CAMPBELL COUNTY

UTILITIES AND SERVICE AUTHORITY

20644 Timberlake Road
Lynchburg, VA 24502

WATER AND SEWERAGE

ADMINISTRATIVE CONTRACT DOCUMENTS,

CONSTRUCTION MATERIALS,

CONSTRUCTION PROCEDURES, STANDARD DETAILS,

DESIGN STANDARDS, AND POLICIES

(CCUSA STANDARDS)

January 5, 2017

COMMONWEALTH OF VIRGINIA
TIMOTHY R. WAGNER
No. 25127
1/5/17
PROFESSIONAL ENGINEER

PREAMBLE

WHEREAS, the Campbell County Utilities and Service Authority (the Authority) *Water and Sewerage Administrative Contract Documents, Construction Materials, Construction Procedures, Standard Details, Design Standards, and Policies (CCUSA Standards)* are established for the purpose of obtaining consistency in the design and construction of waterlines, gravity sewers, and force mains; and,

WHEREAS, projects such as water treatment plants, wastewater treatment plants, groundwater well and treatment systems, water storage facilities, water booster pump stations, wastewater pump stations, and Authority buildings are more complex and required more detailed design and construction; and,

WHEREAS, the Authority has the long term maintenance of the public water and wastewater infrastructure in Campbell County, Virginia;

NOW, THEREFORE, parties wishing to design and construct water treatment plants, wastewater treatment plants, groundwater well and treatment systems, water storage facilities, water booster pump stations, wastewater pump stations, and Authority buildings shall schedule a Pre-Design Conference with the Authority so that the Authority can relay its requirements for the project. Waterlines, gravity sewers, and force mains shall follow the requirements of the CCUSA Standards.

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ADMINISTRATIVE CONTRACT

DOCUMENTS

SECTION A-1

INVITATION TO BID

[Note: The following elements need to be addressed and modified for the specific project.]

Re: *[Project Name, No.]*
Campbell County Utilities and Service Authority (Owner)

1. The Campbell County Utilities and Service Authority will receive sealed bids for the furnishing of all labor, materials and equipment, and the performing of all work for the above referenced project including *[insert project description]*.

   Bids will be received until _____p.m. on _____, 20___at the Office of the Authority, 20644 Timberlake Road, Lynchburg, Virginia, 24502. Bids will be publicly opened and read aloud at that time. Bids are to be submitted, single copy, on the bid form, in a sealed envelope clearly marked "Bid on Project
   [insert project title]."

2. Title 54.1, Chapter 11, Section 54.1-1112, Code of Virginia requires bidders to show evidence of a certificate of registration before a bid may be received and considered. In compliance with this requirement, the bidder shall place on the outside of the envelope containing its bid the following notation: "Registered Virginia Contractor No. _____," the bidder's name, and business address.

3. Bids must be accompanied by a Cashier's Check or acceptable Bid Bond for not less than 5 percent of the bid, made payable to the Campbell County Utilities and Service Authority.

4. Contract Documents may be obtained from *[insert information]*. Documents may be viewed at the following locations: *[insert locations and where to obtain documents and the cost]*

5. Should a bidder find it necessary to receive clarifications concerning the Contract Documents, or should the bidder be in doubt as to the meaning thereof, the bidder should at once notify the Engineer. Any interpretation of the Contract Documents shall be made only by addenda. Addenda will be delivered to bidders prior to bid opening. The Owner will not be responsible for any other explanation of the Contract Documents.

6. All blank spaces on the bid form must be filled in, in ink or typewritten, and must be fully completed.

   For unit price contracts, the product of each unit price and the bid quantity shall govern in evaluating bids received. The summary of all total item prices is included in the schedule of prices for the purpose of convenience only in announcing an apparent low bidder at the time of opening and has no meaning otherwise. All bids are subject to review and checking for completeness and accuracy by the Owner or its agents.

7. Bid award shall be made to the lowest responsive and responsible bidder. Whenever such low bid exceeds available funds, the Owner reserves the right to negotiate with the lowest responsive and responsible bidder in order to obtain a contract price within funds available. Negotiations with the lowest bidder may include modifications to the bid price and changes in the scope of work as outlined by the technical specifications and the Drawings.

8. The Owner reserves the right to reject any and all bids and to waive any informality so designated by the Code of Virginia in bids received.

9. The Owner will act on bona fide bids within *[insert 30, 60, or 90 as selected by the Owner]* days after the opening of all bids and a bidder may not withdraw his bid within this period except as indicated below. However, in the event of unintentional arithmetic or similar mistake made directly in the compilation of the bid, the bidder may withdraw its bid in accordance with Title 2.2, Chapter 43, Section 2.2-4330(A) of the Code of Virginia. By the giving of this written notice for the causes cited, the bidder may withdraw its bid within 2 business days after the conclusion of the bid opening procedure.

10. The bidders business practices shall conform to Title 2.2, Chapter 43, Section 2.2-4311, prohibition of employment discrimination and Section 2.2-4312, provision of a drug free work place, as described by the Code of Virginia and further detailed in the Standard Form of Agreement.

11. A mandatory Pre Bid conference will be held at the Office of the Authority at (hour and date). *[this provision may be waived by the authority]*

Campbell County Utilities and Service Authority

BY: Frank L. Davis, Jr., Administrator

SECTION A-2

INSTRUCTIONS TO BIDDERS

1. It is the declared and acknowledged intent of these standards to provide and secure the construction of the project identified in Invitation to Bid in Campbell County, Virginia, complete, tested, and ready for service. The work includes furnishing all labor, materials and equipment, and performing all work necessary to complete the project as described in the Contract Documents and as shown on the Drawings.

2. Bidders are urged to visit the site of the proposed work and satisfy themselves as to the surface and subsurface conditions in and adjacent to the site, the availability of water, electricity, telephone, sanitary facilities, access roads, storage sites, and related factors.

3. The Owner will act upon bids as indicated in the Invitation to Bid. The acceptance of a proposal shall bind the successful bidder to execute the Agreement when presented to it. All terms and conditions of the Agreement shall be effective upon acknowledgment by the Contractor of receipt of the notice of award.

4. Any Contractor whose proposal shall be accepted will be required to execute the Agreement within 10 business days after Notice of Award. Failure or neglect to do so shall constitute a breach of the Agreement effected by the acceptance of the proposal. The damages to the Owner for such breach will include loss from interference with its construction program and other items whose accurate amount will be difficult or impossible to compute. Therefore, the amount of the Bid Bond or Cashier's Check accompanying the proposal shall become the property of the Owner.

   The Owner may make such investigations as it deems necessary to determine the ability of the bidder to perform the work. If requested, the bidder shall furnish, within 5 days of the Owner's request, any information pertinent to the determination of its experience and financial capability to perform this work. Should this evidence not satisfy the Owner that such bidder is properly qualified to carry out the obligations of the Agreement and the work contemplated therein, the bid may be rejected.

5. Bidders must be responsible parties, regularly and practically engaged in the installation of the class of work, and known to possess ample facilities for doing this work.

   Title 59.1, Chapter 5, Code of Virginia, requires Contractors operating as a partnership or under an assumed or fictitious name to file a Certificate of Ownership with the State Corporation Commission and to appoint an attorney for service of process.

6. The Contractor shall furnish bonds executed by an acceptable Surety Company duly authorized to do business in the Commonwealth of Virginia or a Letter of Credit by a bank duly licensed to do business in the Commonwealth of Virginia, in an amount at least equal to 100 percent of the contract price, as security both for faithful performance and for payment of all persons performing labor and furnishing materials in connection with this contract.

7. The Contractor shall furnish evidence of insurance coverage as detailed in the Supplementary Conditions.

8. The Contractor shall commence the work within 10 business days of the Notice to Proceed.

9. The Contractor shall employ an individual certified by the Department of Environmental Quality as the Responsible Land Disturber. This person shall be responsible for the proper functioning of the erosion control devices throughout the project.

10. The entire Virginia Work Area Protection Manual of the Virginia Department of Transportation (VDOT), latest edition, and requirements of the VDOT Land Use Permit obtained by the Owner shall be included as part of this Information to Bidders as if attached hereto. Signs, traffic control devices, and other details outlined therein shall be specifically followed when working within or adjacent to the VDOT's right-of-way. Should traffic control signal persons be employed on the work, the Contractor shall assure these persons are properly certified signal persons with their certificates available for inspection at the site.

11. In accordance with Title 2.2, Chapter 43, Section 2.2-4334**,** of the Code of Virginia, for certain construction contracts valued in excess of $200,000, for construction of roads, pump stations and water, gas and sewage mains (but not water and or waste treatment plants), the Contractor may have the option to utilize the escrow account procedure for investment of partial payment retainage amounts. Should the Contractor elect this option, the Escrow Agreement form shall be executed and returned to the Owner within 15 calendar days of the Notice of Award. If the form is not furnished within the 15-day period, the Contractor shall forfeit its right to use the escrow account procedure. The Escrow Agreement form contained on the following pages shall be included as part of this information for bidders.

12. During the performance of this contract, the Contractor agrees as follows:

    A. The Contractor will not discriminate against any employee or application for employment because of race, religion, color, sex or national origin, except where religion, sex, or national origin is a bona fide occupational qualification reasonably necessary to the normal operation of the Contractor. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

    B. The Contractor, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, will state that such Contractor is an equal opportunity employer.

    C. Notices, advertisements, and solicitations placed in accordance with federal law, rule, or regulation shall be deemed sufficient for the purpose of meeting the requirements of this Section.

    D. The Contractor will include the provisions of the foregoing Paragraphs A, B, and C in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

SECTION A-3

BID FORM

[Note: The following elements need to be addressed and modified for the specific project.]

Campbell County Utilities and Service Authority (Owner)
20644 Timberlake Road
Lynchburg, Virginia 24502
Attn: Authority Administrator

Gentlemen:

The undersigned, having visited and examined the site and having carefully studied the Contract Documents for *[project name]* hereby proposes to furnish all labor, equipment, materials, and services and to perform all operations necessary to execute and complete the work required for the project, in strict accordance with the Contract Documents prepared by the Engineer, dated *[insert date of document]* together with addenda numbered _____, issued during bidding period and hereby acknowledged, subject to the terms and conditions of the Agreement for the sum of _____ _____ dollars ($_____) which is the sum of all the individual bid items shown in the attached Bid Schedule and shall be referred to hereinafter as the Base Bid. The Base Bid is founded upon furnishing equipment and materials of specified manufacturers.

It is understood and agreed that the Owner, in protecting his best interest, reserves the right to reject any or all bids, or accept any bid at the Base Bid price, whereupon the Contractor shall furnish equipment and materials as specified.

The Base Bid shall include the quantities on the attached Bid Schedule. The bidder declares that he understands that the quantities shown in the Bid Schedule are approximate only; and are subject to either increase or decrease based on the work shown on the Drawings and for changes in the work as directed by the Owner and that should the quantities of any of the items of work be increased, the undersigned proposes to do the additional work at the unit price set out herein, and should the quantities be decreased, he also understands that payment will be made on the actual quantities installed at the unit prices, and will make no claim for the anticipated profits for any decrease in the quantities. Actual quantities will be determined upon completion of the work. Lump sum bid items will not be adjusted.

We are properly equipped to execute work of the character and extent indicated by the Contract Documents and so covered by this bid and will enter into Agreement for the execution and completion of the work in accordance with the Drawings, project manual, and this bid; and we further agree that if awarded the contract, we will commence the work on the date stated in "Notice to Proceed" and the work be substantially complete within ___ calendar days.

The Owner and Contractor recognize that time is of the essence with this Agreement and that the Owner will suffer financial loss if the work is not completed within the number of calendar days listed above for all work associated with the *[project name]*. They also recognize the delays, expense, and difficulties involved in proving the actual loss suffered by the Owner if the work is not completed on time. Accordingly, instead of requiring any such proof, the Owner and Contractor agree that, as liquidated damages for delay (but not as a penalty), the Contractor shall pay the Owner *[insert dollar amount]* ($_____) for each day that expires after the time specified for substantial completion of the project.

Enclosed herewith is the following security, offered as evidence that the undersigned will enter into Agreement for the execution and completion of the work in accordance with the Contract Documents:

Cashier's Check for the Sum of _____

Name of Bank _____

Bidder's Bond in Amount of _____

Bond Issued by _____

The undersigned further agrees that in case of failure on his part to execute the said Agreement within the 10 days after written notice being given on the award of the contract, the monies payable by the securities accompanying this bid shall be paid to the Owner as liquidated damages for such failure; otherwise, the securities accompanying this bid shall be returned to the undersigned.

This bid is subject to acceptance within a period of *[insert number of days used in Invitation to Bid]* days from this date.

Respectfully Submitted,

_____
Contractor

By _____

_____

_____
Address

_____
Telephone Number

Date _____

Contractor's Current Virginia
License Number _____ Code _____

If determined to be the successful low bidder(s), the above-signed elects to use the escrow account procedure, a copy of which is attached to this bid proposal package.

_____
Write "Yes" or "No" on
Above Line.

In the event the successful bidder elects to use the escrow account procedure, the "Escrow Agreement" form shall be executed and submitted to the Owner within 15 days after notification. If the "Escrow Agreement" form is not submitted within the fifteen-day period, the Contractor shall forfeit his rights to the use of the escrow account procedure.

EQUAL OPPORTUNITY REPORT STATEMENT

The bidder shall complete the following statement by checking the appropriate blank as follows.

The bidder has _____ has not _____ participated in a previous contract subject to the non-discrimination clause prescribed by Executive Order 10925, dated March 6, 1961, or Executive Order 11114 dated June 22, 1963, and Executive Order 11246 dated September 24, 1965.

In conjunction with the goals established for this project for minority and women business enterprises, the bidder has solicited quotations for labor, material, and/or services from the following:

Name of Firm	Person(s) Contacted	Date
_____	_____	_____
_____	_____	_____
_____	_____	_____

Of those listed above, we intend, at this time, to utilize the following in the completion of the work required by this contract:

_____

_____

_____

"This firm assures that it will give its best efforts to utilize disadvantaged business enterprises wherever possible."

Certified by: _____ (Signature)

_____ (Typed/Printed Name & Title)

Bidder's Name: _____

IRS Number: _____

ANTI-COLLUSION STATEMENT

In the preparation and submission of this proposal on behalf of, we did not either directly or indirectly enter into any combination or arrangement with any person, firm or corporation, or enter into any agreement, participate in any collusion, or otherwise take any action in the restraint of free competition in violation of the Sherman Anti-Trust Act, 15 USC Sections 1 et seq; the Virginia Antitrust Act, Virginia Code Sections 59.1-9.1 through 59.19.18, and the Conspiracy to Rig Bids to Government Statutes, Virginia Code Sections 59.1-68.6 through 59.1-68.8.

The undersigned Contractor hereby certifies that this agreement, or any claims resulting there from, is not the result of, or affected by, any act of collusion with, or any act of, another person or persons, firm or corporation engaged in the same line of business or commerce; and that no person acting for, or employed by, the Campbell County Utilities and Service Authority has an interest in, or is concerned with, this proposal; and, that no person or persons, firm or corporation, other than the undersigned, have or are interested in this proposal.

Certified by:_____(Corporate Seal)

Acknowledged before me this _____ day of _____,_____

_____
Notary Public

SECTION A-4

ESCROW AGREEMENT

This Escrow Agreement, made and entered into this _____ day of _____, 20____, by between and among the Campbell County Utilities and Service Authority, the Contractor,_____, the Bank, trust company or savings institution named herein _____ with its principal office located in the Commonwealth of Virginia, at _____, and the Surety, _____, with its home office located at _____ provides that:

ARTICLE I. The Owner and the Contractor have entered into a contract Agreement for construction of a project entitled _____ _____.

This Escrow Agreement is pursuant to, but in no way amends or modifies, the contract Agreement. Payments made hereunder or the release of funds from escrow shall not be deemed approval of or acceptance of the performance of the Contractor.

ARTICLE II. In order to assure full and satisfactory performance by the Contractor of its obligations under the contract Agreement, the Owner is required thereby to retain certain amounts otherwise due the Contractor. The Contractor has, with the approval of the Owner, elected to have these retained amounts held in escrow by the Bank. This Escrow Agreement sets forth the terms of such escrow. The Bank shall not be deemed a party to, bound by or required to inquire into the terms of, the contract Agreement or any other instrument or Agreement between the Owner and the Contractor.

ARTICLE III. The Owner shall from time-to-time pursuant to its contract Agreement pay to the Bank amounts retained by it under the contract Agreement. Except as to amount actually withdrawn from escrow by the Owner for just cause, the Contractor shall look solely to the Bank for the payment of funds retained under the contract Agreement and paid by the Owner to the Bank.

The risk of loss by diminution of the principal of any fund invested under the terms of this Escrow Agreement shall be solely upon the Contractor.

Funds and securities held by the Bank pursuant to this Escrow Agreement shall not be subject to levy, garnishment, attachment, lien, or other process whatsoever. Contractor agrees not to assign, pledge, discount, sell or otherwise transfer or dispose of his interest in the escrow account or any part thereof, except to the Surety.

ARTICLE IV. Upon receipt of checks or warrants drawn by the Owner and made payable to it as escrow agent, the Bank shall promptly notify the Contractor, negotiate the same and deposit or invest and reinvest the proceeds in approved securities in accordance with the written instructions of the Contractor. In no event shall the Bank invest the escrowed fund in any security not approved.

ARTICLE V. The following securities, and no other, are approved securities for all purposes for this Escrow Agreement.

1. United States Treasury Bonds, United States Treasury Notes, United States Treasury Certificates of Indebtedness or United States Treasury Bills.

2. Bonds, notes, and other evidences of indebtedness unconditionally guaranteed as the payment of principal and interest by the United States.

3. Bonds or notes of the Commonwealth of Virginia.

4. Bonds of any political subdivisions of the Commonwealth of Virginia, if such bonds carried, at the time of purchase by the Bank or deposit by the Contractor, a Standard and Poor's or Moody's Investors Service rating of at least "A".

5. Certificates of deposit issued by commercial Banks located within the Commonwealth, including, but not limited to, those insured by the Bank and its affiliates.

6. Any bonds, notes or other evidences of indebtedness listed in 1. through 3. Herein may be purchased pursuant to a repurchase Agreement with a Bank, within or without the Commonwealth of Virginia having a combined capital, surplus, and undivided profit of not less than $25,000,000.00, provided the obligation of the Bank to repurchase is within the time limitations established for investment as set forth herein. The repurchase Agreement shall be considered a purchase of such securities even if Title, and/or possession of such securities is not transferred to the Escrow Agent, so long as the repurchase obligation of the Bank is collaterized by the securities themselves, and the securities have on the date of the repurchase Agreement a fair market value equal to at least 100 percent of the amount of the repurchase obligation of the Bank, and the securities are held by a third party, and segregated from other securities owned by the Bank.

No security is approved hereunder which matures more than 5 years after the date of its purchase by the Bank or deposit by the Contractor.

ARTICLE VI. Upon receipt of a direction signed by the Owner, the Bank shall pay the principal of the fund, or any specified amount thereof, to the Owner in the event that Contractor has not progressed the work in accordance with the contract Agreement. Such payment shall be made in cash as soon as is practical after receipt of the direction.

Upon receipt of a direction signed by the Owner, the Bank shall pay and deliver the principal of the fund, or any specified amount thereof, to the Contractor, in cash or in kind, as may be specified by the Contractor. Such payment and delivery shall be made as soon as is practical after receipt of the direction.

ARTICLE VII. For its services hereunder the Bank shall be entitled to a reasonable fee in accordance with its published schedule of fees or as may be agreed upon by the Bank and the Contractor. Such fee and any other cost of administration of this Escrow Agreement shall be paid from the income earned upon the escrowed fund and, if such income is not sufficient to pay the same, by the Contractor.

ARTICLE VIII. The net income earned and received upon the principal of the escrowed fund shall be paid over to the Contractor in quarterly installments. Until so paid or applied to pay the Bank's fee or any other costs of administration, such income shall be deemed a part of the principal of the fund.

ARTICLE IX. The Surety undertakes no obligation hereby but joins in this Escrow Agreement for the sole purpose of acknowledging that its obligations as Surety for the Contractor's performance of the contract are not affected hereby.

Witness the following signatures, all as of the day and year first above written.

Owner Campbell County Utilities and Service Authority

By_____

Title_____

Contractor_____

By_____

Title_____

Attest:

Bank_____

By_____

_____ Title_____

Bank Officer

Attest:

Surety_____

By_____

_____ Title_____

Surety Company

By_____ _____

Resident Virginia Agent Address

SECTION A-5

SUPPLEMENTARY CONDITIONS

[Note: The following element should be addressed and modified for the specific project.]

1.01 Supplements.

1. These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract, EJCDC Document C-700, 2013 Edition, and other provisions of the Contract Documents to the extent indicated. All provisions, which are not so amended or supplemented, remain in full force and effect.

2.01 Definitions.

1. The terms used in these Supplementary Conditions which are defined in the Standard General Conditions of the Construction Contract (No. C-700, 2013 Edition) have the meanings assigned to them in the General Conditions.

3.01 Copies of Documents. Modify Article 2.02 as follows: For construction purposes the Contractor will be issued, free of charge, the following Documents:

Project manuals - 6 sets

Original size Drawings - 6 sets of prints

If the Contractor requires additional sets of documents during the construction period (above the number specified above), he may obtain them at the cost of reproduction.

4.01 Bonds.

1. Add the following to Article 6, Paragraph 6.01.

6.01.G The Contractor shall secure and provide all bonds called for in the General Conditions and Instructions to Bidders. All bonds shall be written by Sureties or Insurance Companies licensed to do business in the Commonwealth of Virginia.

5.01 Insurance.

1. The Contractor shall purchase and maintain the insurance, required by Article 6 of the General Conditions, in at least the following amounts:

2. Contractor's Commercial General Liability (bodily injury and property damage) shall be provided for the following limits:

(1)	Bodily Injury Liability	1,000,000 dollars each occurrence 2,000,000 dollars annual aggregate
(2)	Property Damage Liability	1,000,000 dollars each occurrence 2,000,000 dollars annual aggregate

(3) The General Liability Insurance shall include the following coverages:

a. Comprehensive form

b. Premises - operations

c. Explosion and collapse hazard

d. Underground hazards

e. Products/completed operations hazard

f. Contractual liability insurance

g. Broad form property damage, including completed operations

h. Independent Contractors (Contractor's protective liability)

i. Personal injury (all insuring Agreements), deleting the employee exclusion.

j. Owner's protective liability, separate policy in name of Owner.

k. Additional Insured: Campbell County Utilities and Service Authority and the Engineer

3. Contractor's Automobile Liability (bodily injury and property damage) shall be provided for the following limits:

(1)	Bodily Injury Liability	1,000,000 dollars each person 2,000,000 dollars each occurrence
(2)	Property Damage Liability	1,000,000 dollars each occurrence

(3) The Automobile Liability Insurance shall include the following coverages:

a. Comprehensive Form

b. Owned Autos

c. Hired Autos

d. Nonowned Autos

4. Excess Liability (Umbrella) Coverage shall be provided by the Contractor with a minimum limit of 5,000,000 dollars aggregate.

