shall be constructed in the valve vault.
3. **Access Hatches.** Contractor shall furnish and install two (2) access hatches approved by GCDC-WWS and Engineer in writing, as shown on the Drawings, at the nominal dimensions required on the Drawings. Each access hatch shall be hinged and equipped with a hasp suitable for use with a padlock.

The access hatch for the pump chamber shall be located to permit the removal of the pumps. The exact location of the access hatches shall be as specified on the Drawings.

The valve vault shall have a one-quarter inch (1/4") thick aluminum access hatch with stainless steel hardware, locks and spring-loaded hinges to be placed on top of the valve vault.

The size of the access hatch shall be a minimum of forty-eight inches (48") by forty-eight inches (48"), as determined by GCDC-WWS and Engineer and shall be positioned over the valves. Each access door leaf shall have a safety handle to maintain the door in the open position. Access doors shall be designed to support a uniform load of one hundred fifty (150) pounds per square foot. The access doors and frames shall have a mill finish. A bituminous coating shall be provided on surfaces of access hatches that may contact concrete.

H. ELECTRICAL WORK

- 1. General.** Contractor shall furnish and install a primary power service junction box, primary disconnect switch, two hundred (200) amp, four hundred sixty (460) volt, three (3) phase Crouse-Hinds AR2401 S22 generator plug with transfer switch, wire, conduit, meter and meter socket, all meeting the requirements of the NEC, the ICC Electrical Code, NFPA 820 or other electrical code as determined by the agency having jurisdiction regarding electrical inspections and the local power company. Contractor shall make and pay for the connection to the electrical power supply as installed by the local power company and shall furnish all labor and Materials to complete the system beyond the local power company's terminus point. All electrical equipment shall have an approved electrical inspection by an electrical inspector having jurisdiction over permitting prior to putting the station into service.
- 2. Power Source.** The power drop to service the pump station shall be furnished by the Contractor. The power supply from the power pole to the meter pedestal and from the meter pedestal to the pump station shall be constructed underground.
- 3. Primary Switch.** A primary switch shall be furnished by Contractor and located so that an easy disconnect can be made for all power to the pump station. The primary switch shall be three (3) pole, gang operated, heavy duty type in a NEMA 4X enclosure with locking capability.
- 4. Pole Mounted Transformer.** A pole-mounted transformer shall be furnished and installed by the local power company and paid for by the Contractor or the local unit of government, whichever is applicable.
- 5. Grounding.** All electrical equipment shall be adequately grounded in accordance with the NEC, the ICC Electrical Code, NFPA 820 or other electrical code as determined by the agency having jurisdiction regarding electrical inspections.

I. COATING

- 1. General.** Pump discharge pipe, ferrous brackets and other ferrous items within the wet well shall be coated by Contractor with fourteen (14) to twenty (20) millimeters coal tar epoxy. The pipe surface shall be prepared for to near white blast cleaning.

Pumps and items that are pre-coated before delivery shall be touched up by Contractor where the coating has been damaged through shipping, handling and installation. The touch up coating shall be of the same type used for the original coating.

Pipe, valves, and ferrous items in the valve chamber, shall be coated by Contractor with three (3) to five (5) millimeters epoxy primer and four (4) to six (6) millimeters epoxy-polyamide. The surfaces shall be commercially blast cleaned.

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