5. Contractor's Worker's Compensation insurance as required by federal, state, and municipal laws for the protection of all Contractors' employees working on or in connection with the Project, including Broad Form All States and Voluntary Compensation Coverages and Employers' Liability Coverage.

6. The Contractor shall purchase Special Form Completed Value Builder's Risk Insurance as required by the General Conditions, Article 5.06. The Builder's Risk Insurance shall be for the benefit of the Owner, the Contractor, the Engineer, and the Subcontractors, as their interest may appear.

7. The Contractor shall require his insurance agent to certify on the Insurance Certificate that the insurance coverage specified by these Supplementary Conditions is fully in effect, both in scope and amount. If insurance coverage is affected with more than one company, the individual Certificates shall identify the items of insurance which the individual companies cover. The Insurance Certificate shall contain a provision that coverages afforded under the policies will not be canceled or materially changed unless at least 30 days prior written notice has been given to the Owner and the Engineer.

8. All insurance shall be written by insurance companies licensed to do business in the Commonwealth of Virginia.

9. All Certificates of Insurance, except Worker's Compensation, shall name the Campbell County Utilities and Service Authority and the Engineer and the officers and employees of both as Additional Insured.

6.01 Contractor's Responsibilities.

1. Services, Materials and Equipment. Add the following to Paragraph 7.03:

"All material incorporated in the work of this Contract shall be free of asbestos and other hazardous materials."

2. Laws and Regulations. Add the following to Subparagraph 7.10.A:

(1) Contractor shall be licensed in the Commonwealth of Virginia in accordance with Title 54.1, Chapter 11, Section 54.1-1112, Code of Virginia, as amended.

3. Permits. The Contractor shall obtain and pay for all permits for this project required by Campbell County and the Virginia Department of Environmental Quality. The Owner will obtain and pay for, unless indicated elsewhere, the VDOT Land Use Permit, Railroad Permits, Army Corps of Engineer Permits, Virginia Marine Resources Commission Permit, and Virginia Department of Health Permit, as required for this Project.

4. OSHA Requirements. The Contractor shall be responsible for all safety at the job site and shall comply with OSHA regulations for all work associated with this project.

7.01 Project Representation.

1. Add the following to Article 10, Paragraph 10.03:

10.03 B. The Owner will furnish a Resident Project Representative (RPR), assistants, and other field staff to observe performance of the work of the Contractor. Through more extensive on-site observations of the work in progress and field checks of materials and equipment by the RPR and assistants, the Owner shall endeavor to provide further protection against defects and deficiencies in the work; but, the furnishing of such services will not make the Owner responsible for or give the Owner control over construction means, methods, techniques, sequences or procedures or for safety precautions or programs, or responsibility for Contractor's failure to perform the work in accordance with the Contract Documents. The duties and responsibilities of the RPR are limited to those in the Agreement with the Owner and in the Construction Contract Documents, and are further limited and described as follows:

General: RPR is the Owner's agent at the site, will act as directed by and under the supervision of the Owner and the Engineer, and will confer with the Owner and the Engineer. RPR's dealings in matters pertaining to the on-site work shall in general be with the Owner, the Engineer, and Contractor keeping Owner advised as necessary. RPR's dealings with subcontractors shall only be through or with the full knowledge and approval of Contractor.

8.01 Add the following as Article 11.05.C:

11.05.C Time extensions for abnormal weather:

(1) This provision specifies the procedure for the determination of time extensions for abnormal weather in accordance with the Contract General Condition 12.03.

This listing below defines the monthly-anticipated working days of adverse weather for each month and is based upon NOAA climatological data for Campbell County, Virginia.

Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec
8	7	8	7	8	7	8	7	6	6	6	7

(2) The anticipated days provided above will constitute the baseline for monthly weather time evaluations. Throughout the contract, actual weather working days are to be recorded and compared to the monthly-anticipated working days.

(3) Once the number of actual adverse weather working days exceeds the anticipated working days, any subsequent days may be used as a basis to determine whether a Contractor is entitled to a time extension. The adverse weather must have prevented work for 50 percent or more of the Contractor's workday and delayed work critical to the timely completion of the Project.

(4) The Contractor's schedule must indicate the critical (path) work and must reflect the above anticipated adverse weather days on all weather dependent activities.

(5) At the end of each quarter of the calendar year, the anticipated days scheduled will be balanced with the actual adverse weather days.

9.01 Replace Paragraph 15.01.D with the following:

15.01.D "The Owner will make partial payments to the Contractor within 30 days of billing by check via first class mail through the U. S. Postal Service for a duly certified and approved estimate of work performed during the preceding calendar month (subject to the provisions of Paragraph 14.02.D) and the Agreement. The Contractor shall take one of the two following actions within 7 days after receipt of payment from the Owner with regards to work performed by a subcontractor and/or supplier under their contract:

1. Pay the subcontractor and/or supplier for the proportionate share of the total payment received from the Owner attributable to the work performed by the subcontractor and/or supplier under that Contract; or

2. Notify the Owner and subcontractor and/or supplier, in writing, of his intention to withhold all or part of the subcontractor's and/or supplier's payment with the reason for nonpayment.

The Contractor will pay interest to the subcontractor and/or supplier on all amounts owed by the Contractor that remain unpaid after 7 days following receipt by the Contractor of payment from the Owner for work performed by the subcontractor and/or supplier under this contract, except for amounts withheld as allowed above. Interest shall accrue at the rate of 1 percent per month.

The Contractor shall include in each of its subcontracts a provision requiring each subcontractor and/or supplier to include or otherwise be subject to the same payment and interest requirements with respect to each lower-tier subcontractor and/or supplier. A Contractor's obligation to pay an interest charge to a subcontractor and/or supplier pursuant to the payment clause in this section may not be construed to be an obligation of the Owner's. A Contract modification may not be made for the purpose of providing reimbursement for such interest charge. A cost reimbursement claim may not include any amount for reimbursement for such interest charge.

10.01 Delete Article 17 Dispute Resolution and replace with the following:

This Agreement and all questions arising herewith shall be governed by and construed in accordance with the Laws of the Commonwealth of Virginia. The parties agree that the sole and exclusive jurisdiction for all disputes arising under this agreement shall be in the state and federal courts closest to Campbell County, Virginia.

End of Supplementary Conditions

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.

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

Prepared by

EJCDC®
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

Issued and Published Jointly by

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AMERICAN COUNCIL OF ENGINEERING COMPANIES

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NOTE: EJCDC publications may be purchased at www.ejcdc.org, or from any of the sponsoring organizations above.

INTRODUCTION

This Agreement between Owner and Contractor for Construction Contract (Stipulated Price) ("Agreement") has been prepared for use with the Suggested Instructions to Bidders for Construction Contracts ("Instructions to Bidders") (EJCDC® C-200, 2013 Edition); the Suggested Bid Form for Construction Contracts ("Bid Form") (EJCDC® C 410, 2013 Edition); and the Standard General Conditions of the Construction Contract ("General Conditions") (EJCDC® C-700, 2013 Edition). Their provisions are interrelated, and a change in one may necessitate a change in the others. See also the Guide to the Preparation of Supplementary Conditions (EJCDC® C-800, 2013 Edition), and the Commentary on the 2013 EJCDC Construction Documents (EJCDC® C-001, 2013 Edition).

In construction contracting, as a general matter the "agreement" is the legal instrument executed (signed) by the project owner and the construction contractor, binding the parties to the terms of the contract. See CSI Project Delivery Practice Guide (2011), Section 11.1.2, p. 210, and CSI Construction Specification Practice Guide (2011), Section 5.1, p. 75. This EJCDC Agreement form serves that basic function, by identifying the parties and Contract Documents, and establishing the Contract Price and Contract Times. This Agreement form is specifically intended for stipulated price (fixed price) contracts—that is, contracts in which Owner and Contractor identify specific lump sums and unit prices as Contractor's compensation for performing the Work. For construction contracts in which the Contract Price is primarily based on costs incurred during construction, users should select EJCDC® C-525, Agreement between Owner and Contractor for Construction Contract (Cost-Plus).

This Agreement form is drafted to be flexible enough to be used on projects that are competitively bid, and for public and private contracts that are negotiated or awarded through a proposal process or otherwise. On competitively bid projects, the following documentary information would typically be made available to bidders:

- Bidding Requirements, which include the Advertisement or invitation to bid, the Instructions to Bidders, and the Bid Form that is suggested or prescribed, all of which provide information and guidance for all Bidders, and Bid Form supplements (if any) such as Bid Bond and Qualifications Statement.

- Contract Documents, which include the Agreement, performance and payment bonds, the General Conditions, the Supplementary Conditions, the Drawings, and the Specifications.

- Documents referred to in the Supplementary Conditions or elsewhere as being of interest to bidders for reference purposes, but which are not Contract Documents.

Together, the Bidding Requirements and the Contract Documents are referred to as the Bidding Documents. (The terms "Bidding Documents," "Bidding Requirements," and "Contract Documents" are defined in Article 1 of the General Conditions.) The Bidding Requirements are not Contract Documents because much of their substance pertains to the relationships prior to the award of the Contract and has little effect or impact thereafter. Many contracts are awarded without even going through a bidding process, and thus have no Bidding Requirements, illustrating that the bidding items are typically superfluous to the formation of a binding and comprehensive construction contract. In some cases, however, a bid or proposal will contain numerous line items and their prices; in such case the actual bid or proposal document may be attached as an exhibit to the Agreement to avoid extensive rekeying.

Suggested provisions are accompanied by "Notes to User" and bracketed notes and prompts to assist in preparing the Agreement. The provisions have been coordinated with the other forms produced by EJCDC. Much of the language should be usable on most projects, but modifications and additional provisions will often be necessary. When modifying the suggested language or writing additional provisions, the user must check the other documents thoroughly for conflicts and coordination of terms, and make appropriate revisions in all affected documents.

All parties involved in construction projects benefit significantly from a standardized approach in the location of subject matter throughout the documents. Experience confirms the danger of addressing the same subject matter in more than one location; doing so frequently leads to confusion and unanticipated legal consequences. When preparing documents for a construction project, careful attention should be given to the guidance provided in EJCDC® N-122/AIA® A521, Uniform Location of Subject Matter (2012 Edition), available at no charge from the EJCDC website, www.ejcdc.org, and from the websites of EJCDC's sponsoring organizations.

CSI MasterFormat™ (50-Division format) designates Document "00 52 XX" for various forms of the owner-contractor agreement. If this format is used, the first page of the Agreement would be numbered 00 52 13-1 (or other appropriate third pair of numbers, in accordance with MasterFormat™).

Instructions and restrictions regarding the use of this document are set out in the License Agreement that accompanied the document at the time of purchase. To prepare the Agreement for inclusion in a Project Manual or for use in a specific contractual engagement, (1) remove the cover pages and this Introduction, (2) fill in Project-specific information and make revisions to the Agreement, following the guidance in the Notes to Users and bracketed notes and prompts, and the advice of legal counsel, and (3) delete the Notes to Users and bracketed notes and prompts.

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

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

Owner and Contractor hereby agree as follows:

ARTICLE 1 – WORK

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

ARTICLE 2 – THE PROJECT

2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows: _____

ARTICLE 3 – ENGINEER

3.01 The Project has been designed by _____.

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

NOTE(S) TO USER:

If an entity or individual other than the design engineer will serve as Owner's representative during construction, then make appropriate revisions and additions to this Agreement, the General Conditions, the Supplementary Conditions, and other Contract Documents regarding the construction-phase roles and duties of the design engineer and such other entity or individual.

ARTICLE 4 – CONTRACT TIMES

4.01 *Time of the Essence*

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

NOTE(S) TO USER:

1. *Select one of the two alternative Paragraphs 4.02 below, and delete the other. The first uses dates for the time of completion; the second uses number of days.*
2. *If Owner elects to predetermine fixed dates or fixed number of days for completion of the Work, such dates or number of days should be inserted in the appropriate Paragraph 4.02 below prior to the bidding or other contractor*

selection process. If the time for completion will be determined through negotiation or a bidding process that allows bidders to specify the time for completion, then leave the blanks below open until the Contract is finalized (e.g., until after the Successful Bidder has been determined and its proposed completion time accepted).

4.02 *Contract Times: Dates*

A. The Work will be substantially completed on or before _____, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before _____.

[or]

4.02 *Contract Times: Days*

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

NOTE(S) TO USER:

If the Contract includes Milestones, add the following Paragraph 4.02.B to the selected version of Paragraph 4.02.A:

B. Parts of the Work shall be substantially completed on or before the following Milestone(s):

1. Milestone 1 [event & date/days]
2. Milestone 2 [event & date/days]
3. Milestone 3 [event & date/days]

4.03 *Liquidated Damages*

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

1. Substantial Completion: Contractor shall pay Owner $_____ for each day that expires after the time (as duly adjusted pursuant to the Contract) specified in Paragraph 4.02.A above for Substantial Completion until the Work is substantially complete.
2. Completion of Remaining Work: After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner $_____ for each day that expires after such time until the Work is completed and ready for final payment.
3. Liquidated damages for failing to timely attain Substantial Completion and final completion are not additive and will not be imposed concurrently.

4. Milestones: Contractor shall pay Owner $_____ for each day that expires after the time (as duly adjusted pursuant to the Contract) specified above for achievement of Milestone 1, until Milestone 1 is achieved.

NOTE(S) TO USER:

1. *At Substantial Completion, the Owner is able to use the Work for its intended purpose, by definition. See General Conditions, Paragraph 1.01.A. Achieving Substantial Completion is typically a critical deadline, and the associated damages for missing this deadline are typically significant. The subsequent failure to complete the punch list tasks and bring the Work to a complete close by the final completion date may also result in some degree of damages to Owner—though typically these damages are significantly less than the daily damages for not achieving Substantial Completion on time. Some users may choose to establish liquidated damages only for the failure to achieve Substantial Completion. If that is the case, delete paragraphs 4.03.A.2 and .3 above.*
2. *If failure to achieve a Milestone on time is of such consequence that the assessment of liquidated damages is warranted for the failure to reach the Milestone on time, then retain and complete Paragraph 4.03.A.4; if not, delete it. Add additional similar paragraphs for any additional Milestones subject to a liquidated damages assessment. Liquidated damages for Milestones might, in some cases, be additive to liquidated damages for failing to timely attain Substantial Completion; if so this should be specifically noted.*

B. *Bonus*: Contractor and Owner further recognize the Owner will realize financial and other benefits if the Work is completed prior to the time specified for Substantial Completion. Accordingly, Owner and Contractor agree that as a bonus for early completion, Owner shall pay Contractor $_____ for each day prior to the time specified in Paragraph 4.02 for Substantial Completion (as duly adjusted pursuant to the Contract) that the Work is substantially complete. The maximum value of the bonus shall be limited to $_____.

NOTE(S) TO USER:

If early completion would be a benefit to Owner, then consider retaining and completing the bonus clause above as 4.03.B. The daily bonus for early completion need not be exactly the same as the daily post-Substantial Completion liquidated damages amounts, but presumably the two amounts will be reasonably compatible. If no bonus will be offered, then delete 4.03.B.

4.04 *Special Damages*

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

B. After Contractor achieves Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times, Contractor shall reimburse

Owner for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in Paragraph 4.02 for Work to be completed and ready for final payment (as duly adjusted pursuant to the Contract), until the Work is completed and ready for final payment.

NOTE(S) TO USER:

EJCDC recommends developing daily liquidated damages amounts that comprehensively account for the full range of Owner's damages, including costs of additional engineering, construction observation, inspection, and administrative services, and potential fines or penalties. Some Owners, however, prefer to charge a Contractor that has not completed the Work on schedule for Owner's additional hard-dollar costs for fines and penalties, and for extended engineering, construction observation, inspection, and administrative services; these charges are levied on top of the daily liquidated damages amount. It is very important if this practice is followed to be certain that the liquidated damages amount does not already include or rely in part on the potential for incurring these very same hard-dollar costs; if it does, then the separate charge for actual costs may be regarded as "double dipping" and the entire framework of liquidated damages for late completion may be called into question.

Those users that choose the "liquidated damages plus actual hard dollar costs" approach may use the preceding "Special Damages" provisions, together with the liquidated damages provisions in Paragraph 4.03, Liquidated Damages, above. ***Those users that follow the more conventional path of relying on comprehensive daily liquidated damages to cover the full scope of damage done by late Contractor completion should delete the "Special Damages" provisions—Paragraph 4.04—and rely solely on Paragraph 4.03, Liquidated Damages, above.***

Finally, note that Paragraph 4.04.B above does not refer to fines or penalties. In the typical case, fines and penalties are linked to Substantial Completion, and are not applicable to delays in final completion of the Work.

ARTICLE 5 – CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents the amounts that follow, subject to adjustment under the Contract:

A. For all Work other than Unit Price Work, a lump sum of: $_____.

All specific cash allowances are included in the above price in accordance with Paragraph 13.02 of the General Conditions.

B. For all Unit Price Work, an amount equal to the sum of the extended prices (established for each separately identified item of Unit Price Work by multiplying the unit price times the actual quantity of that item):

Unit Price Work					
Item No.	**Description**	**Unit**	**Estimated Quantity**	**Unit Price**	**Extended Price**

Unit Price Work					
Item No.	**Description**	**Unit**	**Estimated Quantity**	**Unit Price**	**Extended Price**
Total of all Extended Prices for Unit Price Work (subject to final adjustment based on actual quantities)					$

The extended prices for Unit Price Work set forth as of the Effective Date of the Contract are based on estimated quantities. As provided in Paragraph 13.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Engineer.

C. Total of Lump Sum Amount and Unit Price Work (subject to final Unit Price adjustment) $_____.

D. For all Work, at the prices stated in Contractor's Bid, attached hereto as an exhibit.

NOTE(S) TO USER:

1. *If adjustment prices for variations from stipulated Base Bid or other baseline quantities have been agreed to, insert appropriate provisions.*
2. *Depending upon the particular project's pricing structure, use 5.01.A alone; 5.01.A, 5.01.B, and 5.01.C together; 5.01.B alone; or 5.01.D alone, deleting those not used and renumbering accordingly. If 5.01.D is used, Contractor's Bid is attached as an exhibit and listed as a Contract Document in Article 9 below.*

ARTICLE 6 – PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

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

6.02 *Progress Payments; Retainage*

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

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments

previously made and less such amounts as Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract

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

b. _____ percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

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

NOTE(S) TO USER:

Typical values used in Paragraph 6.02.B are 100 percent and 200 percent respectively, subject to Laws and Regulations specific to the Project.

6.03 *Final Payment*

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

ARTICLE 7 – INTEREST

7.01 All amounts not paid when due shall bear interest at the rate of _____ percent per annum.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

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

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

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

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

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

NOTE(S) TO USER:

Modify the above paragraph if there are no such reports or drawings.

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

NOTE(S) TO USER:

If the Contract Documents do not identify any Site-related reports and drawings, modify this paragraph accordingly.

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

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

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

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

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

ARTICLE 9 – CONTRACT DOCUMENTS

9.01 *Contents*

A. The Contract Documents consist of the following:

1. This Agreement (pages 1 to ___, inclusive).
2. Performance bond (pages ___ to ___, inclusive).
3. Payment bond (pages ___ to ___, inclusive).
4. Other bonds.
   a. ___ (pages ___ to ___, inclusive).

NOTE(S) TO USER:

Such other bonds might include maintenance or warranty bonds intended to manage risk after completion of the Work.

5. General Conditions (pages ___ to ___, inclusive).
6. Supplementary Conditions (pages ___ to ___, inclusive).

7. Specifications as listed in the table of contents of the Project Manual.

8. Drawings (not attached but incorporated by reference) consisting of ___ sheets with each sheet bearing the following general title: ___ **[or]** the Drawings listed on the attached sheet index.

9. Addenda (numbers ___ to ___, inclusive).

10. Exhibits to this Agreement (enumerated as follows):

    a. Contractor's Bid (pages ___ to ___, inclusive).

NOTE(S) TO USER:

1. As noted in the introduction to this Agreement, in the typical case bidding-related documents such as the Instructions to Bidders and Bid are not included as Contract Documents. Include Contractor's Bid as a Contract Document here only as a matter of necessity, for example if the Bid contains numerous line items and their prices, and rekeying such information would be burdensome and susceptible to error.

2. List other required attachments (if any), such as documentation submitted by Contractor prior to Notice of Award and documents required by funding or lending agencies.

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

    a. Notice to Proceed.

    b. Work Change Directives.

    c. Change Orders.

    d. Field Orders.

NOTE(S) TO USER:

If any of the items listed are not to be included as Contract Documents, remove such item from the list and renumber the remaining items.

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

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

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

ARTICLE 10 – MISCELLANEOUS

10.01 *Terms*

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

10.02 *Assignment of Contract*

A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without

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

10.03 *Successors and Assigns*

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

10.04 *Severability*

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

10.05 *Contractor's Certifications*

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

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

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

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

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

10.06 *Other Provisions*

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

NOTE(S) TO USER:

1. Delete Paragraph 10.06.A if inapplicable.

2. *Insert other provisions here if applicable.*

3. *When the Contractor is required in this Contract to accept assignment of a procurement contract, previously entered into by the Owner (as "Buyer") with a manufacturer or distributor (as "Seller") for the direct purchase of goods (most commonly equipment) and related special services, insert at this location in the Agreement language regarding the assignment. For model language, refer to EJCDC® P-200 (Suggested Instructions to Bidders for Procurement Contracts), Notes to User at Article 23. For additional information on assigning a procurement contract, refer to EJCDC® P-001, Commentary on the EJCDC Procurement Documents.*

4. *Performance Requirements and Damages. In some cases the construction contract will contain performance requirements that must be met by the equipment, systems, or facilities constructed or furnished by Contractor. The Owner's remedies for Contractor's failure to meet the performance requirements may include rejection of the items in question; correction remedies; exercise of warranty rights; and acceptance of the underperforming items coupled with a reduction in Contract Price or imposition of damages to compensate Owner for not receiving its full contractual entitlement. Typical damages might be for reduced production or treatment, or for the costs of increased electricity or chemical consumption over the life of the equipment. On some projects the Owner and Contractor may contractually stipulate specific damages that will be owed in the event of specific levels of underperformance. It is important when drafting such provisions to clarify whether the availability of underperformance damages is meant to close off other potential remedies. Most commonly performance provisions (and any stipulated damages amounts) will be located in the Specifications. It may be useful to provide a cross-reference to such provisions here in the Agreement, or in some cases to state the stipulated damages amounts here because of their importance to the pricing of the Contract, which is one of the primary subjects of the Agreement.*

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

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

NOTE(S) TO USER:

1. *See Article 21 of the Instructions to Bidders and correlate procedures for format and signing of the documents.*
2. *The Effective Date of the Contract stated above and the dates of any construction performance bond (EJCDC® C-610 or other) and construction payment bond (EJCDC® C-615 or other) should be the same, if possible. In no case should the date of any bonds be earlier then the Effective Date of the Contract.*

OWNER:	CONTRACTOR:
_____	_____
By: _____	By: _____
Title: _____	Title: _____
	(If Contractor is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)
Attest: _____	Attest: _____
Title: _____	Title: _____
Address for giving notices:	Address for giving notices:
_____	_____
_____	_____
_____	_____
	License No.: _____ *(where applicable)*
(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)	*NOTE TO USER: Use in those states or other jurisdictions where applicable or required.*

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

NOTICE OF AWARD

Date of Issuance:

Owner: Owner's Contract No.:

Engineer: Engineer's Project No.:

Project: Contract Name:

Bidder:

Bidder's Address:

TO BIDDER:

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

_____ .

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

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

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

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

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

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

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

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

Owner**:**

Authorized Signature

By:

Title:

Copy: Engineer

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

NOTICE TO PROCEED

Owner:	Owner's Contract No.:
Contractor:	Contractor's Project No.:
Engineer:	Engineer's Project No.:
Project:	Contract Name:
	Effective Date of Contract:

TO CONTRACTOR:

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

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

Before starting any Work at the Site, Contractor must comply with the following:
[Note any access limitations, security procedures, or other restrictions]

Owner**:**

Authorized Signature

By:

Title:

Date Issued:

Copy: Engineer

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

Contractor's Application for Payment No.

	Application Period:	Application Date:
To (Owner):	From (Contractor):	Via (Engineer):
Project:	Contract:	
Owner's Contract No.:	Contractor's Project No.:	Engineer's Project No.:

Application For Payment

Change Order Summary

Approved Change Orders		
Number	Additions	Deductions
TOTALS		
NET CHANGE BY CHANGE ORDERS		

1. ORIGINAL CONTRACT PRICE			**$**
2. Net change by Change Orders			**$**
3. Current Contract Price (Line 1 ± 2)			**$**
4. TOTAL COMPLETED AND STORED TO DATE (Column F total on Progress Estimates)			**$**
5. RETAINAGE:			
a.	**X** _____	**Work Completed**	**$**
b.	**X** _____	**Stored Material**	**$**
c. Total Retainage (Line 5.a + Line 5.b)			**$**
6. AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5.c)			**$**
7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application)			**$**
8. AMOUNT DUE THIS APPLICATION			**$**
9. BALANCE TO FINISH, PLUS RETAINAGE (Column G total on Progress Estimates + Line 5.c above)			**$**

Contractor's Certification

The undersigned Contractor certifies, to the best of its knowledge, the following:
(1) All previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with the Work covered by prior Applications for Payment;
(2) Title to all Work, materials and equipment incorporated in said Work, or otherwise listed in or covered by this Application for Payment, will pass to Owner at time of payment free and clear of all Liens, security interests, and encumbrances (except such as are covered by a bond acceptable to Owner indemnifying Owner against any such Liens, security interest, or encumbrances); and
(3) All the Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

Contractor Signature

By:	Date:

Payment of: $ _____
(Line 8 or other - attach explanation of the other amount)

is recommended by: _____ _____
(Engineer) (Date)

Payment of: $ _____
(Line 8 or other - attach explanation of the other amount)

is approved by: _____ _____
(Owner) (Date)

Approved by: _____ _____
Funding or Financing Entity (if applicable) (Date)

Progress Estimate - Lump Sum Work

Contractor's Application

For (Contract):	Application Number:
Application Period:	Application Date:

			Work Completed		E	F		G
A		B	C	D	Materials Presently Stored (not in C or D)	Total Completed and Stored to Date (C + D + E)	% (F / B)	Balance to Finish (B - F)
Specification Section No.	Description	Scheduled Value ($)	From Previous Application (C+D)	This Period				
	Totals							

Progress Estimate - Unit Price Work

Contractor's Application

For (Contract):								Application Number:			
Application Period:								Application Date:			
A					B	C	D	E	F		
Item		Contract Information				Estimated Quantity Installed	Value of Work Installed to Date	Materials Presently Stored (not in C)	Total Completed and Stored to Date (D + E)	% (F / B)	Balance to Finish (B - F)
Bid Item No.	Description	Item Quantity	Units	Unit Price	Total Value of Item ($)						
	Totals										

Stored Material Summary

Contractor's Application

For (Contract):								Application Number:			
Application Period:								Application Date:			
A		B	C		D		E		F		G
Bid Item No.	Supplier Invoice No.	Submittal No. (with Specification Section No.)	Storage Location	Description of Materials or Equipment Stored	Stored Previously		Amount Stored this Month ($)	Subtotal Amount Completed and Stored to Date (D + E)	Incorporated in Work		Materials Remaining in Storage ($) (D + E - F)
					Date Placed into Storage (Month/Year)	Amount ($)			Date (Month/ Year)	Amount ($)	
				Totals							

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Change Order No. _____

Date of Issuance:	Effective Date:
Owner:	Owner's Contract No.:
Contractor:	Contractor's Project No.:
Engineer:	Engineer's Project No.:
Project:	Contract Name:

The Contract is modified as follows upon execution of this Change Order:

Description:

Attachments: *[List documents supporting change]*

CHANGE IN CONTRACT PRICE	**CHANGE IN CONTRACT TIMES** *[note changes in Milestones if applicable]*
Original Contract Price: $_____	Original Contract Times: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
[Increase] [Decrease] from previously approved Change Orders No. ___ to No. ___: $_____	[Increase] [Decrease] from previously approved Change Orders No. ___ to No. ___: Substantial Completion: _____ Ready for Final Payment: _____ days
Contract Price prior to this Change Order: $_____	Contract Times prior to this Change Order: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
[Increase] [Decrease] of this Change Order: $_____	[Increase] [Decrease] of this Change Order: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
Contract Price incorporating this Change Order: $_____	Contract Times with all approved Change Orders: Substantial Completion: _____ Ready for Final Payment: _____ days or dates

RECOMMENDED:	ACCEPTED:	ACCEPTED:
By: _____	By: _____	By: _____
Engineer (if required)	Owner (Authorized Signature)	Contractor (Authorized Signature)
Title: _____	Title _____	Title _____
Date: _____	Date _____	Date _____

Approved by Funding Agency (if applicable)

By: _____ Date:

Title: _____

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CERTIFICATE OF SUBSTANTIAL COMPLETION

Owner:	Owner's Contract No.:
Contractor:	Contractor's Project No.:
Engineer:	Engineer's Project No.:
Project:	Contract Name:

This [preliminary] [final] Certificate of Substantial Completion applies to:

☐ All Work ☐ The following specified portions of the Work:

Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Work or portion thereof designated above is hereby established, subject to the provisions of the Contract pertaining to Substantial Completion. The date of Substantial Completion in the final Certificate of Substantial Completion marks the commencement of the contractual correction period and applicable warranties required by the Contract.

A punch list of items to be completed or corrected is attached to this Certificate. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance, and warranties upon Owner's use or occupancy of the Work shall be as provided in the Contract, except as amended as follows: *[Note: Amendments of contractual responsibilities recorded in this Certificate should be the product of mutual agreement of Owner and Contractor; see Paragraph 15.03.D of the General Conditions.]*

Amendments to Owner's responsibilities: ☐ None ☐ As follows

Amendments to Contractor's responsibilities: ☐ None ☐ As follows:

The following documents are attached to and made a part of this Certificate: *[punch list; others]*

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents, nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract.

EXECUTED BY ENGINEER:	RECEIVED:	RECEIVED:
By: _____ (Authorized signature)	By: _____ Owner (Authorized Signature)	By: _____ Contractor (Authorized Signature)
Title: _____	Title: _____	Title: _____
Date: _____	Date: _____	Date: _____

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

EJCDC®
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

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These General Conditions have been prepared for use with the Agreement Between Owner and Contractor for Construction Contract (EJCDC® C-520, Stipulated Sum, or C-525, Cost-Plus, 2013 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other.

To prepare supplementary conditions that are coordinated with the General Conditions, use EJCDC's Guide to the Preparation of Supplementary Conditions (EJCDC® C-800, 2013 Edition). The full EJCDC Construction series of documents is discussed in the Commentary on the 2013 EJCDC Construction Documents (EJCDC® C-001, 2013 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, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

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

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

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

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

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

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

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

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

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

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

has declined to address. A demand for money or services by a third party is not a Claim.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

1.02 *Terminology*

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

B. *Intent of Certain Terms or Adjectives*:

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

C. *Day*:

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

D. *Defective*:

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

a. does not conform to the Contract Documents; or

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

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

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

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

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

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

4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

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

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

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

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

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

2.02 *Copies of Documents*

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

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

2.03 *Before Starting Construction*

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

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

2. a preliminary Schedule of Submittals; and

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

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

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

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

2.05 *Initial Acceptance of Schedules*

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

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

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

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

2.06 *Electronic Transmittals*

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

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

C. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient's use of software application packages, operating systems, or

computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

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

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

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

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

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

3.02 *Reference Standards*

A. Standards Specifications, Codes, Laws and Regulations

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

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

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*:

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

error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

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

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

B. *Resolving Discrepancies*:

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

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

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

3.04 *Requirements of the Contract Documents*

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

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

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

3.05 *Reuse of Documents*

A. Contractor and its Subcontractors and Suppliers shall not:

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

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

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

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

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

4.02 *Starting the Work*

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

4.03 *Reference Points*

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

4.04 *Progress Schedule*

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

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

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

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

4.05 *Delays in Contractor's Progress*

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

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

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

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

2. abnormal weather conditions;

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

4. acts of war or terrorism.

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

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

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

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

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

5.01 *Availability of Lands*

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

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

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

5.02 *Use of Site and Other Areas*

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

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

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

by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

B. *Removal of Debris During Performance of the Work*: During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

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

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

5.03 *Subsurface and Physical Conditions*

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

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

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

3. Technical Data contained in such reports and drawings.

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

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

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

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

5.04 *Differing Subsurface or Physical Conditions*

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

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

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

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

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

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

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

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

D. *Possible Price and Times Adjustments*:

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

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

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

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

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

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

b. the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or

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

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

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

5.05 *Underground Facilities*

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

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

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

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

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

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

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

B. *Notice by Contractor*: If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then Contractor shall, promptly after

becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer.

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

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

E. *Possible Price and Times Adjustments*:

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

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

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

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

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

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

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

5.06 *Hazardous Environmental Conditions at Site*

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

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

2. Technical Data contained in such reports and drawings.

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

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

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

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

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

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

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

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

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

H. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.

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

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

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

ARTICLE 6 – BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

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

B. All bonds shall be in the form prescribed by the Contract except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (as amended and supplemented) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

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

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

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

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

6.02 *Insurance—General Provisions*

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

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

C. Contractor shall deliver to Owner, with copies to each named insured and additional insured (as identified in this Article, in the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Contractor has obtained and is

maintaining the policies, coverages, and endorsements required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

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

E. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, shall not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.

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

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

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

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

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

6.03 *Contractor's Insurance*

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

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

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

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

4. Foreign voluntary worker compensation (if applicable).

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

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

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

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

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

1. Products and completed operations coverage:

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

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

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

3. Broad form property damage coverage.

4. Severability of interest.

5. Underground, explosion, and collapse coverage.

6. Personal injury coverage.

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

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

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

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

F. *Contractor's pollution liability insurance*: Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result

of pollution conditions arising from Contractor's operations and completed operations. This insurance shall be maintained for no less than three years after final completion.

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

H. *Contractor's professional liability insurance*: If Contractor will provide or furnish professional services under this Contract, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance shall provide protection against claims arising out of performance of professional design or related services, and caused by a negligent error, omission, or act for which the insured party is legally liable. It shall be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. If such professional design services are performed by a Subcontractor, and not by Contractor itself, then the requirements of this paragraph may be satisfied through the purchasing and maintenance of such insurance by such Subcontractor.

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

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

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

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

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

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

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

6.04 *Owner's Liability Insurance*

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

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

6.05 *Property Insurance*

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

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

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

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

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

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

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

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

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

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

10. not include a co-insurance clause.

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

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

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

B. *Notice of Cancellation or Change*: All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured.

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

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

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

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

6.06 *Waiver of Rights*

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

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

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and

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

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

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

6.07 *Receipt and Application of Property Insurance Proceeds*

A. Any insured loss under the builder's risk and other policies of insurance required by Paragraph 6.05 will be adjusted and settled with the named insured that purchased the

policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

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

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

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

7.01 *Supervision and Superintendence*

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

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

7.02 *Labor; Working Hours*

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

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

7.03 *Services, Materials, and Equipment*

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

B. All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and

guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

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

7.04 *"Or Equals"*

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

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

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

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

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

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

4) it is not objectionable to Owner.

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

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

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

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

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

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

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

7.05 *Substitutes*

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

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

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

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

a. shall certify that the proposed substitute item will:

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

2) be similar in substance to that specified, and

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

b. will state:

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

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

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

c. will identify:

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

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

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

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

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

D. *Reimbursement of Engineer's Cost*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

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

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

7.06 *Concerning Subcontractors, Suppliers, and Others*

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

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

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

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

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

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

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

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

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

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

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

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

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

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

O. Nothing in the Contract Documents:

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

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

7.07 *Patent Fees and Royalties*

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

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

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

7.08 *Permits*

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

7.09 *Taxes*

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

7.10 *Laws and Regulations*

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

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

C. Owner or Contractor may give notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.11 *Record Documents*

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

7.12 *Safety and Protection*

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

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

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

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

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

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

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

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

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

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

7.13 *Safety Representative*

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

7.14 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or

exchanged between or among employers at the Site in accordance with Laws or Regulations.

7.15 *Emergencies*

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

7.16 *Shop Drawings, Samples, and Other Submittals*

A. *Shop Drawing and Sample Submittal Requirements*:

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

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

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

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

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

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

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

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

1. *Shop Drawings*:

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

b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to

provide and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.D.

2. *Samples*:

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

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

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

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

D. *Engineer's Review*:

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

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

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

4. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order.

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

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

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

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

E. *Resubmittal Procedures*:

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

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

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

7.17 *Contractor's General Warranty and Guarantee*

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

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

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

2. normal wear and tear under normal usage.

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

1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. use or occupancy of the Work or any part thereof by Owner;

5. any review and approval of a Shop Drawing or Sample submittal;

6. the issuance of a notice of acceptability by Engineer;

7. any inspection, test, or approval by others; or

8. any correction of defective Work by Owner.

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

7.18 *Indemnification*

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

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

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

1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

7.19 *Delegation of Professional Design Services*

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

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

Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

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

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

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

ARTICLE 8 – OTHER WORK AT THE SITE

8.01 *Other Work*

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

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

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

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

8.02 *Coordination*

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

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

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

3. the extent of such authority and responsibilities.

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

8.03 *Legal Relationships*

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

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

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

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

ARTICLE 9 – OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

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

9.02 *Replacement of Engineer*

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

9.03 *Furnish Data*

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

9.04 *Pay When Due*

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

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

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

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

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

9.06 *Insurance*

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

9.07 *Change Orders*

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

9.08 *Inspections, Tests, and Approvals*

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

9.09 *Limitations on Owner's Responsibilities*

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

9.10 *Undisclosed Hazardous Environmental Condition*

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

9.11 *Evidence of Financial Arrangements*

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

9.12 *Safety Programs*

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

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

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

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

10.02 *Visits to Site*

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

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.08. Particularly, but without limitation, during

or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 *Project Representative*

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

10.04 *Rejecting Defective Work*

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

10.05 *Shop Drawings, Change Orders and Payments*

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

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

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

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

10.06 *Determinations for Unit Price Work*

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

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

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

10.08 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

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

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

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

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

10.09 *Compliance with Safety Program*

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

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

11.01 *Amending and Supplementing Contract Documents*

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

1. *Change Orders*:

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

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

2. *Work Change Directives*: A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an

adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.

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

11.02 *Owner-Authorized Changes in the Work*

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

11.03 *Unauthorized Changes in the Work*

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

11.04 *Change of Contract Price*

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

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

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

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

3. where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on

the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.04.C).

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

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee shall be 15 percent;

b. for costs incurred under Paragraph 13.01.B.3, the Contractor's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.04.C.2.a and 11.04.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;

e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 11.04.C.2.a through 11.04.C.2.e, inclusive.

11.05 *Change of Contract Times*

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

B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor's progress.

11.06 *Change Proposals*

A. Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; appeal an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under

the Contract. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.

1. *Procedures*: Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal.

2. *Engineer's Action*: Engineer will review each Change Proposal and, within 30 days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

3. *Binding Decision*: Engineer's decision will be final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.

B. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

11.07 *Execution of Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders covering:

1. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;

2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;

3. changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.02, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and

4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.

B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of this Paragraph 11.07, it shall be deemed to be of full force and effect, as if fully executed.

11.08 *Notification to Surety*

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

ARTICLE 12 – CLAIMS

12.01 *Claims*

A. *Claims Process*: The following disputes between Owner and Contractor shall be submitted to the Claims process set forth in this Article:

1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;

2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and

3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.

B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim shall be stated in writing and submitted to the other party, with a copy to Engineer.

D. *Mediation*:

1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate shall stay the Claim submittal and response process.

2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process shall resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim

submittal and decision process shall resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.

E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action shall be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.

F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim shall be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.

G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim shall be incorporated in a Change Order to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

ARTICLE 13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 *Cost of the Work*

A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:

1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.

B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 13.01.C, and shall include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, and vacation and holiday pay applicable

thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

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

    b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

    c. Rentals of all construction equipment and machinery, and the parts thereof, whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

    d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.

    e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

    f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 6.05), provided such losses and damages have resulted from causes

other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

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

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

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

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

D. *Contractor's Fee*: When the Work as a whole is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 11.04.C.

E. *Documentation*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

13.02 *Allowances*

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. *Cash Allowances*: Contractor agrees that:

1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. *Contingency Allowance*: Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

13.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

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

E. Within 30 days of Engineer's written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price if:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement;

2. there is no corresponding adjustment with respect to any other item of Work; and

3. Contractor believes that it is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price, and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 14 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

14.01 *Access to Work*

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

14.02 *Tests, Inspections, and Approvals*

A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.

B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:

1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;

2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;

3. by manufacturers of equipment furnished under the Contract Documents;

4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and

5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests shall be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.

F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to

cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

A. *Contractor's Obligation*: It is Contractor's obligation to assure that the Work is not defective.

B. *Engineer's Authority*: Engineer has the authority to determine whether Work is defective, and to reject defective Work.

C. *Notice of Defects*: Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.

D. *Correction, or Removal and Replacement*: Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.

E. *Preservation of Warranties*: When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

F. *Costs and Damages*: In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work shall be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 *Uncovering Work*

A. Engineer has the authority to require additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.

C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.

1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.

2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *Owner May Stop the Work*

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

14.07 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, then Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.

C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will

include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 *Progress Payments*

A. *Basis for Progress Payments*: The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.

B. *Applications for Payments*:

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens, and evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. *Review of Applications*:

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

a. the Work has progressed to the point indicated;

b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and

c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or

b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

a. to supervise, direct, or control the Work, or

b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

d. to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price, or

e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.

6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:

a. the Work is defective, requiring correction or replacement;

b. the Contract Price has been reduced by Change Orders;

c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or

e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. *Payment Becomes Due*:

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

E. *Reductions in Payment by Owner*:

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:

a. claims have been made against Owner on account of Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages on account of Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;

c. Contractor has failed to provide and maintain required bonds or insurance;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;

e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;

f. the Work is defective, requiring correction or replacement;

g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

h. the Contract Price has been reduced by Change Orders;

i. an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;

j. liquidated damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;

k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

l. there are other items entitling Owner to a set off against the amount recommended.

2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount

remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 15.01.C.1 and subject to interest as provided in the Agreement.

15.02 *Contractor's Warranty of Title*

A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than seven days after the time of payment by Owner.

15.03 *Substantial Completion*

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

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

D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.

E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.

F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. At any time Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through E for that part of the Work.

2. At any time Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.05 regarding builder's risk or other property insurance.

15.05 *Final Inspection*

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

15.06 *Final Payment*

A. *Application for Payment*:

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of

inspection, annotated record documents (as provided in Paragraph 7.11), and other documents, Contractor may make application for final payment.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

   a. all documentation called for in the Contract Documents;

   b. consent of the surety, if any, to final payment;

   c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

   d. a list of all disputes that Contractor believes are unsettled; and

   e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

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

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the Application for Payment to Owner for payment. Such recommendation shall account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to the provisions of Paragraph 15.07. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Completion of Work*: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment.

D. *Payment Becomes Due*: Thirty days after the presentation to Owner of the final Application for Payment and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer's recommendation,

including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor.

15.07 *Waiver of Claims*

A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor's failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from outstanding Claims by Owner, or from Contractor's continuing obligations under the Contract Documents.

B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted or appealed under the provisions of Article 17.

15.08 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. correct the defective repairs to the Site or such other adjacent areas;

2. correct such defective Work;

3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

16.01 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension. Any Change Proposal seeking such adjustments shall be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);

2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;

3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or

4. Contractor's repeated disregard of the authority of Owner or Engineer.

B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) ten days written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to:

1. declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and

2. enforce the rights available to Owner under any applicable performance bond.

C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.

D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.

E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses,

and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.

G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate For Convenience*

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and

3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

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

16.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for

expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

A. *Disputes Subject to Final Resolution*: The following disputed matters are subject to final resolution under the provisions of this Article:

1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full; and

2. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents, and arising after final payment has been made.

B. *Final Resolution of Disputes*: For any dispute subject to resolution under this Article, Owner or Contractor may:

1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions; or

2. agree with the other party to submit the dispute to another dispute resolution process; or

3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18 – MISCELLANEOUS

18.01 *Giving Notice*

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

1. delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

18.02 *Computation of Times*

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

18.03 *Cumulative Remedies*

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

18.04 *Limitation of Damages*

A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

A. A party's non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

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

18.07 *Controlling Law*

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

18.08 *Headings*

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

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SECTION B-1

WATER RELATED MATERIALS

1.01 Pipe. Pipe shall be of the sizes, types, and classes shown on the Drawings.

1. Ductile Iron Pipe. Ductile iron pipe shall be centrifugally cast and manufactured in accordance with AWWA/ANSI C151/A21.51 Specifications. Mechanical joints and push-on joints shall be manufactured in accordance with AWWA/ANSI C111/A21.11. Unless otherwise dictated, minimum pipe thickness shall meet requirements of AWWA/ANSI C150/A21.50 Specifications. Ductile iron pipe shall be cement-mortar lined inside in accordance with AWWA/ANSI C104/A21.4 Specification. Cement for the mortar shall be Type II Portland Cement. The standard seal coat of bituminous material shall be applied over the cement lining. The standard exterior coating of bituminous material shall also be applied.

   The following pipe manufacturers are approved:

   a. Griffin Pipe Products Co.
   b. U.S. Pipe
   c. American Ductile Iron Pipe
   d. McWane

2. PVC Pipe. Water line sizes 2-inch and 3-inch shall be PVC, unless otherwise specified. PVC pipe shall meet the requirements of NSF 61 and ASTM Standard Specification D-2241 for Polyvinylchloride plastic pipe. Lock joints shall meet ASTM D3139, joints for plastic pressure pipes using flexible elastomeric seals. Rubber O-rings shall meet ASTM F477, Standard Specification for elastomeric seals (gaskets) for joining PVC pipe. All connections and joints are to be in accordance with manufacturer's recommendations and requirements. All glued type joints and fittings shall be Schedule 80 PVC.

   The following pipe manufacturers are approved:

   a. Aquamine Corporation
   b. Certainteed Corporation

3. Red Brass Pipe. Red brass pipe shall be manufactured in accordance with ASTM B43, Specification for seamless red brass pipe. Reference from AWWA C800.

4. Polyethylene Tubing. Polyethylene tubing for service piping shall conform to ASTM Designation D-2737 and shall be Class 200, NSF-PW for drinking water use. Tubing shall have a uniform wall thickness and dimensions such that it can be adapted for use with CTS standard waterworks compression type fittings. Tubing shall be clearly marked to show class, size, manufacturer's name, and NSF-PW symbol. Stainless steel insert stiffeners shall be required at all compression joint fittings.

5. Copper Tubing. Copper tubing for service connections shall conform to ASTM B88 for Type K flexible copper and Type L hard drawn copper shall be used as specified.

6. Casing Pipe.

   a. Water Service Casing Pipe for 3/4-inch and 1-inch service tubing. Casing pipe shall be 2-inch PVC Schedule 40 when installed by boring and jacking. Where directional boring equipment is used for installation, continuous polyethylene tubing, 2-inch, DR 11 shall be used.

   b. Water Service Casing Pipe for 1-1/2 inch and 2-inch Service Pipe. Casing pipe shall be 4-inch PVC Schedule 40 unless otherwise specified.

   c. Water Main Casing Pipe. (Water Mains 3-inch and greater)
   Steel casing pipe for boring or jacking under highways and railroads shall meet requirements of ASTM A 139, Grade B or ASTM A53 Standard Weight Class and shall have beveled edges suitable for welding or be threaded. Nominal pipe diameter and wall thickness shall be as indicated on drawings. No protective coating or lining will be required. Steel casing pipe shall be spiral welded.

1.02 Pipe Fittings. Fittings for ductile iron pipe shall conform to the requirements of AWWA/ANSI C110/A21.10 for size, joint type, same pressure class as pipe, type of coating, and lining as specified for pipe. Compact ductile iron fittings may be used in lieu of standard fittings for pipe 20 inches and smaller and shall meet AWWA/ANSI C153/A21.53. All fittings shall be cement-mortar lined inside in accordance with AWWA/ANSI C104/A21.4 and shall receive the standard bituminous seal coating on all surfaces.

1.03 Pipe Couplings. Flexible couplings shall be of a gasketed, sleeve type. Each coupling shall consist of a steel middle ring, two steel followers, two rubber compounded wedge section gaskets, and sufficient galvanized track and head steel bolts to properly compress the gaskets. Couplings shall be of the type to match piping in which installed. Couplings shall be Dresser, ROMAC, or approved equal.

1.04 Valves.

1. Gate Valves. Two-inch gate valves shall be inside-screw, iron-body, tapered-seat, resilient-wedge construction with threaded ends and 2 inch operating nut. Larger gate valves shall conform to AWWA C509 or C515 and shall be iron-body, bronze-mounted, non-rising stem with an oil reservoir enclosed between two “O” rings, one below and one above the thrust collar on the operating stem. Valves shall be resilient wedge. All valves shall be Model No. A-2362, as manufactured by Mueller Co.; Series 2500, as manufactured by American Darling; Model KS-FW, as manufactured by Kennedy Valve; or Series 45, as manufactured by American AVK Company. Gate valves shall have all mechanical joint bell ends for underground service, shall be nut operated and shall open left. Valves for interior service shall be equal but shall have flanged ends and be handwheel operated.

2. Butterfly Valves. For use with 16 inch and larger pipe, butterfly valves shall be rubber seated conforming to AWWA C504, Class 150B, and shall be suitable for buried service.

Valve ends shall be all bell, standard mechanical joint. All valves must have full Class 150B or 250B valve shaft diameter and full Class 150B or 250B underground service operation torque throughout the entire travel. Valve body and disc shall be cast iron ASTM A126. Valve shaft shall be one piece, extending full size through the entire valve and operator. Valve operator shall be sealed, gasketed, and lubricated for underground service. The operator shall be capable of withstanding an overload input torque of 450 ft. lbs. at full-open or closed position without damage to valve or valve operator. Valves shall include traveling nut or worm gear operators with standard AWWA operating nut. Valves shall be Mueller Lineseal III, M&H 4500, or equal.

3. Valve boxes. Valve boxes shall be cast iron screw type with adjustable extension pieces and flared base to fit the operating mechanism of the valve and shall be bituminous coated. The least diameter of the shaft shall be 5.25 inches. The head shall be round and shall have the word "water" cast upon it. Valve boxes shall be Capitol Foundry Part Nos. 562S* or 664S*, depending upon depth of bury. Each valve shall be protected by a valve box.

4. Valve Stem Extensions. Where valves are installed at depths greater than 5 feet, valve stem extensions shall be furnished. Valves stem extensions shall be compatible to the valve operator utilized and contain centering plate.

5. Valve Box Adaptor. All valve boxes shall be installed upon the valve with the use of a valve box adaptor (types A-H) as manufactured by Adaptor Inc. or an approved equal. The adaptor shall be installed in lieu of hardwood, brick, or other types of blocking and shall be incidental to the valve and box installation.

6. Ball Valve Curb Stops. Ball valve curb stops used for services, sample stations, air releases, flushing assemblies, and other locations as required, shall be as follows:

3/4–Inch CTS Ball Valve Curb Stop	BH44-233-Q-NL (Ford) B-25209N (Mueller) 76100T (AY McDonald)
1–Inch CTS X FIP Ball Valve Curb Stop	BH41-444-Q-NL (Ford) B-25172N (Mueller) 76102T (AY McDonald)
1–Inch CTS Ball Valve Curb Stop	B44-444-Q-NL (Ford) B-25209N (Mueller) 76100T (AY McDonald)

7. Check Valve, Flushing Line. A check valve shall be installed on the end of the flushing line outlet, as shown on the flushing assembly detail. The check valve shall be all rubber and of the flow operated check type with a slip-end connection. Inlet port areas shall be 100 percent of the mating pipe port size. The port area shall contour down to a duckbill which shall allow passage of flow in one direction while preventing reverse flow. The following is approved, or equal:

   a. Tide Flex Series TF-2 (slip-on) by Red Valve Company, Inc.

1.05 Fire Hydrants. Fire hydrants shall be manufactured in accordance with ANSI/AWWA C502 and shall be approved by the National Board of Fire Underwriters. Hydrants shall meet the following minimum standards:

1. Barrel shall be 6-inch with 5.25-inch clear opening through the valve.
2. Pumper connection shall be 4-1/2 inch with National Standard Threads (NST).
3. Hose connections shall be two 2-1/2 inch connections with NST.
4. Hydrant shall be frost proof with two drain orifices for draining when the hydrant valve is closed.
5. Hydrants shall have a safety flange for clean break-a-way in the event it is struck. A safety stem coupling shall connect the upper and lower stem sections and allow for clean break-a-way at the safety flange connection.
6. Hydrant shall be 4-foot minimum bury unless otherwise specified or directed.
7. Hydrant grade extensions will be approved on a case-by-case basis.
8. Hydrants shall be designed for 250 PSI working pressure unless otherwise specified.
9. Hydrants shall open counterclockwise.
10. Hydrants shall be painted OSHA approved safety red.
11. Weep holes are to be plugged in areas of high ground water

Approved Fire Hydrants are as follows:

a. Mueller A423
b. Kennedy K81A
c. American Darling B84B
d. American AVK Series 2780

Mueller AquaGrip System (Fire Hydrant and Valve) may be used as an alternative restraining system, which eliminates the mechanical joint restraints on hydrant and valve. Mechanical joint restraint will be required on tee.

1.06 Tapping Sleeves and Valves. Tapping sleeves shall be split sleeve, AISI type 304 stainless steel body with stainless steel lifter bar, nuts, and washers with gridded virgin SBR gasket. Outlets shall be ductile iron flange with recess to accept standard tapping valve. The drill machine shall be attached directly to the branch flange. The 3/4-inch test plug shall be used to air test the sleeve prior to the tapping operation. Tapping sleeves shall be Ford FAST, Romac SST, Mueller H304, or JCM 432. Upon completion of the tap a standard concrete thrust block shall be installed at the sleeve. Tapping valves shall be Mueller Co. T-2360 resilient wedge with maximum operating pressure of 250 psi or equal.

1.07 Water Meters. Meters shall record flow in cubic feet. Meters shall be provided by the Authority.

1.08 Corporation Stops. Corporation stops used for services, sample stations, air releases, flush valves, and other locations as required, shall be as follows:

3/4-Inch AWWA THD X 3/4-inch PJ Ball Corp Stop-CTS	FB1000-3-Q-NL (Ford) B-25008N (Mueller)

	74701BT (AY McDonald)
3/4-inch THD X 1-inch PJ Ball Corp Stop-CTS	FB1000-34-Q-NL (Ford) B-25008N (Mueller) 74701BT (AY McDonald)
1-inch AWWA THD X 1-inch PJ Ball Corp Stop-CTS	FB1000-4-Q-NL (Ford) B-25008N (Mueller) 74701BT (AY McDonald)
1-1/2 inch AWWA THD X CTS PJ Ball Corp Stop	FB1000-6-Q-NL (Ford) B-25008N (Mueller) 74701BT (AY McDonald)
1-1/2 inch AWWA THD X PVC PJ Ball Corp Stop	FB1002-6-NL (Ford) V-25056N (Mueller) 74701B-44 (AY McDonald)
2-inch AWWA THD X FIPT Ball Corp Stop	FB1600-7-NL (Ford) B-20045N (Mueller) 73148B (AY McDonald)
2-inch AWWA THD X CTS Ball Corp Stop	FB1000-7-Q-NL (Ford) B-25008N (Mueller) 74701BT (AY McDonald)
2-inch AWWA THD X PVC Ball Corp Stop	FB1002-7-NL (Ford) V-25056N (Mueller) 74701B-44 (AY McDonald)

1.09 Double Service Connection. All double service connections shall be provided as shown on Standard Details.

1.10 Service Boxes. Service boxes shall be 5/8 x 3/4 yokebox with lockless lid, CTS grip joint, with 4-inch plastic riser installed. Service settings for larger meters shall be as shown on the Standard Details:

5/8 X 3/4 Inch Yoke Meterbox	YMBHC241-95186-032-NL (Ford) 775-B214ADTG 335 (AY McDonald)
1 Inch Meterbox with inline dual check backflow preventer/device	YL111-444-NL (Ford) with HHC11-444-NL (Ford) or 711-4FE44 (AY McDonald) straight dual cartridge check valve.

1.11 Service Saddles. Service saddles shall be used for all services and for all corporation stops installed into ductile iron pipe. Saddles shall be double-strap design. Saddles shall be as follows:

Service Saddles for Ductile Iron Pipe (Larger than 2 inches OD)	F202 (Ford) DR2A (Mueller)
Service Saddles for IPS PVC Pipe (Larger than 2 inches OD)	FS202 (Ford) DR2S (Mueller) 202S (Romac)
Service Saddles for IPS PVC Pipe (2 inch OD)	S70-203 (Ford) H-13420 (Mueller) 3891 (AY McDonald)

1.12 Restraint Devices. Any change in direction will require an appropriate restraint device or method.

1. Mechanical Joint Restraints. Where mechanical joint restraints are required, but not limited to, fire hydrants, valves, tees, and flushing valves, the following devices shall be used, or approved equal:

    a. Uniflange Series 1400 (Ford)
    b. RomaGrip Mechanical Joint Restraint (Romac)
    c. Meg-A-Lug (EBAA Iron)
    d. Stargrip Series 3000 (Star Pipe Products)
    e. TufGrip Series 1000 (Tyler Union)

2. Mechanical Joint Adaptors. Mechanical joint adaptors shall meet the ductile iron and working pressure specifications of AWWA compact fittings, ANSI/AWWA C153/A21.53 and C110/A21.10 — American National Standard for Ductile Iron Compact Fittings, 3-Inch Through 36-Inch (76mm Through 914mm) for Water Service. Mechanical joint (MJ) valves and fittings shall be connected using a bolt-through positive restraint mechanism manufactured of U. S. A. ductile iron conforming to ASTM A536, 65-45-12. The positive restraint device shall connect the valves and/or fittings at a linear distance not to exceed three (3) inches and without attachment to pipe. The device shall come complete with all accessories, including standard styrene butadiene rubber (SBR) MJ gaskets conforming to the latest revision of AWWA C111/ASTM F-477 and weathering steel (Corten) bolts conforming to AWWA C111/A21.11 and ASTM A242. Nuts for 3 through 12-inch sizes shall be SAE Grade 5 steel with black oxide coating. Nuts for 14-inch and larger adaptors shall be heavy hex Corten steel conforming to ASTM A242. Sizes 3-12-inch of the bolt-through MJ positive restraining device shall be supplied with an NSF 61 asphaltic seal coating in accordance with ANSI/AWWA C104/A21.4. Sizes 14-36-inch shall be supplied with NSF 61, 7-mil. fusion bonded epoxy conforming to AWWA C116/A21.16-09 as well as the coating, surface preparation and application requirements of ANSI/AWWA C550.

The device shall be used with standard mechanical joint fittings (AWWA C110 or C153) and valves. The device shall be Infact Corporation Foster Adaptor or approved equal.

3. Push-On Joint Restraints. When push-on joint restraints are required the following devices shall be used:

   a. Gripper Gasket

4. Restrained Joint Ductile Iron Pipe. Ductile iron pipe shall be restrained in casing pipe, special stream crossings, and/or other locations as required. Restrained joints will vary from manufacturer to manufacturer. Application of restraint will be one of the determining factors as to type of joint restraint required. The following manufacturers are approved for joint restraint pipe.

   a. U.S. Pipe
   b. American Ductile Iron Pipe
   c. McWane
   d. Griffin Pipe Products Co.

5. Pipe Restraining Systems. A pipe restraining system, where required, will be approved on a case-by-case basis. The following manufacturers of these restraining systems are as follows, or approved equal:

   a. Romac Industries, Inc.
   b. Ford Meter Box Company
   c. Smith-Blair, Inc.
   d. EBAA Iron, Inc.
   e. Star Pipe Products

6. Thrust Blocks & Bulkhead Anchor. Blocks and anchors shall be in accordance with the standard detail, bearing on undisturbed earth. Thrust blocking shall be made of concrete having a compressive strength of not less than 3,000 PSI after 28 days. The system shall not be pressure tested for 14 days after the thrust blocks are poured.

7. Threaded Rod Applications. All threaded rods used for restraints shall be stainless steel (S.S.) 304. Mild alloy steel or plated steel will not be allowed. All nuts and washers shall be S.S. 304. To facilitate the restraining of pipe and mechanical joints fittings, "Ductile Lugs" (ASTM A536) shall be for all threaded rod applications. Eye bolts are not allowed.

1.13 Air Release and Combination Air/Vacuum Release Devices.

1. Air release valves for 12-inch and smaller water lines, where the projected flow is up to 2,200 gpm shall be:

   a. Cla-Val Model No. 3410-AR116.3
   b. Val-Matic Model No. 22.9

2. Air release valves for 12-inch and smaller water lines, where the projected flow is expected to exceed 2,200 gpm shall be:

    a. Cla-Val Model No. 3410-AR532.3C
    b. Val-Matic Model No. 38.6
    c. Crispin Model No. PL10

3. Combination air/vacuum release devices are to be used on 16-inch and larger water lines and shall be sized in accordance with AWWA M51 Air Valves: Air-Release, Air/Vacuum & Combination. Approved combination air/vacuum valve devices are:

    a. Cla-Val Model 36CAV
    b. Val-Matic 200C Series
    c. Crispin Model UL Series

4. All air release and combination air/vacuum release devices shall be capable of withstanding 300 psi working pressure, have ASTM 536 65-45-12 ductile iron body and cover, stainless steel float and internal parts, and Buna-N or Viton seals. Combination air/vacuum release assemblies shall ANSI Class 250 flanged inlets. The valves shall be as shown on the Drawings.

1.14 Flushing Assemblies: Flushing assemblies shall be installed at main dead ends and other locations as required.

1. Manual Flushing Hydrant Assembly. The flushing hydrant shall contain a bronze body ball valve with a chrome plated ball and automatic weep, the lower barrel shall be 2-inch schedule 40 iron pipe epoxy coated blue, the main valve stem shall be protected with a stem cover, and 2-inch quick disconnect coupling with dust cap. If the flushing hydrant is located in an area of high ground water, the automatic weep shall be plugged. The following is approved:

    a. GIL Industries 2" Slimline Flushing Assembly

2. Main Line Flushing Assembly. Materials shall be provided in accordance with main line flushing detail.

3. Automatic Flushing Units. Automatic flushing valves shall be "Hydro-Guard Vertical Unit HG 5VAC" Direct Discharge Unit with thermal control valve to prevent freezing, backflow preventer, 19 tablet dechlorination assembly, pressure/vacuum breaker, sample port, and have a battery operated controller to open and close a solenoid valve at preset days, times, and for varying duration. Materials to be provided in accordance with automatic flushing assembly detail.

1.15 Back Flow Prevention Devices. Back flow prevention devices shall be Reduced-Pressure Principle or Double Gate Double Check Devices depending upon the potential for hazard materials entering the water system from the customer. Such devices shall be manufactured by Watts Regulator Company, Hersey Products, Zurn Wilkins, or approved equal. Residential use services up to 2 inches shall be furnished with standard double check devices.

1.16 Sampling Station. Sampling station shall be 3-foot bury, with a 3/4-inch FIP inlet, and an unthreaded nozzle. All stations shall be enclosed in a lockable, non-removable, aluminum-cast housing. When opened, the station shall require no key for operation and the water will flow in an all brass waterway. All working parts will also be of brass and be removable from above ground with no digging. A copper vent tube shall be included to enable each station to be pumped free of standing water to prevent freezing and to minimize bacteria growth. The exterior piping shall be galvanized.

Sample station shall be as follows:

a. Eclipse No. 88 as manufactured by Kupferle Foundry Company.

1.17 Pipe Support Spacers. Pipe support spacers for use in casing pipe shall be steel and primed and then coated with an anti-corrosion finish as manufactured by Spider Manufacturing, Inc. or approved equal and shall be furnished in accordance with Standard Details. Pipe support spacers for small diameter IPS carrier pipe shall be Calpico Model P or approved equal.

1.18 Brass couplings, Adaptors, and Stainless Steel Inserts (Tubing Stiffeners).

The following material list may not be inclusive to job design. Other specific materials may be required.

3/4 X 1 inch CTS Wye Branch	Y44-243-Q-NL (Ford) H-15343N (Mueller) 708YSTT (AY McDonald)
3/4 X 3/4 inch CTS Packjoint	C44-33-Q-NL (Ford) H-15403N (Mueller) 74758T (AY McDonald)
1 X 1 inch CTS Packjoint	C44-44-Q-NL (Ford) H-15403N (Mueller) 74758T (AY McDonald)
3/4 X 1 inch CTS Packjoint	C44-34-Q-NL (Ford) H-15403N (Mueller) 74758T (AY McDonald)
1 MIP X 1 inch CTS Packjoint	C44-44-Q-NL (Ford) H-15428N (Mueller) 74753T (AY McDonald)
3/4 MIP X 3/4 inch CTS Packjoint	C84-33-Q-NL (Ford) H-15428N (Mueller) 74753T (AY McDonald)

3/4 MIP X 3/4 inch 90 Bend CTS Packjoint	L84-33-Q-NL (Ford) H-15531N (Mueller) 74779MT (AY McDonald)
3/4 FIP x 3/4 inch CTS Packjoint	H-15451N (Mueller) 74754T (AY McDonald)
1-1/2 inch MIP X PVC Packjoint	C-87-66-NL (Ford) V-15440N (Mueller) 74753-44 (AY McDonald)
1-1/2 inch FIP X PVC Packjoint	C-17-66-NL (Ford) V-15442N (Mueller) 74754-44 (AY McDonald)
2 inch MIP X CTS Packjoint	C84-77-Q-NL (Ford) H-15428N (Mueller) 74753T (AY McDonald)
2 inch FIP X CTS Packjoint	C14-77-Q-NL (Ford) H-15451N (Mueller) 74754T (AY McDonald)
2 inch MIP X PVC Packjoint	C87-77-NL (Ford) V-15440N (Mueller) 74753-44 (AY McDonald)
2 inch FIP X PVC Packjoint	C17-77-NL (Ford) V-15442N (Mueller) 74754-44 (AY McDonald)
3/4 inch CTS T-Branch Packjoint	T444-333-Q-NL (Ford) H-15381N (Mueller) 74760T (AY McDonald)
1 inch CTS T-Branch Packjoint	T444-444-Q-NL (Ford) H-15381N (Mueller) 74760T (AY McDonald)
3/4 inch CTS Insert	Insert 51 (Ford) 504281 (Mueller) 6133T (AY McDonald)
1 inch CTS Insert	Insert 52 (Ford) 504385 (Mueller) 6133T (AY McDonald)

1.19 Box Covers. Box covers for flushing hydrant assembly, air release valve assembly, large meter services, and other assemblies that may be required, are as follows:

30-inch Monitor Cover (for Larger Meter Settings)	MC-30-T (Ford) 74M30 (AY McDonald)
18-inch Box Cover with Locking Lid, Standard Pentagon Bolt, 18 X 11-1/2 Lid	A32-T (Ford) H-1081609 (Mueller) 74M32ACT (AY McDonald)

1.20 Tracer Wire. Tracer wire for open trench installation shall be a 12 AWG solid conductor of soft-drawn 21% IACS, copper clad steel, utilizing a AISI 1006 or 1010 low carbon steel core, with a minimum break load of 282 lbs. (55,000 psi). Conductor shall be rated for direct burial use at 30 volts and RoHS compliant. The insulation shall be 30 mil high-density, high molecular weight polyethylene (HDPE insulation). Approved tracer wire for open trench installation includes:

a. Pro-Trace HF-CCS PE30
b. Copperhead Superflex

Tracer wire for directional drilling and boring installation shall be a 12 AWG solid conductor of soft-drawn 21% IACS, copper clad steel, utilizing a AISI 1055 high carbon steel core, with a minimum break load of 1150 lbs. (200,000 psi). Conductor shall be rated for direct burial use at 30 volts and RoHS compliant. The insulation shall be 45 mil high-density, high molecular weight polyethylene (HDPE insulation). Approved tracer wire for directional drilling and boring installation includes:

a. Pro-Trace HDD-CCS PE45
b. DURAtrace CCS HDPE 45
c. Copperhead SoloShot Extra High Strength Tracer Wire

As an alternative to the tracer wires listed above, tracer wire for open trench or directional drilling and boring installation may be a 19 AWG tin coated solid copper conductor, with a resistivity of 16.85 OHMS per MFT, a tensile strength of 38,500 psi nominal, a break strength of 38.95 lbs. nominal, and an elongation of 30%. The conductor insulation shall be polyethylene with a nominal thickness of 0.006-inches, a maximum voltage of 300 volts insulated, and a dielectric constant of 2.29 @ 1 MHZ. The core material shall be woven polyester and water blocking polyester yarns. The outer jacket shall be high-density polyethylene. Approved alternate tracer wire for directional drilling and boring installation includes:

a. Trace-Safe RT Series

All mainline tracer wires must be interconnected in intersections, at mainline tees and mainline crosses. At tees, the three wires shall be joined using a single 3-way lockable connector. At crosses, the four wires shall be joined using a 4-way connector. Use of two 3-way connectors with a short jumper wire between them is an acceptable alternative.

Direct bury wire connectors – shall include 3-way lockable connectors and mainline to lateral lug connectors specifically manufactured for use in underground trace wire installation. Connectors shall be dielectric silicon filled to seal out moisture and corrosion, and shall be installed in a manner so as to prevent any uninsulated wire exposure. Approved connectors includes:

a. 3M DBY-6
b. Copperhead SnakeBite Locking Connector
c. Trace-Safe

Non locking friction fit, twist-on or taped connectors are prohibited.

Tracer wire must be wrapped or taped to the pipe or tubing. Strip insulation from each end a minimum of 12-inches, where connections will be made.

For services, wrap and secure the bare stripped wire to the meter box's compression fitting and to the corporation stop compression fitting. The tracer wire shall make a complete and traceable circuit.

Trace wire installation shall be performed in such a manner that allows proper access for connection of line tracing equipment, proper locating of wire without loss or deterioration of low frequency (512Hz) signal for distances in excess of 1,000 linear feet, and without distortion of signal caused by multiple wires being installed in close proximity to one another.

Trace wire systems shall be installed as a single continuous wire, except where using approved connectors. No looping or coiling of wire is allowed. All new trace wire installations shall be located using typical low frequency (512Hz) line tracing equipment, witnessed by the Contractor, Engineer and Owner as applicable, prior to acceptance of ownership.

This verification shall be performed upon completion of rough grading and again prior to final acceptance of the project.

Continuity testing in lieu of actual line tracing shall not be accepted.

1.21 Marking Tape. Underground marking tape shall be a 2-inch wide detectable marking tape, with a minimum 5.0 mil overall thickness. Tape shall me manufactured using a 0.8 mil clear virgin polypropylene film, reverse printed and laminated to a solid 0.35 mil solid aluminum foil core, and then laminated to a 3.75 mil clear Virginia polyethylene film. Tape shall be printed "CAUTION BURIED WATER LINE BELOW", and meet the APWA Color-Code standard for identification of buried utilities. Acceptable marking tapes are:

a. Pro-Line Safety Products.
b. Presco
c. Mutual Industries, Inc.

SECTION B-2

WASTEWATER RELATED

2.01 Gravity Pipe and Fittings. Pipe size, type, joint, and class shall be detailed on the Drawings. The following are general descriptions.

1. Polyvinylchloride (Main Line Pipe Material). Polyvinylchloride pipe and fittings for gravity sewers with nominal diameters of between 6 and 15 inches, inclusive, shall be manufactured in accordance with ASTM Designation D3034 and shall meet the requirements for SDR 35. Pipe and fittings for gravity sewers with nominal diameters between 18 and 36 inches, inclusive, shall be manufactured in accordance with ASTM Designation F679 and shall meet the requirements for pipe stiffness 46 (PS 46). The assembly of gravity sewer joints for internal or external pressures of less than 25 feet of head shall be in accordance with ASTM Designation D3212 and shall consist of an integral wall section with a solid cross section rubber gasket manufactured in accordance with ASTM Designation F477. PVC pipe shall be installed on Standard Bedding as shown in the Standard Details.

2. Polyvinylchloride (4 Inch and 6 Inch Diameter Service Lateral Pipe Material). Polyvinylchloride pipe shall be SDR 26.

3. Ductile Iron (Main Line Pipe Material). Ductile iron pipe shall be centrifugally cast and manufactured in accordance with AWWA/ANSI C151/A21.51 Specification, shall be at least Thickness Class 51 and shall be used at sewer depths greater than 15 feet or in special circumstances. Ductile iron pipe for gravity sewers shall be cement mortar lined with Type II Portland cement and shall be coated inside and outside with bituminous material of either coal tar or asphalt base in accordance with AWWA/ANSI C104/A21.4 Specification. Mechanical joints and push-on joints shall be manufactured in accordance with AWWA/ANSI Specification C111/A21.11.

   Where required by circumstances, ductile iron pipe and fittings shall be designed with special linings such as Protecto 401, or equal, in accordance with ASTM Designation A746. Ductile iron pipe and fittings shall be coated on the exterior with bituminous material of either coal tar or asphalt base in accordance with AWWA/ANSI Specification C151/A21.51.

   Fittings for ductile iron pipe shall be compact style ductile iron fittings manufactured in accordance with AWWA/ANSI C153/A21.53 Specification wall thickness shall be Thickness Class 54. All fittings shall be bituminous coated inside and out.

2.02 Precast Concrete Manholes. Precast concrete manholes shall be constructed to meet requirements of ASTM C478 and in accordance with the Standard Details. The walls of precast concrete manholes shall have a minimum thickness of 5 inches. Manhole sections shall be tongue and groove and shall be joined with an "O" ring rubber gasket conforming to ASTM C-443 and butyl mastic sealant. Holes for the required sewers shall be made in the manhole sections during the

manufacturing operation to the diameters required and shall be provided with flexible connections comprised of rubber boots and stainless steel straps, similar to Kor-N-Seal, A-Lok Products, Press-Seal Corporation, or approved equal and meet requirements of ASTM C923.

The joints and/or joining surfaces of the manholes shall be sealed with a butyl rubber based tape. The butyl component of the tape shall consist of 50% (min.) butyl rubber, shall contain 2% or less volatile matter, and shall be .050 inch thick. The backing component shall be high-density polyethylene film. A release paper may be utilized. The tape width shall be 6-inches wide. The tape shall be overlapped at least twice its width. The tape shall not be stretched during application. Primer and/or adhesive as recommended by the tape supplier shall be employed for adverse, critical, or other applications. Testing of joints and compliance with construction requirements shall be conducted in strict conformance with the requirements of the sealant supplier.

All precast units shall be constructed of 4000 PSI concrete and reinforced with welded wire fabric conforming to ASTM standards. Detailed shop drawings showing the reinforcing and design calculations shall be stamped by a Professional Engineer registered in the Commonwealth of Virginia. Manholes shall be carefully made and shall have no honeycomb or other deteriorated surfaces. All surfaces shall be smooth. Manholes shall not have steps.

2.03 Manhole Frames and Covers. Frames and covers for manholes shall be best quality gray iron cast in accordance with ASTM A48 for the service conditions shown on the Standard Details. Castings shall be sound, true to form and thickness, sand blast cleaned, and machined on all bearing surfaces. Castings shall receive one coat of black asphaltum paint prior to delivery to the job site. For manhole frames and covers set flush with final grade, the frames shall be set in butyl mastic sealant. For manhole frames and covers set above grade, the manhole frame shall be set in butyl mastic sealant and bolted to the manhole with two ½ inch diameter stainless steel epoxied anchor bolts, two ½ inch diameter stainless steel wedge anchors, or two ½ inch diameter stainless steel stud anchors which extend no more than two inches above the top of the frame flange when installed. Watertight manhole frames and covers shall be attached to the top of the manhole with four bolts in addition to the above requirements and be equipped with a manhole chimney seal sized to fit the field application. Manhole chimney seals shall be Cretex or approved equal.

Manhole covers for air/vacuum release manholes shall have two 1-inch diameter holes drilled in the cover 180 degrees apart.

2.04 Manhole Vents. Manhole vents, where required, shall be fabricated of ductile iron pipe and fittings as specified in paragraph 2.01.3 with bronze insect screen.

2.05 Structure Penetrations. Where existing manholes or similar structures are core drilled radially, flexible connections comprised of rubber boots and stainless steel straps, such as Kor-N-Seal, A-Lok Products, Press-Seal Corporation, or approved equal shall be furnished. At non-radial penetration locations, Link-Seal devices in steel sleeves shall be installed to seal the structure against infiltration.

2.06 Service Laterals. All 4-inch and 6-inch service lateral pipe and fittings shall be PVC SDR 26 and as specified in paragraph 2.01.2 except the service stub-out and cap shall be PVC Schedule 40 as shown on the Standard Detail.

2.07 Cleanout Frame and Cover. A cleanout frame and cover shall be furnished at each service location. Cleanout frame and cover shall be PCO-1*MOD, Capitol Foundry or approved equal.

2.08 Sewer Service Saddles. Where service laterals are connected to existing sewers, service saddles shall be utilized. Sewer service saddles shall be ductile iron in accordance with ASTM A536 and shall be Style CB as manufactured by Romac Industries.

2.09 Pressure Pipe and Fittings.

1. Polyvinylchloride. Where polyvinylchloride pipe is designated for use in 4-inch through 12-inch force mains, such pipe shall be manufactured in accordance with AWWA Specification C900 to cast iron pipe outside diameter dimensions. Class 150 pipe shall meet the requirements of DR 18 and Class 200 pipe shall meet the requirements of DR 14. Joints shall consist of an integral wall section with solid cross section rubber gasket conforming to ASTM Designation F-477. Fittings shall be all bell, mechanical joint, manufactured as specified for ductile iron. For sizes less than 4-inch, pipe shall be Yelomine by Aquamine Corporation or equal. PVC pipe used for sanitary sewer force mains shall be green. Standard bedding, tracer wire, and locator warning tape shall be furnished for PVC pipe as shown in the Standard Details.

2. High Density Polyethylene (HDPE). HDPE pipe for force mains shall be manufactured from a PE 3408 high density resin compound meeting the specifications of ASTM D3350 with a cell classification of PE:345434C and meeting Type III, Class C, Category 5, Grade P34 per ASTM D1238. HDPE pipe shall comply with AWWA Specification C-901 for pipe less than 4 inches in diameter and AWWA Specification C-906 for pipe 4 inches or greater in diameter. HDPE pipe 4 inches or greater shall be ductile iron pipe size (DIPS). The pipe shall contain no recycled materials except that generated in the manufacturer's own plant from resin of the same specification from the same raw material. Pipe and accessories shall be 160 psi at 73.4 degrees F meeting the requirements of Standard Dimension Ratio (SDR) 11 as a minimum strength.

   Butt fusion fittings shall be PE3408 HDPE, Cell Classification of 345464C as determined by ASTM D3350 and manufactured to ASTM D3261. Molded and fabricated fittings shall have the same pressure rating as the pipe unless otherwise specified on the drawings. Fabricated fittings are to be manufactured using a Data Logger. Temperature, fusion pressure, and a graphic representation of the fusion cycle shall be part of the quality control records.

   Electrofusion fittings shall be PE3408 HDPE, Cell Classification of 345464C as determined by ASTM D3350 and manufactured to ASTM F1055. Electrofusion fittings shall have the same pressure rating as the pipe unless otherwise specified on the drawings.

   Flanged and mechanical joint adaptors shall be PE3408 HDPE, Cell Classification of 345464C as determined by ASTM D3350 and manufactured to ASTM D3261. Electrofusion fittings shall have the same pressure rating as the pipe unless otherwise specified on the drawings.

HDPE pipe for force mains shall be color coded green. The color coding shall be permanently co-extruded striped on the pipe outside surface as part of the pipe's manufacturing process.

3. Ductile Iron. Ductile iron pipe for force mains shall be Thickness Class 51, manufactured in accordance with ANSI/AWWA C151/A21.51 Specification, and shall be cement-mortar lined inside in accordance with ANSI/AWWA C104/A21.4 Specification. Cement for the mortar shall be Type II Portland cement. The standard seal coating of bituminous material shall be applied. The exterior coating of bituminous material shall be applied in accordance with the AWWA/ANSI C104/A21.4 Specification. Ductile iron pipe with flanged joints shall be manufactured in accordance with AWWA/ANSI C115/A21.15.

   Ductile iron pipe and fittings used to convey wastewater shall be designed with special linings such as Protecto 401, or equal, in accordance with ASTM Designation A746. Ductile iron pipe and fittings shall be coated on the exterior with bituminous material of either coal tar or asphalt base in accordance with AWWA/ANSI Specification C151/A21.51.

   Fittings for ductile iron pipe shall be compact style ductile iron fittings manufactured in accordance with AWWA/ANSI C153/A21.53 Specification wall thickness shall be Thickness Class 54. All fittings shall be designed with special interior linings such as Protecto 401, or equal, in accordance with ASTM Designation A746 and coated on the outside with bituminous material.

4. Restraint Devices. Any change in direction will require an appropriate restraint device or method.

   a. Mechanical Joint Restraints. Where mechanical joint restraints are required, but not limited to, valves, tees, bends, and emergency pump connections, the following devices shall be used, or approved equal:

      i. Uniflange Series 1400 (Ford)
      ii. RomaGrip Mechanical Joint Restraint (Romac)
      iii. Meg-A-Lug (EBAA Iron)
      iv. Stargrip Series 3000 (Star Pipe Products)
      v. TufGrip Series 2000 (Tyler Union)

   b. Mechanical Joint Adaptors. Mechanical joint adaptors shall meet the ductile iron and working pressure specifications of AWWA compact fittings, ANSI/AWWA C153/A21.53 and C110/A21.10 — American National Standard for Ductile Iron Compact Fittings, 3-Inch Through 36-Inch (76mm Through 914mm) for Water Service. Mechanical joint (MJ) valves and fittings shall be connected using a bolt-through positive restraint mechanism manufactured of U. S. A. ductile iron conforming to ASTM A536, 65-45-12. The positive restraint device shall connect the valves and/or fittings at a linear distance not to exceed three (3) inches and without attachment to pipe. The device shall come complete with all accessories, including standard styrene butadiene rubber (SBR) MJ gaskets conforming to the latest revision of AWWA C111/ASTM F-477 and weathering steel (Corten) bolts

conforming to AWWA C111/A21.11 and ASTM A242. Nuts for 3 through 12-inch sizes shall be SAE Grade 5 steel with black oxide coating. Nuts for 14-inch and larger adaptors shall be heavy hex Corten steel conforming to ASTM A242. Sizes 3-12-inch of the bolt-through MJ positive restraining device shall be supplied with an NSF 61 asphaltic seal coating in accordance with ANSI/AWWA C104/A21.4. Sizes 14-36-inch shall be supplied with NSF 61, 7-mil. fusion bonded epoxy conforming to AWWA C116/A21.16-09 as well as the coating, surface preparation and application requirements of ANSI/AWWA C550. For sewer installations, the device shall be supplied with 40-mil Protecto 401 epoxy. The device shall be used with standard mechanical joint fittings (AWWA C110 or C153) and valves. The device shall be Infact Corporation FOSTER ADAPTOR or approved equal.

c. Push-On Joint Restraints. When push-on joint restraints are required the following devices shall be used:

i. Gripper Gasket

d. Restrained Joint Ductile Iron Pipe. Ductile iron pipe shall be restrained in casing pipe, special stream crossings, and/or other locations as required. Restrained joints will vary from manufacturer to manufacturer. Application of restraint will be one of the determining factors as to type of joint restraint required. The following manufacturers are approved for joint restraint pipe.

i. U.S. Pipe
ii. American Ductile Iron Pipe
iii. McWane
iv. Griffin Pipe Products Co.

e. Pipe Restraining Systems. A pipe restraining system, where required, will be approved on a case-by-case basis. The following manufacturers of these restraining systems are as follows, or approved equal:

i. Romac Industries, Inc.
ii. Ford Meter Box Company
iii. Smith-Blair, Inc.
iv. EBAA Iron, Inc.
v. Star Pipe Products

f. Thrust Blocks & Bulkhead Anchor. Blocks and anchors shall be in accordance with the standard detail, bearing on undisturbed earth. Thrust blocking shall be made of concrete having a compressive strength of not less than 3,000 PSI after 28 days. The system shall not be pressure tested until at least 14 days after the thrust blocks are poured.

g. Threaded Rod Applications. All threaded rods used for restraints shall be stainless steel (S.S.) 304. Mild alloy steel or plated steel will not be allowed. All nuts and washers shall be S.S. 304. To facilitate the restraining of pipe and mechanical

joints fittings, "Ductile Lugs" (ASTM A536) shall be for all threaded rod applications. Eye bolts are not allowed.

2.10 Valve Boxes. Valve boxes shall be cast iron screw type with adjustable extension pieces and flared base to fit the operating mechanism of the valve and shall be bituminous coated. The least diameter of the shaft shall be 5.25 inches. The head shall be round and shall have the word "SEWER" cast upon it. Valve boxes shall be Capitol Foundry Part Nos. 562S* or 664S*, depending upon depth of bury. Each valve shall be protected by a valve box.

2.11 Valve Stem Extensions. Where valves are installed at depths greater than 5 feet, valve stem extensions shall be furnished. Valves stem extensions shall be compatible to the valve operator utilized and contain centering plates.

2.12 Valve Box Adaptor. All valve boxes shall be installed upon the valve with the use of a valve box adaptor (types A-H) as manufactured by Adaptor Inc. or an approved equal. The adaptor shall be installed in lieu of hardwood, brick, or other types of blocking and shall be incidental to the valve and box installation.

2.13 Plug Valves. Valves shall be of the non-lubricated, eccentric type with resilient-faced plugs and screwed, flanged, or mechanical joint ends as shown on the Drawings. Port areas of 4-inch through 20-inch valves shall be at least 30 percent of full pipe area. Bodies shall be semi-steel with raised seats. Seats in 3 inch and larger valves shall have a welded-in overlay of high nickel content on all surfaces contacting the plug face. Valves through 20 inches shall have permanently lubricated, stainless steel bearings in the upper and lower plug stem journals.

All valves shall be of the bolted bonnet design. All 4 inch and larger valves shall be designed so that they can be repacked without removing the bonnet and the packing shall be adjustable. All exposed nuts, bolts, springs, and washers shall be stainless steel 304. Flanged valves through 12 inches shall have face-to-face dimensions of standard gate valves. A valve whose exterior is susceptible to attack by weather or contact with partially treated sewage shall receive one coat of primer on the exterior.

Resilient plug facings shall be compatible with raw sewage and sludge. Plug facings shall provide drip tight shut-off regardless of flow direction.

Manual valves shall have gear actuators and tee wrenches, as indicated on the Drawings. All gearing shall be enclosed in a semi-steel housing and be suitable for running in a lubricant with seals provided on all shafts to prevent entry of dirt and water into the actuator. The actuator shaft and the quadrant shall be supported on permanently lubricated bronze bearings. Actuators shall clearly indicate valve position and an adjustable stop shall be provided to set closing torque.

Valves for buried service shall have seals on all shafts and gaskets on the valve and actuator covers to prevent the entry of water. Actuators mounting brackets for buried service shall be totally enclosed and shall have gasket seals. All exposed nuts, bolts, springs, and washers shall be stainless steel 304. Valves shall have two coats asphalt varnish on exterior.

Valves shall be PEC Eccentric Plug Valves as manufactured by DeZurik Corporation or approved equal.

2.14 Air Release and Vacuum Valves. Combination air valves shall be capable of withstanding 150 psi working pressure, have ASTM 536 65-45-12 ductile iron body and cover, stainless steel float and internal parts, and Buna-N or Viton seals. The valves shall be as shown on the Drawings, complete with backwash accessories. Acceptable combination air valves are:

1. Cla-Val Model 36WW
2. Val-Matic 800 Series
3. Crispin US Series

2.15 Casing Pipe.

1. Sewer Casing Pipe. (Sewer Mains 3-inch and greater)
   Steel casing pipe for boring or jacking under highways and railroads shall meet requirements of ASTM A 139, Grade B or ASTM A53 Standard Weight Class and shall have beveled edges suitable for welding or be threaded. Nominal pipe diameter and wall thickness shall be as indicated on drawings. No protective coating or lining will be required. Steel casing pipe shall be spiral welded.

2.16 Pipe Support Spacers. Pipe support spacers for use in casing pipe shall be steel and primed and then coated with an anti-corrosion finish as manufactured by Spider Manufacturing, Inc. or approved equal and shall be furnished in accordance with Standard Details.

2.17 Tracer Wire. Tracer wire for open trench installation shall be a 12 AWG solid conductor of soft-drawn 21% IACS, copper clad steel, utilizing a AISI 1006 or 1010 low carbon steel core, with a minimum break load of 282 lbs. (55,000 psi). Conductor shall be rated for direct burial use at 30 volts and RoHS compliant. The insulation shall be 30 mil high-density, high molecular weight polyethylene (HDPE insulation). Approved tracer wire for open trench installation includes:

a. Pro-Trace HF-CCS PE30
b. Copperhead Superflex

Tracer wire for directional drilling and boring installation shall be a 12 AWG solid conductor of soft-drawn 21% IACS, copper clad steel, utilizing a AISI 1055 high carbon steel core, with a minimum break load of 1150 lbs. (200,000 psi). Conductor shall be rated for direct burial use at 30 volts and RoHS compliant. The insulation shall be 45 mil high-density, high molecular weight polyethylene (HDPE insulation). Approved tracer wire for directional drilling and boring installation includes:

a. Pro-Trace HDD-CCS PE45
b. DURAtrace CCS HDPE 45
c. Copperhead SoloShot Extra High Strength Tracer Wire

As an alternative to the trace wires listed above, tracer wire for open trench or directional drilling and boring installation may be a 19 AWG tin coated solid copper conductor, with a resistivity of 16.85 OHMS per MFT, a tensile strength of 38,500 psi nominal, a break strength of 38.95 lbs. nominal, and an elongation of 30%. The conductor insulation shall be polyethylene with a nominal thickness of 0.006-inches, a maximum voltage of 300 volts insulated, and a dielectric constant of

2.29 @ 1 MHZ. The core material shall be woven polyester and water blocking polyester yarns. The outer jacket shall be high-density polyethylene. Approved alternate tracer wire for directional drilling and boring installation includes:

b. Trace-Safe RT Series

All mainline tracer wires must be interconnected in intersections, at mainline tees and mainline crosses. At tees, the three wires shall be joined using a single 3-way lockable connector. At crosses, the four wires shall be joined using a 4-way connector. Use of two 3-way connectors with a short jumper wire between them is an acceptable alternative.

Direct bury wire connectors – shall include 3-way lockable connectors and mainline to lateral lug connectors specifically manufactured for use in underground trace wire installation. Connectors shall be dielectric silicon filled to seal out moisture and corrosion, and shall be installed in a manner so as to prevent any uninsulated wire exposure. Approved connectors includes:

a. 3M DBY-6
b. Copperhead SnakeBite Locking Connector

Non locking friction fit, twist-on or taped connectors are prohibited.

Tracer wire must be wrapped or taped to the pipe or tubing. Strip insulation from each end a minimum of 12-inches, where connections will be made.

For services, wrap and secure the bare stripped wire to the meter box's compression fitting and to the corporation stop compression fitting. The tracer wire shall make a complete and traceable circuit.

Trace wire installation shall be performed in such a manner that allows proper access for connection of line tracing equipment, proper locating of wire without loss or deterioration of low frequency (512Hz) signal for distances in excess of 1,000 linear feet, and without distortion of signal caused by multiple wires being installed in close proximity to one another.

Trace wire systems shall be installed as a single continuous wire, except where using approved connectors. No looping or coiling of wire is allowed. All new trace wire installations shall be located using typical low frequency (512Hz) line tracing equipment, witnessed by the Contractor, Engineer and Owner as applicable, prior to acceptance of ownership.

This verification shall be performed upon completion of rough grading and again prior to final acceptance of the project.

Continuity testing in lieu of actual line tracing shall not be accepted.

2.18 Marking Tape. Underground marking tape shall be a 2-inch wide detectable marking tape, with a minimum 5.0 mil overall thickness. Tape shall me manufactured using a 0.8 mil clear virgin polypropylene film, reverse printed and laminated to a solid 0.35 mil solid aluminum foil core, and then laminated to a 3.75 mil clear Virginia polyethylene film. Tape shall be printed "CAUTION

BURIED SEWER LINE BELOW", and meet the APWA Color-Code standard for identification of buried utilities. Acceptable marking tapes are:

a. Pro-Line Safety Products.
b. Presco
c. Mutual Industries, Inc.

SECTION C

CONSTRUCTION PROCEDURES

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SECTION C-1 - GENERAL REQUIREMENTS

1.01 Summary of Work.

1. Work covered consists of providing all work indicated on Drawings or required by the Contract Documents approved for Project.

2. The Contractor shall restrict his activities to take place during the week from Monday through Friday. Work shall not take place on Saturday, Sunday, or Campbell County Utilities and Service Authority holidays without prior written consent from the Owner.

3. Where portions of the Project are near overhead high voltage lines, the Contractor shall meet the requirements of the Virginia Overhead High Voltage Line Safety Act. Costs involved in meeting these requirements shall be the responsibility of the Contractor.

4. The Contractor shall comply with the Virginia Underground Utility Protection Act at no additional cost to the Owner.

5. The Contractor shall comply with the Occupational Safety and Health Act at no additional cost to the Owner.

6. Traffic Control. When working within Virginia Department of Transportation right-of-way, the Contractor shall comply with the requirements of the Virginia Department of Transportation, the Virginia Work Area Protection Manual, the Virginia Department of Transportation Land Use Permit issued for the Project, and the Maintenance of Traffic (MOT) Plan developed for the Project. When working within easements on private property, the Contractor shall comply with all maintenance of traffic issues contained within the easement agreements, other agreements between the Owner and the private property owner, and other agreements between the Contractor and the private property owner.

7. Erosion & Sediment Control Measures. The Contractor shall comply with the Sediment and Control Plan developed for the Project, the Virginia Erosion and Sediment Control Manual, and the Virginia Sediment and Erosion Control Law. The Contractor shall install additional erosion and sediment control measures as required and as directed by the Owner.

8. Permits. The Contractor shall obtain all permits required for the Project, unless already obtained by the Owner. These may include, but not be limited to the Campbell County Building Permit, the Campbell County Land Use Permit, the VDOT Land Use Permit, and a Campbell County Business License. It is the Contractor's duty during the bid period to ask the Owner what permits have been obtained or are in the process of being obtained.

1.02 Payment.

1. Applications for Payment.

(1) Application for Payment shall be EJCDC Document C-620, entitled "Contractor's Application for Payment". Each application for payment by the Contractor, excluding the first, shall be accompanied by a "Contractor's Affidavit of Payment of Debts and Claims," AIA Document G706 and "Contractor's Affidavit of Release of Liens," AIA Document G706A. Payment for stored material delivered but not incorporated in the work will be the invoiced amount only.

Material must be stored in a bonded or insured location approved by the Owner. Submit applicable invoices with Application for Payment.

(2) For each Application for Payment that is approved, the Owner shall pay to the Contractor 95 percent of the total amount due and the Owner shall retain 5 percent of the amount due until final completion and acceptance of all work covered by the Contract.

2. Change Order Procedures.

(1) No amount, in part or in whole, of a Change Order shall be included in a requisition for payment by the Contractor until the Change Order has been executed and copies of the Change Order have been distributed to the Owner and Contractor.

(2) Work Change Directive. A Work Change Directive is a device which enables the Owner to promptly order changes in the work which may involve changes in cost or contract time, or both pending preparation and execution of a formal Change Order.

(3) Request for Change Order Proposal. The Owner may request the Contractor to submit a Change Order proposal for changes in contract work. The Contractor shall submit the proposal in accordance with Contract requirements within a reasonable time. The Owner may issue to the Contractor a Proceed Order authorizing the required changes for an additional amount not to exceed, or a deduction of not less than the amount shown in the Proceed Order. If the Contractor is not in agreement with the amount stipulated in the Proceed Order, he shall, within a reasonable time after the issue date of the order, submit an equitable proposal and develop with the Owner a mutually acceptable price for the required change in work.

(4) Change Order Proposal. Without further request and within a reasonable time from the issue date of a proceed order, the Contractor shall submit a written Change Order proposal covering the work authorized in the Proceed Order so that a Change Order may be prepared for execution.

1.03 Measurement and Payment Definitions.

1. Standard Payment Items.

(1) Price per horizontal linear foot for all size free bores and/or directional bores shall include furnishing all materials, equipment, and labor required to bore or push a hole under a driveway or like obstruction and restoring disturbed area to original or better conditions. This price shall include the setup cost for excavation of boring and receiving pits and installation or removal of boring machines. The cost and installation of the pipe shall be included in this item.

(2) Price per horizontal linear foot for each size and wall thickness steel casing pipe bored and jacked shall include furnishing all materials, equipment, and labor required to bore or jack a hole under pavement, or like obstruction and installation of the casing pipe through the bore, and restore disturbed area to original or better conditions. Price also includes each size restrained joint pipe, and pipe supports, required to be installed through the casing pipe. Price also includes all materials, equipment, and labor to seal the ends of the casing pipe after the carrier pipe has been installed. Price shall include setup costs required to excavate boring and receiving pits and to install and remove boring equipment.

(3) Price per horizontal linear foot for each material, size, and wall thickness pipe horizontally directionally drilled (HDD) shall include furnishing all materials, equipment, and labor required to install an HDD and restore disturbed area to original or better conditions. Price also includes each material, size, and wall thickness restrained joint pipe through the bore. Price shall include setup costs required to excavate, backfill, and restore boring and receiving pits.

(4) Price per ton for grouted Class I dry riprap shall include all materials, equipment, and labor required to install riprap at locations designated on the Drawings and as directed by the Owner.

(4) Price per ton for ungrouted Class I dry riprap shall include all materials, equipment, and labor required to install the riprap at the locations designated on the Drawings and as directed by the Owner.

(5) Price per cubic yard for select borrow shall include all material, equipment, and labor required to remove unsuitable material for backfill and furnish, haul, place, compact, and grade select borrow approved by the Owner. The select borrow shall be used in the locations designated on the Drawings and/or as directed by the Owner.

(6) Price per ton of aggregate fill shall include removal and disposal of unsuitable material and replacement with aggregate fill material as directed by the Owner.

(7) Mobilization shall include all activities necessary to mobilize in order to carry out construction activities. No more than 50 percent of the mobilization cost will be paid in the first pay request by the Contractor under this item. Any additional monies will be paid on a pro-rated basis over the remaining months of the Contract.

(9) Replacement of Plant Mix Pavement in Streets and Driveways: Price per linear foot of pipe line trench for the replacement of state highways and driveways surfaced with plant mix pavement in accordance with the conditions existing prior to construction.

2. Water Line Payment Items.

(1) Pipe. Price per horizontal linear foot for each size and type of pipe, complete in place as shown on the Drawings shall include all pipe, fittings, corporation stops, service saddles, all types of joint restraints, and all materials, equipment, and labor to excavate, provide bedding, install pipe, required compaction tests, backfill the water line, pressure tests, flushing, disinfecting, and restoring disturbed area to original or better conditions. Price includes tracer wire and marking tape. Price includes all clearing and grubbing, seeding and fine grading, concrete encasement, and also includes all erosion control measures and devices including, but not limited to, silt fence, straw bale barrier, drop inlet silt traps, riprap, and miscellaneous stone. Price includes relocation, repair, and/or replacement of all above ground obstructions along the water line alignment including but not limited to fence, landscaping, signs, mailboxes, curbs, asphalt pavement or reinforced concrete pavement and/or structures, and miscellaneous items. Price includes relocation, repair, and/or replacement of all below ground improvements along the alignment including, but not limited to, all underground utilities, vaults, and miscellaneous items. Price shall be based on horizontal linear feet between stations shown on the Drawings and not actual pipe length.

(2) Valves. Price for each size and type of valve with stem extension (if required), concrete collar (if required), valve box adaptor, and valve box shall include furnishing all materials, equipment, and labor to install, test, disinfect each valve and restore disturbed area to like or

better conditions. Valves included in blowoff assemblies, vaults, and fire hydrant assemblies shall not be included in this payment item.

(3) Service Connections. Price for each type of service connection (near side or far side) as shown on Standard Details, complete in place. The price shall include the yoke box with adaptor, locator tracer wire, corporation stops, service saddles, taps in water line, and restoration of disturbed area to like or better condition. The pipe shall include the bore pit, bore, PVC casing pipe, installation of service pipe in casing pipe, and restoration of bore pit for far side service connections. The cost of the service pipe is included in this payment item.

(4) Fire Hydrant Assembly. Price for each fire hydrant assembly shall include furnishing all materials, equipment, and labor to install a fire hydrant assembly including hydrant, gate valve, valve box, pipe, fittings, restraints, stone, testing and disinfection to connect hydrant assembly to the water line. The price shall include all excavation and backfill for the entire fire hydrant assembly and piping, and restoring disturbed area to like or better conditions.

(5) Sampling Station. Price for each sampling station shall include all materials, equipment, and labor to install a sampling station including sampling station, valve, valve box, pipe, fittings, corporation stop, bedding stone, testing, and disinfection to connect the sampling station to the water line. The price shall also include excavation and backfill for the entire sampling station assembly, and restoring disturbed area to like or better conditions.

(6) Air Release Assembly. Price for each size and type air release valve assembly shall include furnishing all materials, equipment, and labor to install a corporation stop, brass nipple(s), air release valve assembly, and discharge piping with threaded brass insect screen on a water line. Price shall include the concrete manhole and manhole frame and cover that will enclose the air release valve assembly. Price shall also include excavation, bedding, stone, backfill for the concrete manhole, and restoring disturbed area to like or better conditions.

(7) Flushing Hydrant. Price for a flushing hydrant assembly shall include furnishing and installing all material, equipment, and labor to install flushing hydrant assembly including flushing hydrant, meter box, brass nipple, frame and cover, and stone bedding. Price shall include all excavation and backfill from the main water line to the flushing hydrant assembly and restoring disturbed area to like or better conditions.

(8) Automatic Flushing Assembly. Price for automatic flushing valve assembly shall include furnishing and installing all material, equipment, and labor to install flushing valve assembly, including connection to main and piping to the flushing unit, excavation, backfill, discharge piping from unit to outlet point, and check valve at end of discharge piping as shown on the Drawings.

(9) Main Line Flushing Assembly. Price for main line flushing assembly shall include furnishing and installing all material, equipment, and labor to install main line flushing assembly, including connection to main, piping, fittings, mechanical joint restraints, gate valve and box, check valve, filter fabric, riprap, excavation, backfill, compaction, and restoration as shown on the Drawings.

(10) Wet Tap. Price for a wet tap shall include furnishing and installing all material, equipment, and labor to install a wet tap, including the tapping sleeve and tapping valve, valve box, excavation, backfill, compaction, and restoration as shown on the Drawings.

(11) Bulkhead Anchor. Price for bulkhead anchors shall include furnishing and installing all material, equipment, and labor to install bulkhead anchors, including excavation, installation of mechanical joint restraint where required or stainless steel threaded rod where required, forming, concrete, backfill, compaction, and restoration as shown on the Drawings.

(12) Type F Horizontal Anchor. Price for type F horizontal anchor shall include furnishing and installing all material, equipment, and labor to install type F horizontal anchor, including excavation, concrete, 6 mil polyethylene sheeting, backfill, compaction, and restoration as shown on the Drawings.

(13) Abandonment of Existing Waterlines. Price for abandonment of existing waterlines shall include all labor, material, and equipment to close the existing valves, dewater the existing waterlines, cut the existing waterlines, remove the cut portions of pipe and appurtenances, and plug or cap the existing waterline where designated by the drawings or where directed by the Engineer.

(14) Abandonment of Existing Water Services and Removal of Existing Meters Boxes. This bid item shall include all labor, material, and equipment to excavate to the corporation stop, close the corporation stop, cut and crimp the service line, cut the service lines at the meter box, remove the meter box, and backfill and restore the excavated areas. All meter boxes removed shall be delivered to the Authority's inventory storage facility at 20644 Timberlake Road, Lynchburg, Virginia, unless directed otherwise by the Engineer.

3. Sewer Line Payment Items.

(1) Gravity Sewer. Price per linear foot for each size and type gravity sanitary sewer, complete in place, and shall include furnishing all material, equipment, and labor to excavate, provide bedding, install the pipe, backfill to subgrade if under paved area or backfill to grade if not under paved area, and test the sewer line. Price includes tracer wire and marking tape. Price includes all clearing and grubbing, seeding and fine grading, concrete encasement, and also includes all erosion control measures and devices including but not limited to silt fence, straw bale barrier, drop inlet silt traps, riprap, and miscellaneous stone. Price includes relocation, repair, and/or replacement of all above ground obstructions along the sewer alignment including but not limited to fence, landscaping, signs, mailboxes, curbs, asphalt pavement or reinforced concrete pavement and/or structures and miscellaneous items. Price includes relocation, repair, and/or replacement of all below ground improvements along the sewer alignment including but not limited to all underground utilities, vaults, and miscellaneous items.

(2) Force Main. Price per linear foot for each size and type force main, complete in place, and shall include furnishing all material, equipment, and labor to excavate, provide bedding, install the pipe, backfill to subgrade if under paved area or backfill to grade if not under paved area, and test the force main. Price includes all required fittings and joint restraints, tracer wire, and marking tape along the entire length of PVC force mains, and above ground force main sewer indicator posts (one every 500 feet along the entire length of force mains). Price includes all clearing and grubbing, seeding and fine grading, concrete encasement, and also includes all erosion control measures and devices including but not limited to silt fence, straw bale barrier, drop inlet silt traps, riprap, and miscellaneous stone. Price includes relocation, repair, and/or replacement of all above ground obstructions along the sewer alignment including but not limited to fence, landscaping, signs, mailboxes, curbs, asphalt pavement or reinforced concrete pavement and/or structures, and miscellaneous items. Price

includes relocation, repair, and/or replacement of all below ground improvements along the sewer alignment including but not limited to all underground utilities, vaults, and miscellaneous items.

(3) Manhole. Price per vertical foot for each size sanitary sewer manhole measured from invert to bottom of casting shall include furnishing all material, equipment, and labor to excavate, provide bedding, install and test the new manholes, and backfill to subgrade if in paved area or backfill to grade if not in paved area.

(4) Inside Drop Manhole. Price per vertical foot for each size sanitary sewer manhole with inside drop connection measured from invert to bottom of casting shall include furnishing all material, equipment, and labor to excavate, provide bedding, install and test the new inside drop manholes, and backfill to subgrade if in paved area or backfill to grade if not in paved area.

(5) Manhole Frame and Cover. Price for each manhole frame and cover shall include furnishing all material, equipment, and labor to install the manhole frame and cover.

(6) Waterproof Manhole Frame and Cover. Price for each waterproof manhole frame and cover shall include furnishing all material, equipment, and labor to install the manhole frame and cover.

(7) Service Lateral. Price per linear foot for each size sanitary sewer service lateral complete in place shall include furnishing and installing all material, equipment, and labor to install the service lateral and backfill. The price shall also include the service saddle on the main sewer line, bedding, pipe, fittings, adapters, and testing.

(8) Cleanout Assembly. Price for each size cleanout assembly complete in place and shall include wyes, 45-degree bends, clean-out plugs, adapters, service stub-out, and plug. Price includes vertical cleanout riser pipes complete in place.

(9) Air Release/Vacuum Assembly. Price for each sewage air release and vacuum valve assembly shall include furnishing all material, fittings, valves, equipment, and labor to install air release and vacuum valve. Price shall include the concrete manhole and manhole frame and cover that will enclose the air release and vacuum valve assembly. Price shall also include excavation, bedding, and backfill for the concrete manhole.

(10) Valves. Price for each size and type of valve with stem extension, adapter, and valve box shall include furnishing all materials, equipment, and labor to install and test each valve and valve box, and restore disturbed area to like or better conditions.

(11) Special Design Manholes or Vaults. Lump sum price for special design manholes or vaults in accordance with Drawings and specifications, complete in place.

(12) Abandonment of Existing Sewer lines. Price for abandonment of existing sewer lines shall include all labor, material, and equipment to cut the existing sewer lines, remove the cut portions of pipe, and plug the existing sewer line with concrete where designated by the drawings or where directed by the Engineer.

1.04 Coordination. Phases of the construction which involve the temporary interruption of essential services shall be scheduled in consultation with the Owner or Owner's representative and shall not be of longer duration than essential to accomplish the purpose of such interruptions. Liaison in this matter shall be required before beginning work.

1.05 Field Engineering. Reference points shall be provided on the Drawings from which the Contractor shall lay out the work. The Contractor shall stake out the alignment of the actual centerline using offset stakes. The Contractor shall protect and preserve all reference points and offset stakes and replace same at no additional cost if they are destroyed. All sanitary sewer stakeout work shall be done by a Surveyor licensed to do business in the Commonwealth of Virginia. The cost of the Surveyor shall be distributed among the various bid items and will not be paid for separately.

1.06 Project Meetings.

1. Preconstruction Conference with the Contractor shall be held before beginning any work.

2. Monthly construction progress meeting shall be held at a time and place designated by the Owner.

1.07 Submittals.

1. Construction Schedules. Submit a detailed construction schedule prior to the Preconstruction Conference. Revise the schedule before each progress meeting.

2. Disbursement of Funds Schedule. At the Preconstruction Conference, submit a disbursement of funds schedule detailing the Contractor's anticipated monthly pay request amounts for the entire project time. Revise the schedule before each progress meeting.

3. At the Preconstruction Conference, submit the following, if required:

   (1) A detailed written construction operations plan providing a description of how bypass pumping operations shall be performed.

   (2) A plan for blasting operations.

   (3) A plan for temporary stream crossings for access to construction areas.

   (4) A copy of the detailed erosion and sedimentation control plan.

   (5) A copy of the completed registration statement sent to DEQ and the Stormwater Pollution Prevention Plan that has been prepared in accordance with Virginia Pollutant Discharge Elimination System General Permit for control of stormwater discharges from construction activities.

   (6) A Maintenance of Traffic (MOT) plan, approved by VDOT, showing how traffic will be managed in all streets affected by the project work.

   (7) A schedule of values.

4. Shop Drawings or Product Data. Within 10 days of Notice to Proceed, provide a submittal schedule. A submittal shall be required for each item of material to be used for construction.

   (1) Submit a minimum of four copies of all shop drawings or product data. Electronic submittal of shop drawings is permissible, but the shop drawings must have the Contractor’s approval stamp on them, otherwise they will be returned without Owner or Engineer review.

   (2) The Owner shall retain two copies. The Engineer shall retain one copy and the remaining copy will be returned to the Contractor. Should the Contractor need more than one paper

copy of the approved shop drawings, the extra paper copies shall be submitted with the shop drawing package.

(3) All shop drawings shall be approved by the Contractor and any subcontractors prior to being submitted, certifying that the materials or item is provided in accordance with Contract Documents.

(4) Failure to comply with these requirements will result in the submittal being returned unprocessed.

5. Material Schedule. Within 20 days after effective date of the agreement, submit for approval a schedule listing manufacturer of the items of equipment and materials proposed for the construction. Following approval of the schedule, no changes in material or equipment from those listed will be allowed except in unusual or extenuating circumstances. When such circumstances arise, the Contractor shall request, in writing, approval of the proposed change stating the circumstances necessitating such a change. The intent of this schedule is to name the manufacturers of material specified by a product standard and to designate which manufacturer will be used when more than one has been named for an item in the specifications. The schedule shall not be interpreted as allowing any change from base bid items or those substitute items offered with the bid and accepted by the Owner.

6. Contractor shall update Record Drawings and present them at each progress meeting for review and approval. Failure to maintain an up-to-date set of Record Drawings shall be grounds for withholding partial or complete payment of the Contractor's monthly pay request.

1.08 Construction Facilities and Temporary Controls.

1. Temporary Utilities.

(1) Temporary Sanitary Facilities. Contractor shall provide and maintain in a neat and sanitary condition such accommodations for the use of his employees as will comply with laws and regulations.

(2) Temporary Electricity and Water. The Contractor shall make all necessary arrangements for obtaining electric power and water for construction purposes. No separate payment for these items for construction purposes or testing will be made.

2. Pollution Control.

(1) Dust Control. Ensure that dust is held to an absolute minimum during all portions of the work through the application of moisture and dust suppression agents as required.

(2) The Contractor is responsible for managing construction practices in accordance with his approved erosion control and stormwater pollution prevention plans, and shall install and maintain all measures necessary to maintain compliance with applicable stormwater management and erosion control regulations.

3. Project Identification. One clear and legible project sign shall be provided on the Project by the Contractor as soon as work commences, and the work forces are mobilized. Project sign shall be approved by the Owner. The location of sign shall be as determined by the Owner. The sign shall contain the following information and meet the following requirements:

(1) Dimensions shall not be less than 4 feet by 8 feet.

(2) Lettering shall not be less than as shown on Standard Detail.

(3) It shall list Contractor's name, Contractor's representative, emergency phone number, and local phone number.

(4) It shall list the name of the Project and project number.

(5) "Campbell County Utilities and Service Authority" and phone number.

(6) The construction cost of the Project and funding source(s). Example: 50% Developer funding and 50% CCUSA funding.

(7) It shall list Engineer's company.

(8) The sign shall be constructed of a sturdy and durable material.

(9) Sign or signs shall be placed in such a manner as to be clearly visible to the public.

The Contractor shall maintain this sign for the duration of the Contract and dispose of it after completion. The Contractor shall replace deteriorated signs as directed by the Owner. There shall be no separate payment for this item.

4. Field Offices and Sheds. Provide and maintain a weathertight, heated, and properly lighted temporary field office, if required by the Owner. Wood or kerosene stove shall not be used for heating. Field office shall provide 100 square feet for use by the inspector. The space shall be equipped with a 3-foot by 5-foot plan table, plan chair, a 15-inch wide four-drawer metal filing cabinet, a plan rack, one chair, and reasonable lighting furnished by the Contractor.

5. Traffic Control.

(1) This work shall consist of maintenance and protection of pedestrian and vehicular traffic around all areas of construction. The Contractor shall submit a detailed Maintenance of Traffic (MOT) plan to VDOT for approval. This plan shall specifically address traffic control for all streets affected by the Project and must be approved prior to starting construction. All traffic control devices indicated on the layouts or deemed necessary are to be furnished by the Contractor. All traffic control devices provided by the Contractor shall conform to the MUTCD requirements such as warning lights, barricades, delineators, frames for signs, cones, poles, drums, flagmen, and project signs.

(2) The Contractor shall erect, maintain, and remove all traffic control devices.

(3) The Contractor shall furnish, install, and maintain amber warning lights at all locations necessary for the control and protection of vehicular traffic. Warning lights placed at or on warning signs shall be flashing lights. Warning lights used at locations of work area shall be steady-burn lights. Amber warning lights shall be battery powered lights conforming to the Institute of Transportation Engineers (ITE) Standard for Flashing and Steady-Burn Barricade Warning Lights.

(4) The Contractor shall maintain local resident and business access on all streets during construction of all improvements on this Project.

1.09 Materials and Equipment.

1. Quality. Material and equipment incorporated into the work.

   (1) Conform to applicable specifications and standards.

   (2) Comply with size, make, type, and quality specified, or as specifically approved in writing by the Owner.

   (3) Manufactured and Fabricated Products

      a. Design, fabricate, and assemble in accordance with the best engineering and shop practices.

      b. Manufacture like parts of duplicate units to standard sizes and gages, to be interchangeable.

      c. Two or more items of the same kind shall be identical, by the same manufacturer.

      d. Products shall be suitable for service conditions.

      e. Equipment capacities, sizes, and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing.

   (4) Do not use material or equipment for any purpose other than that for which it is designed or is specified.

   (5) Except as specifically indicated or specified, materials and equipment removed from existing structures shall not be used in the completed work.

   (6) For material and equipment specifically indicated or specified to be reused in the work:

      a. Use special care in removal, handling, storage, and reinstallation to assure proper function in the completed work.

      b. Arrange for transportation, storage, and handling of products, which require off-site storage, restoration, or renovation. Pay all costs for such work.

   (7) Manufacturer's Instructions

      a. Installation of work shall comply with manufacturer's printed instructions.

      b. Maintain one set of complete instructions at the job site during installation and until completion.

      c. Handle, install, connect, clean, condition, and adjust products in accordance with such instructions and in conformity with specified requirements.

      d. Do not proceed with work without clear instructions.

      e. Do not omit any preparatory step or installation procedure unless specifically modified or exempted by Contract Documents and the manufacturer.

2. Transportation and Handling.

(1) Arrange deliveries of products in accordance with construction schedules. Coordinate to avoid conflict with work and conditions at the site.

a. Deliver products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.

b. Immediately on delivery, inspect shipments to assure compliance with requirements of Contract Documents and approved submittals, and that products are properly protected and undamaged.

(2) Provide equipment and personnel to handle products by methods to prevent soiling or damage to products or packaging.

3. Storage and Protection.

(1) Store products in accordance with manufacturer's instructions, with seals and labels intact and legible.

a. Store products subject to damage by the elements in weathertight enclosures.

b. Maintain temperature and humidity within the ranges required by manufacturer's instructions.

(2) Exterior Storage.

a. Store fabricated products above the ground, on blocking or skids; prevent soiling or staining; cover products which are subject to deterioration with impervious sheet coverings; and provide adequate ventilation to avoid condensation.

b. Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter.

(3) Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions and free from damage or deterioration.

(4) Protection after Installation. Provide substantial coverings or barriers as necessary to protect installed products from damage from traffic and subsequent construction operations. Remove when no longer needed. Contractor is responsible for the condition of installed products until accepted by the Owner.

4. Project Substitutions.

(1) Substitutions. The Contractor may offer with his bid, substitute items of equipment and materials to those of specified manufacturers called for in Part B - Construction Materials, provided that, if approved:

a. No major changes in the construction or design intent of the Project would be required. Changes required to accommodate substituted items shall be made by the Contractor at no additional cost or time delay.

b. Features of quality, capacity, construction, performance, appearance, size, arrangement, and general utility including economy of operation of substitutes offered, either parallel or exceed those of specified products.

c. The provisions of Article 6.19 of the General Conditions and any other guarantees, if required by the specification sections, shall apply in full force and effect to the performance of such substitute products approved for incorporation into the work.

(2) Technical data covering the proposed substitution shall be furnished with the bid when possible, and not later than 10 days after bid submission.

(3) If the substitute item is not approved in writing, the Contractor shall provide the item from a specified manufacturer.

1.10 The Contractor shall give his personal superintendence to the work and shall assign a specific project superintendent, experienced with utility work, to the Project. This superintendent shall be present on the work site at all times during progress, any absences shall be coordinated with the inspector and satisfactory coverage provided to ensure adequate superintendence of work. The project superintendent shall be fully competent and have full authority to act for the Contractor, and evidence of competency satisfactory to the Owner shall be provided.

1.11 The Contractor shall have posted in a conspicuous spot with his equipment and on the work site, signage, or stickers identifying the Contractor's equipment and listing an emergency 24-hour phone number.

1.12 The Contractor shall designate a responsible member of their organization at the site whose duty shall be the prevention of accidents.

1.13 Contract closeout shall include the following:

1. Punch List. Correct all punch list items.

2. Cleaning. Clean up all debris; remove stains, spots, marks, and dirt; remove paint spots and smears from all surfaces; and clean appurtenances.

3. Project Record Documents.

(1) Provide one complete set of Drawings recording all changes to the work to indicate actual installation. The Contractor is to note changes in legible red letters at least 1/8 inch high. The Contractor will be responsible for accurately recording the lengths of installed pipe and vertical heights of cleanouts and manholes as they are installed. The Contractor shall note the structure number, lot address, and the distance to the nearest manhole on the Drawings for all sanitary services installed. For all new water services, the structure number, lot address, and the distance along the main line to the nearest main line valve shall be noted on the Drawings. This information will be reviewed at each progress meeting and will be used as a basis for pay requests. The end of project record survey by a Licensed Surveyor shall record the northing, easting, and rim elevation coordinates of all manholes and cleanouts, deflections to upstream manholes, and the invert elevations of all pipes in newly installed manholes. The Licensed Surveyor shall use this electronic information to calculate manhole-to-manhole lengths and slopes for all newly installed pipes. The Contractor's Record Drawing submittal shall include a digital and hardcopy printout of this record survey and calculated information in tabular format – including the Licensed Surveyor's feature code legend, a digital copy of the Licensed Surveyor's original record survey information in AutoCAD Civil 3D 2016

format, and a final copy of the Contractor's redlined Drawings noting all as installed conditions.

(2) These records are a specific contract requirement, and final payment will not be made until the Record Drawings have been submitted in an acceptable form.

4. Guarantees, Warranties, and Bonds. Submit all required guarantees, warranties, and bonds.

5. List of Manufacturers and Suppliers. At the conclusion of the Project, the Contractor shall submit a complete list of subcontractors, manufacturers, and suppliers who participated in the construction or who furnished materials or equipment. The address of each firm shall be included, together with types of materials or work performed.

6. Affidavit of Payment of Debts and Claims. Submit using AIA Document G706.

7. Affidavit of Release of Liens. Submit using AIA Document G706A.

8. Consent of Surety to Final Payment, if retainage is in escrow account.

SECTION C-2 - SITE PREPARATION

2.01 Description. This section applies to all work on this project.

2.02 Provide barricades, coverings, or other types of protection necessary to prevent damage to existing improvements not indicated to be removed, and improvements on adjoining properties.

1. Restore all improvements damaged by this work to their original condition, and acceptable to the Owner or other parties or authorities having jurisdiction, unless indicated otherwise. Damages caused by Contractor accident, negligence, error, carelessness, or which could have been reasonably avoided without undue impact to construction methods shall be repaired at Contractor expense.

2.03 Protect existing trees and other vegetation indicated to remain in place against cutting, breaking, or skinning of roots; skinning and bruising of bark; smothering of trees by stockpiling construction materials or excavated materials within drip line; excess foot or vehicular traffic; or parking of vehicles within drip line. Provide temporary fences, barricades, or guards as required to protect trees and vegetation to be left standing. Trees and vegetation which are wounded or stressed due to failure to adhere to the above standards of care shall be restored, removed, or replaced at Contractor expense at the direction of the Owner.

2.04 Store and use explosives in accordance with Federal, state, and local regulations. The Contractor shall be responsible for and shall satisfactorily correct all damage resulting from use of explosives.

2.05 Construction operations in public streets shall be confined to as small a space as is practicable and shall be subject at all times to the approval of the Owner and VDOT. Unless otherwise directed, the Contractor shall perform the proposed construction as follows:

1. Not over 300 feet of ditch shall be open at any one time, and not more than one intersection blocked. Not more than 15 feet of ditch shall remain open over night and then only when required to expose end of pipe that will be extended the next working day, and it shall be properly barricaded or equipment parked over it.

2. If, in the opinion of the Owner, the material taken from the ditch is not suitable for backfilling, it shall be removed, and an acceptable material used for backfilling trenches.

3. Calcium chloride shall be used to settle dust whenever necessary and required by the Owner.

4. All loose material shall be swept from hard surface immediately behind the backfilling.

5. Contractor shall maintain trenches for a period of 12 months from the completion of work.

6. All walks, driveways, and lawns shall be maintained and restored to their original condition by the applicant and maintained for a period of 12 months from the completion of work.

2.06 Land Disturbing and Construction Limits Criteria for Sewer and Water Line Construction.

1. General Requirements Applying to All Areas.

(1) Contractor shall plan construction to minimize disturbance to properties adjacent to the sewer and water lines. Contractor shall flag the proposed limits of construction and mark all trees proposed to be cut for review and approval by the Owner prior to any clearing being performed. The Contractor shall use appropriately sized equipment for utility installation, to limit impacts to minimum necessary for utility installation.

(2) The Owner reserves the right to limit the width of land to be disturbed and to designate on the Drawings or in the field certain areas or items within this width to be protected from damage.

(3) The Contractor shall be responsible for damages to area or items designated to be protected. Repairs to, replacement of, or reparations for areas or items damaged shall be made to the satisfaction of the Owner before acceptance of the completed project.

(4) In developed areas, brush, laps, roots, and stumps from trees shall be removed from the site. In undeveloped areas, the Contractor will be allowed to leave stumps undisturbed provided the tree is cut within 6 inches of the finish grade, stumps shall be removed when they are located within drainage swales.

(5) All buildings or structures located along the line shall be protected by the Contractor. Hand trenching, shoring, or other methods may be required.

(6) Any fences disturbed by the Contractor shall be repaired with new materials to a condition equal to or better than their original condition or to the satisfaction of the Owner.

(7) Contractor shall limit width of disturbed area through garden and lawn areas to a width absolutely necessary for construction. Prior to construction, topsoil and turf shall be stripped from areas of garden or lawn to be disturbed by Contractor for a depth of 6 inches and stockpiled near garden. After backfilling pipe, topsoil shall be loosely spread over all disturbed areas to a depth of at least 6 inches, and turf reinstated.

(8) Contractor shall obtain written permission from property owners for use of any access roads other than ones located within rights-of-way. Written permission shall contain conditions for use and restoration agreements between property owner and Contractor. The Contractor is responsible for obtaining and complying with all relevant local, state, and Federal permits associated with work on private property.

(9) All areas disturbed shall be restored to a condition equal to or better than their original condition and shall be graded to drain.

(10) The Contractor shall replace or repair all damaged or destroyed hedge rows or property corners. Property corners removed during construction shall be replaced by a Surveyor licensed to practice in Virginia.

2. Specific Requirements Applying to Developed Subdivisions and Lots.

(1) All trees located beyond 7.5 feet of the centerline shall be protected by the Contractor unless the Contractor obtains written authorization from the Owner to remove them. The Owner reserves the right to designate other trees located closer to the centerline for protection where possible.

(2) All shrubs, hedges, or other ornamental plantings located along the line shall be protected or moved and replanted by the Contractor.

(3) Wells or springs located within 50 feet and septic systems within 10 feet of the centerline shall be protected by the Contractor.

(4) Contractor shall grub only brush, roots, and stumps of removed trees. Damage to lawns shall be kept to an absolute minimum necessary for construction.

(5) Excavated or blasted rock shall be removed from the site unless otherwise ordered by the Owner.

(6) Restoration and fine grading shall follow within 1 week from the time an area is disturbed or within 500 feet from the immediate work site, whichever occurs first. Seeding shall follow as ordered by the Owner.

3. Specific Requirements Applying to Undeveloped Areas.

(1) All trees 12 inches in diameter or larger located beyond 7.5 feet of the centerline shall be protected unless Contractor obtains written authorization from Owner to remove them. Owner reserves the right to designate select trees located closer to centerline for protection where possible.

(2) In areas where animals are kept, Contractor shall notify property owner prior to commencing work and keep Owner advised of progress of work. Fences shall be kept secure at all times and animals protected from open ditches, machinery, blasting, and other hazards.

(3) All areas shall be grubbed and cleared of stumps and roots.

(4) Restoration and fine grading shall follow within 1 week from the time an area is disturbed or within 1,000 feet from the immediate work site, whichever occurs first. Seeding shall follow as ordered by the Owner.

(5) When working in wooded areas, the Contractor may construct small brush piles for birds and wildlife instead of hauling off or mulching the brush. The brush piles shall not contain stumps, large limbs, rocks, brick, block, dirt, broken pavement, broken concrete, paper, yard waste, or scrap metal. The brush pile shall be constructed only on Authority owned easements, right-of-ways, or with specific written land owner permission.

4. Construction Limits.

(1) Contractor shall not disturb any areas outside the following limits specified in this section without express written permission from the Owner.

(2) No "clear cutting" of timber shall be permitted within the construction limits. Contractor shall make select cutting of trees, taking smallest trees first, that are mandatory for the construction of the utility line. Owner's decision shall be final on determination of which trees are to be cut.

(3) The following widths measured from the centerline of the sewer and water lines shall be considered the maximum allowable working area and be referred to as "construction limit."

Pipe Size	Distance from C/L	Total Allowable Width
12-inch or smaller	15 feet	30 feet
15-inch to 18-inch	20 feet	40 feet
24-inch and up	25 feet	50 feet

All areas outside these construction limits shall be protected by the Contractor unless written variations are granted by the Owner.

2.07 Demolition.

1. Manholes to be abandoned shall have the frames and covers removed and the top masonry removed 2 feet below surrounding grade. The remaining portion of the manholes shall be cleared of organic material, all pipes plugged with Portland cement grout, the bottom broken to permit drainage, and backfilled with VDOT No. 57 stone. The frame and covers from all existing manholes to be abandoned or removed shall be salvaged.

2. All abandoned valve boxes shall be removed to 6 inches below the surface and backfilled with like surface material. When abandoning existing lines, the line shall be abandoned at its source and all water control devices closed and a 1-foot segment of the line shall be removed at the water control device.

3. Remove pipe at locations shown on the Drawings or where necessary for construction of the new line. Plug pipes at each end and at manholes. Salvaged pipe shall be transported as directed by the Owner. All unsalvageable pipe shall become property of the Contractor and shall be promptly removed from the site. The Contractor shall be responsible for off loading salvaged pipe and scheduling delivery 24 hours in advance.

2.08 Clean up debris resulting from site clearing operations continuously with the progress of the work.

2.09 Remove promptly all salvageable material that becomes property of the Contractor and is not to be reused in construction. Sale of material on the site is prohibited.

2.10 All waste material and debris from the project shall be taken to the Region 2000 Service Authority landfill or other landfill approved by the County. The material shall be broken or cut into pieces which can be easily compacted by the landfill equipment. The Contractor shall be responsible for all tipping fees assessed at any landfill.

2.11 Remove debris from site in such a manner as to prevent spillage. Keep pavement and area adjacent to site clean and free from mud, dirt, and debris at all times.

SECTION C-3 - TRENCHING AND BACKFILLING

3.01 Description. This section specifies all trenching and backfilling work on the Project.

3.02 Storage and use of explosives shall be in accordance with this project manual and the National Fire Protection Association's NFPA 495, Explosive Materials Code, Latest Edition, and the requirements of the storage and use permit issued to the Contractor by the Fire Marshall. In the event of a discrepancy, the more stringent requirements govern.

3.03 Compaction Tests. In the course of backfilling trenches for utility installations, constructing embankments for roadways, and placing aggregate base, the Contractor shall perform and include in his bid the cost of "field density determinations" or compaction tests every 1,000 feet of pipeline or a minimum of one per project. The Owner has the right to call for additional tests and will pay for the additional tests. Compaction tests will be called for by the Owner, the location of the tests will be determined by the Owner, and the Contractor shall cooperate fully. Field density determinations shall be performed in accordance with AASHTO T191, T205, or T214, modified to include material sizes used in the laboratory determination of density; with nuclear field density testing device; or by other approved methods. When the nuclear field density testing device is used, density determinations for the material will be related to the density of the same material tested in accordance with VTM-1, VTM-10, or VTM-12 and a control strip will not be required. When the test results indicate that the density is less than the percent specified, the Contractor shall excavate and re-compact the areas which have failed at no expense to the Owner. Whenever a test fails to meet the required density, the Contractor shall pay for retesting the areas after corrective action has been taken.

3.04 Underground Utilities.

1. The location of all underground utilities shown on the Drawings are approximate and the Contractor shall be responsible for their exact location. Excavation to confirm elevations of existing sanitary lines may be required prior to laying new sanitary sewers to confirm depths of existing sewer lines, particularly on dead end line segments where terminal elevations are unknown.

2. Locate existing utilities, culverts, and structures, above or below ground, before any excavation starts. Coordinate work with utility companies. Protect, maintain in service, and prevent damage to utilities not designated to be removed. When utilities are encountered and are not shown on Drawings or when locations differ from those shown on Drawings, notify the Owner for instructions before proceeding. The Contractor shall repair at his own expense any damage to existing utilities, including service connections.

3.05 All excavation shall be unclassified regardless of the material encountered.

3.06 Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or side dimensions, without specific approval of the Owner. Unauthorized excavation shall be replaced at Contractor's expense.

3.07 Where unauthorized excavations have been carried beyond points required, restore these areas to the elevations and dimensions shown on the Drawings with material approved by the Owner. Compact and restore as specified at Contractor's expense.

3.08 Where soft, yielding, or otherwise unsatisfactory material is encountered in the trench bottom, the Contractor shall remove the material to such depth as determined by the Owner and replace with #57 or #68 coarse aggregate fill. Removal of unsatisfactory material from the trench bottom and replacement with aggregate fill will be paid as aggregate fill material.

3.09 Where removal of unsatisfactory material is due to fault or negligence of the Contractor, by inadequate shoring or bracing, dewatering, material storage, or other failure to meet specified requirements, work shall be performed at no additional cost to the Owner.

3.10 Excavation.

1. Crusher run aggregate, or asphalt millings shall be spread on pavement before stockpiling excavated material on the pavement. The crusher run aggregate shall be considered incidental to the installation of the various utilities, sidewalks, curb and gutter, driveway entrances, etc., and will not be measured for separate payment.

2. Excavate trenches below bottom of pipe for pipe bedding fill for plastic pipe or where trench bottom is rock in accordance with Standard Details.

3. Pavement, curb, gutter, and sidewalk material excavated along the trench shall not be used as backfill material.

4. Rock that has been removed from the trench by blasting or with rock excavation equipment shall not be used as backfill material unless it is less than 5 inches in diameter. Rock that is not suitable for backfill shall be replaced with earth fill.

5. Keep excavations free of water while work is being performed.

6. Where underground streams or springs are found, provide temporary drainage and notify the Owner.

7. Remove from project site and dispose of material unsatisfactory for reuse, including all trash and excess material which cannot be reused continuously with the progress of the work. Keep all pavements and area adjacent to work clean and free from mud, dirt, and debris at all times.

8. Remove shoring and all form materials.

9. Where rock is encountered so that a manhole, vault, or other structure will bear on rock, it shall be used to support the foundation. Where only a part of the foundation will bear on rock, at least 8 inches of compacted aggregate fill shall be provided below bottom of footings.

3.11 Pipe Bedding.

1. Bedding for pipe shall be coarse aggregate fill, #57 or #68 stone.

2. Place required 6-inches of pipe bedding where trench bottom is rock. Bedding to be placed to crown of all plastic piping in accordance with Standard Details.

3. Compact pipe bedding by tamping or rodding to prevent settlement.

4. Excavate bell holes in the bedding to insure that the pipe barrel is fully supported by the bedding.

3.12 Compaction.

1. Compact each layer of fill or backfill to not less than the following percentages of the maximum density at optimum moisture content as determined by ASTM D 698 (AASHTO T-99).

   (1) 100 percent, within 5 percent of optimum moisture content, beneath and within 25 feet of buildings structures, and drainage appurtenances, including those shown for future construction and for top 6 inches within VDOT right of way.

(2) 95 percent beneath pavements, walks, and road shoulders, including those shown for future construction and between ditch to ditch and sidewalk to sidewalk in VDOT right of way

(3) 90 percent in other areas

2. Compact soil materials using equipment suitable for materials to be compacted and work area locations. Use power-driven hand tampers for compacting materials adjacent to structures. Trench backfill shall be compacted in lifts to achieve uniform density. Compacted lifts shall not exceed 6 inches in height under pavement and structures. Moisture content shall be monitored during construction to ensure maintenance of optimum moisture levels.

3.13 Backfill.

1. Obtain the particular backfill material required from excavation stockpiles, borrow areas, or other approved sources.

2. Backfill trench to a compacted depth of 1 foot over the pipe with clean earth fill. Backfill shall be placed by hand uniformly on each side of the pipe and compacted in layers not exceeding 6 inches. Do not backfill on muddy or frozen soil, or with muddy or frozen soil.

3. Backfill trench from 1 foot above the pipe to grade with earth fill free of stones or other material larger than 5 inches or 1/2 the layer thickness in any dimension, whichever is smaller. Layers shall not exceed 12 inches, except that under road shoulders and under existing or future paved areas and structures, layers shall not exceed 8 inches. Backfill shall be compacted to the density specified for the areas in which it is located except that minimum compaction in any area shall be to the density of the adjacent soil.

4. Excavate depressions caused by removal of stumps or other clearing operations to firm subgrade, fill with clean earth fill, and compact as specified.

5. Place backfill materials evenly adjacent to structures. Take care to prevent wedging action of the backfill against structures by carrying the material uniformly around the structure to approximately the same elevation in each lift.

6. Compact each layer of backfill to the required density.

7. Replace topsoil and/or provide new topsoil to at least 6 inches or the original depth whichever is greater in areas to be seeded.

8. Aggregate fill placed under manholes or other structures shall be compacted with two passes of vibratory plate or vibratory roller.

3.14 Grading.

1. Uniformly grade all areas within the limits designated on the Drawings, including adjacent transition areas. Finish surfaces within specified tolerances with uniform levels or slopes between points where elevations are shown and existing grades.

2. Finish all surfaces free from irregular changes, rocks, or debris.

3. Finish subgrade areas to receive topsoil to within 0.1 foot of required subgrade elevations.

4. Shape subgrade under walks to line, grade, and cross-section to within 0.10 foot of required subgrade elevations.

5. Shape subgrade under pavement to line, grade, and cross-section to within 1/2-inch of required subgrade elevations.

6. Protect newly graded areas from traffic and erosion. Repair and reestablish grade in settled, eroded, or rutted areas to the specified tolerances.

7. Where compacted areas are disturbed by subsequent construction or adverse weather, scarify the surface, reshape, and compact to the required density. Use hand tamper for recompaction over underground utilities.

3.15 Utilities to be Abandoned or Removed.

1. When underground utilities are to be abandoned in place, plug, cap, or seal with concrete at the "construction limits" or at points shown.

2. Remove underground utilities indicated on the Drawings to be removed, and backfill resulting excavation with suitable material compacted as specified. Plug, cap, or seal utilities with concrete at the construction limits or at points shown.

3. The cost of removing existing manholes and pipe to allow the installation of new sanitary sewer shall be included in the Contractor's unit prices for sanitary sewer pipe.

3.16 Erosion Control.

1. No more than 300 feet of trench shall be open at any one time.

2. No disturbed area shall be denuded for more than 7 calendar days.

3. Permanent or temporary soil stabilization shall be applied to denuded areas within 7 days after final grade is reached on any portion of the line. Soil stabilization shall also be applied within 7 days to denuded areas which may not be at final grade but will remain dormant (undisturbed) for longer than 15 days. Soil stabilization practices include vegetative establishment, mulching, and early application of gravel base on areas to be paved.

4. Comply with all local requirements and with the Virginia Erosion and Sediment Control Regulations as administered by the Virginia Soil and Water Conservation Board to control erosion and sedimentation.

5. Install silt fences around soil stockpiles and excavations.

6. All applicable erosion and siltation control measures shall be taken prior to grading.

7. Protect and maintain storm sewer inlets with inlet protection devices.

8. Inspect all erosion and sediment control devices at the close of each work day and after each rainstorm. Make necessary repairs or clean up immediately to maintain the effectiveness of the device.

9. Where consistent with job safety requirements, easement conditions, and construction methods, place all excavated material on the uphill side of the trench. When the soil is placed on the downhill side of the trench, divert maximum drainage toward the trench.

10. Water discharged from dewatering activities shall not be discharged directly to any stream or water body. Comply with state minimum standard and Specification 3.26, Dewatering Structure, of the Virginia Erosion and Sediment Control Handbook, 1992 Edition. When working adjacent to or within a water body, comply with state minimum standard and Specification 3.27, Turbidity Curtain, of the Virginia Erosion and Sediment Control Handbook, 1992 Edition.

11. Comply with practices outlined in the project Stormwater Pollution Prevention Plan prepared in accordance with VPDES permit requirements.

12. The Contractor must have a person on-site while working in VDOT right of ways that possesses the Virginia Department of Conservation and Recreation's E & S Contractor's Certifications.

3.17 Riprap shall be installed in accordance with Section 414 "Riprap" of the VDOT Road and Bridge Specifications. Geotextile fabric shall be placed under all riprap.

3.18 Protect graded areas from the action of the elements. Settlement or other damage that occurs prior to acceptance of the work shall be repaired and grades satisfactorily reestablished.

3.19 Repair after Cleanup. Upon completion of construction work and after spoils and debris have been removed, regrade any areas disturbed by the operations. Remove all temporary erosion controls upon final stabilization as directed by the Owner.

3.20 Blasting.

1. The Contractor shall provide a blast warning signal system. The blast warning signal system shall consist of one or more air horns located at the blast site. The air horn(s) shall be audible a minimum of 1 mile from the blast site. The signals shall be one long horn 5 minutes prior to the blast, one short horn 1 minute prior to the blast, and one long horn after the blast to signal all clear. The Contractor shall erect two clear and legible blast warning signal signs at locations determined by the Owner. The signs shall list the blast warning signal system, the Contractor superintendent's name and telephone number, and the Owner inspector's name and telephone number.

2. The Contractor shall establish test pits at up to two representative locations along utility alignments and up to three locations adjacent to railroad right-of-ways to determine if the rock is "ripable" with a Caterpillar 225 Excavator or equivalent and the feasibility of rock excavation by "hoe ramming." if these procedures do not offer reasonable production for rock excavation, then blasting will be allowed unless otherwise indicated. Reasonable production for rock excavation by "hoe ramming" will be defined as 5 or more cubic yards per hour.

3. The blasting shall be performed by a qualified Contractor. Qualifications, proposed procedures, and schedule shall be submitted for approval at least 2 weeks prior to commencing any blasting operations.

4. The Contractor shall notify in writing all property owners within 250 feet of the proposed blast at least 1 week prior to the proposed blast and verbally on the day of the scheduled blast.

5. Blasting shall be limited to mid-morning hours on days of clear-to-partly cloudy skies with increasing surface temperature and light wind. Blasting will not be allowed after 3:30 p.m. Blasting will not be allowed on overcast, low ceiling days. The Contractor shall provide monitoring equipment to monitor all blasting. A copy of the monitor record shall be given to the Owner daily.

6. The use of unconfined explosives shall be prohibited.

7. The maximum allowable peak particle velocity shall be 1.25 inches per second for all structures located 0 to 300 feet from the blasting site, the maximum allowable peak particle velocity shall be 1.00

inch per second for all structures located 301 to 5,000 feet from the blasting site. The maximum allowable peak particle velocity shall be 0.75 inch per second for all structures located 5,001 feet and beyond from the blasting site.

8. To minimize vibration, minimum scaled distance (SD) of 50 shall be used to determine maximum explosive weight per delay. A test blast shall be conducted to verify the scaled distance. The maximum explosive weight per delay shall not exceed the distance from the blast to the nearest structure divided by 50 squared. Maximum explosive weight per delay may be revised pending outcome of test blast. Test blast monitoring shall be at the expense of the Owner. The recommendations indicated for blasting criteria in no way relieves the Contractor of his liability.

9. The peak overpressure or air blast shall not exceed the maximum limits specified in the following table:

Airblast Limits

Lower Frequency of Measuring System (HZ (plus or minus 3 DCB))		Measurement Level (DCB)
0.1 HZ or lower	Flat response	134 peak
2 HZ or lower	Flat response	133 peak
6 HZ or lower	Flat response	129 peak
C-weighted	Slow response	105 peak

10. Pre-blast meetings may be scheduled by the Owner to document hole depths and spacing, charge weight per delay, shot scheduling, and weather conditions. The Contractor shall obtain accurate measured distances from structures to center of blast area prior to determining the safe maximum charge-weight per delay and loading blast holes.

11. Pre-blast and post blast surveys will be performed by the Contractor. The written permission shall be submitted to the Owner prior to entering upon private property. The pre-blast and post blast surveys will include all occupied buildings within 250 feet of blasting areas. The pre-blast and post blast surveys performed by the Owner in no way relieve the Contractor of his liability.

12. The Owner reserves the right to monitor production blasting. In this event, the Contractor shall provide the Owner ample notice of scheduled blasts to allow set-up of monitoring equipment.

13. Prior to blasting operations, the Contractor shall lease for the Owner one seismograph and accessories. The seismograph shall be "Minimate Plus Base Unit" as manufactured by Instantel or an approved equal. The seismograph shall have 300-event capacity and four channels, internal triaxial sensor, installation spikes, linear microphone with stand, Blastmate III to PC connecting cable, operator manual, Blastware III compliance module and operator manual, and AC adaptor. Accessories shall be one fastening plate for precise leveling requirements including ceiling and wall installations; one standard transducer leveling plate with leveling feet and integrated spirit level which can be used with floor, wall, and ceiling installations; one external 12-volt DC battery power supply cable; and one 110-volt AC adaptor. The seismograph and accessories lease will not be paid as a bid item. The Contractor shall have the seismograph calibrated quarterly. Another seismograph shall be provided during the calibration process. The seismograph is in addition to Contractor’s monitoring requirements stated above.

SECTION C-4 - WATER DISTRIBUTION SYSTEM

4.01 Description. This section specifies all water system work on this project.

4.01.1 Installation. Reference is made to AWWA Standard C600 (latest edition) for the installation procedures to waterlines.

4.02 Project Conditions. Separation of water lines and sanitary sewers.

1. Follow Virginia Department of Health standards for separation of water mains and sewer lines.

2. Parallel Installation.

   (1) Normal Conditions. Water lines shall be constructed at least 10 feet horizontally from a sewer, sewer manhole, and drainfields whenever possible; the distance shall be measured edge-to-edge of each structure or drainfield trench. Plans shall show all existing and proposed drainfields.

   (2) Unusual Conditions. When local conditions prevent a horizontal separation of at least 10 feet, the water line may be laid closer to a sewer or sewer manhole provided that:

      a. The bottom of the water line is at least 18 inches above the top of the sewer.

      b. Where this vertical separation cannot be obtained, the sewer shall be constructed of AWWA approved water pipe, pressure-tested in place to 50 psi without leakage prior to backfilling. The sewer manhole shall be of watertight construction and tested in place.

3. Crossing.

   (1) Normal Conditions. Water lines crossing over sewers shall be laid to provide a separation of at least 18 inches between the bottom of the water line and the top of the sewer whenever possible.

   (2) Unusual Conditions. When local conditions prevent a vertical separation described in "Crossing, Normal Conditions", paragraph above, the following construction shall be used.

      a. Sewers passing over or under water lines shall be constructed of the materials as described in the above paragraph for "Parallel Installation, Unusual Conditions."

      b. Water lines passing under sewers shall, in addition, be protected by providing:

         (1) A vertical separation of at least 18 inches between the bottom of the sewer and the top of the water line,

         (2) Adequate structural support for the sewers to prevent excessive deflection of the joints and settling on and breaking of the water line,

         (3) That the length of the water line be centered at the point of the crossing so that joints shall be equidistant and as far as possible from the sewer.

4. Sanitary Sewers or Sewer Manholes. No water pipes shall pass through or come in contact with any part of a sewer or sewer manhole.

4.03 Operation of Valves and Hydrants. The Owner will be the sole operator of all valves and hydrants on the Owner's water system.

4.04 Pipe Laying.

1. Take all precautions necessary to insure that pipe, valves, fittings, and other accessories are not damaged in unloading, handling, and placing in trench. Examine each piece of material just prior to installation to determine that no damage has occurred. Remove any damaged material from the site and replace with undamaged material.

2. Exercise care to keep foreign material and dirt from entering pipe during storage, handling, and placing in trench. Close ends of in-place pipe at the end of any work period to preclude the entry of animals and foreign material.

3. Bedding of pipe shall be as specified in Section 3 - Trenching and Backfilling.

4. Do not lay pipe when trench bottom is muddy, frozen, or has standing water.

5. Use only those tools specifically intended for cutting the size and material and type pipe involved. Make cut to prevent damage to pipe or lining and to leave a smooth end at right angles to the axis of the pipe. Flame cutting or flame tapping of ductile iron and cast iron pipe with an oxyacetylene torch will not be permitted.

6. Lay pipe with bell ends facing the direction of laying. Where grade is 10 percent or greater, lay pipe uphill with bell ends upgrade.

7. Where nonferrous metallic pipe (for example, copper tubing) crosses any ferrous piping material, maintain a minimum vertical separation of 1 foot.

4.05 Joining of Mechanical Joint Pipe.

1. Thoroughly clean inside of the bell and 8 inches of the outside of the spigot end of the joining pipe to remove oil, grit, excess coating, and other foreign matter. Paint the bell and the spigot with soap solution (half cup granulated soap dissolved in 1 gallon water). Slip cast-iron gland on spigot end with lip extension of gland toward end of pipe. Paint rubber gasket with or dip into the soap solution and place on the spigot end with thick edge toward the gland.

2. Push the spigot end forward to seat in the bell. Then press the gasket into the bell so that it is located evenly around the joint. Move the gland into position, insert bolts, and screw nuts up finger tight. Then tighten all nuts to torque listed below:

Bolt Size – Inches	Torque Foot - Pounds
5/8	40 - 60
3/4	60 - 90
1	70 - 100
1-1/4	90 - 120

Tighten nuts on alternate side of the gland until pressure on the gland is equally distributed.

3. Join lock-type mechanical joint pipe according to manufacturer's recommendations.

4. Permissible deflection in mechanical joint pipe shall not be greater than listed in AWWA C600.

5. Permissible deflection in lock-type mechanical joint pipe shall be as recommended by manufacturer.

4.06 Joining of Push-On Joint Pipe.

1. Thoroughly clean inside of the bell and 8 inches of the outside of spigot end of the joining pipe to remove oil, grit, excess coating, and other foreign matter. Flex rubber gasket and insert in the gasket recess of the bell socket. Apply a thin film of gasket lubricant supplied by pipe manufacturer to either the gasket or the spigot end of the joining pipe. Start the spigot end of the pipe into the socket with care. Then complete the joint by forcing the plain end to the bottom of the socket with a forked tool or jack-type device. File the end of field cut pipe to match the manufactured spigot end.

2. Join restrained push-on joints according to manufacturer's recommendations.

3. Permissible deflection in push-on joint pipe shall not be greater than listed in AWWA C600.

4. Permissible deflection in restrained push-on joint pipe shall be as recommended by manufacturer.

4.07 Join PVC pipe as recommended by the manufacturer. Join polyethylene tubing with compression joint fittings and stainless steel insert stiffeners. Join copper pipe using compression fittings.

4.08 Provide retainer gland type or restrained joint type pipe at all changes in direction and at all dead ends of pressure pipelines and as shown on Drawings.

1. Where retainer glands are used, extreme care shall be taken so that each set screw is tightened as recommended by the manufacturer before the pipe is backfilled and tested.

2. Concrete reaction anchors may be required as designated on the Drawings or as directed by the Owner. Concrete reaction anchors, where allowed, shall bear against undisturbed earth and shall be of the size and shape shown on the Drawings.

4.09 Setting of Valves and Valve Boxes.

1. Install valves with operator stems in the vertical plane through the pipe axis and perpendicular to the pipe axis. Locate valves where shown on Drawings. Thoroughly clean before installation. Check valves for satisfactory operation.

2. Equip all underground valve operators with valve box adaptors and valve boxes. Set box in alignment with valve stem centered on valve nut. Set the valve box to prevent transmitting shock or stress to the valve. Set the box cover flush with the finished ground surface or pavement.

3. All valve boxes and manhole frames and covers located between edge of pavement and ditch line shall be installed approximately 1 inch below the finished grade. When located in the pavement, they shall be placed flush with the pavement surface unless otherwise directed by the Owner or noted on the Drawings.

4.10 Installation of Tapping Sleeves and Tapping Valves.

1. All tapping sleeves shall be set to avoid interference with existing pipe joints.

2. After all tapping sleeves and valves have been set in place, a pressure test of 150 psi for 10 minutes shall be made to insure that there are no leaks around the sleeve or through the valve prior to tapping. All leakage shall be corrected.

3. The actual tap shall be made in the presence of the Owner's inspection personnel. The Owner shall be notified 48 hours in advance of making the tap.

4.11 Locate fire hydrants at such a distance from the curb or edge of pavement to provide ready access and minimize the possibility of damage from vehicles. Orient the hydrant so that the pumper nozzle faces the pavement. Set hydrant plumb and with the bury line on the hydrant at grade. Provide at least 0.5 cubic yards of crushed stone under the base to allow drainage from the hydrant drain valve, as shown on Standard Drawings. Place not-in-service bag over hydrants which are not operative immediately after installation.

4.12 Install air release valve or combination air release/vacuum valve assembly at locations indicated on the Drawings and at all high points on the water line. Installation shall be in accordance with the Standard Details.

4.13 Install flushing hydrant assembly at locations shown on the Drawings and in accordance with the Standard Details.

4.14 Install sampling stations at locations indicated on the Drawings and at such a distance from the edge of the pavement to provide ready access and minimize the possibility of damage from vehicles. Orient the sampling stations so that the housing opens toward the adjacent road. Set plumb at grade. Install in accordance with the Standard Details.

4.15 Encase water lines crossing under highways and railroads in a larger pipe or conduit called a casing pipe. The casing pipe shall be of the diameter and wall thickness indicated on the Drawings. Joining of steel casing pipe shall meet requirements of AWWA C206 "Standard for Field Welding of Steel Water Pipe Joints." Install casing pipe by jacking or boring.

1. Installation under highways shall meet requirements of VDOT Road and Bridge Specifications and the VDOT Land Use Permit. Seal up casing pipe ends to protect against foreign matter. Prior to beginning work, notify VDOT. Installation under railroads shall be in accordance with AREMA and the utility crossing railroad permit. Prior to beginning work, notify the railroad.

2. The Contractor shall determine for himself the existing conditions both above and below ground prior to installation. The Contractor shall be responsible for installing the casing pipe and the carrier pipe to the required lines and grades.

3. The carrier pipe shall be centered within the casing pipe by the use of casing spacers. Placement intervals for casing spacers shall be as indicated on the Standard Detail or based on manufacturer's recommendation, whichever is more stringent.

4. The seals at each end of the casing pipe shall be preformed flexible rubber seals with stainless steel bands.

4.16 Water services shall be abandoned by closing the corporation stop at the water main and cutting the water service line at the corporation stop.

4.17 Acceptance Tests.

1. After the line has been backfilled and at least 7 days after the last concrete reaction anchor has been poured, subject the line or any valved section of the line, including service lines and fittings, to a hydrostatic pressure test. Fill the system with water at a velocity of approximately 1 foot per second

while necessary measures are taken to eliminate all air. After the system has been filled, raise the pressure by pump to the greater of 150 psi, 150% of static pressure, or the test pressure noted on the Drawings. Measure pressure at the low point on the system compensating for gage elevation. Maintain this pressure for 2 hours. If pressure cannot be maintained, determine cause, repair, and repeat the test until successful.

2. A leakage test shall be conducted concurrently with the pressure test. Leakage shall be determined with a calibrated test meter furnished by the Contractor. Leakage will be defined as the quantity of water required to maintain a pressure within 5 psi of the specified test pressure, after air has been expelled, and the pipe filled with water. Leakage shall not exceed that quantity obtained by the formula below. If leakage exceeds that determined by the formula, find and repair the leaks and repeat the test until successful. The leakage formula shall be as follows:

For all pipe types except welded steel, L equals SD (square root of P)/148,000

Where L equals allowable leakage in gallons/hour
S equals length of pipeline tested in feet
D equals nominal diameter of the pipe in inches
P equals average test pressure during leakage test in psig

The hydrostatic testing allowances per 1,000 ft. of pipeline, in gallons per hour, are shown in Table 1.

3. All visible leaks shall be repaired regardless of the amount of leakage.

4. Contractor shall provide all temporary measures for removing air from the line.

4.18 Disinfect and test water mains, service lines, and accessories in accordance with AWWA Standard C651 (latest edition) and as noted with the procedures listed below.

1. Preliminary Flushing. The main shall be flushed prior to disinfection, except when the tablet method is used. Flushing shall be at a velocity of not less than 3.0 feet per second. Adequate provisions shall be made for drainage of flushing water in compliance with water quality and erosion control standards.

2. Form of Chlorine for Disinfection.

(1) Liquid chlorine shall be used only when suitable equipment is available and only under the direct supervision of a person familiar with the physiological, chemical, and physical properties of this element and who is properly trained and equipped to handle any emergency that may arise. Introduction of chlorine-gas directly from the supply cylinder is unsafe and shall not be permitted.

(2) Calcium hypochlorite contains 70 percent available chlorine by weight. It shall be either granular or tabular in form. The tablets, six to eight to the ounce, are designed to dissolve slowly in water. A chlorine-water solution shall be prepared by dissolving the granules or tablets in water in the proportion requisite for the desired concentration.

(3) Sodium hypochlorite is supplied in strengths from 5.25 to 16 percent available chlorine. The chlorine-water solution shall be prepared by adding hypochlorite to water. Product deterioration shall be reckoned with in computing the quantity of sodium hypochlorite required for the desired concentration.

Table 1 - Hydrostatic testing allowance per 1,000 lf of pipeline in gallons per hour													
Average Test Pressure (psi)	Nominal Pipe Diameter (in.)												
	2	3	4	6	8	10	12	14	16	18	20	24	30
300	0.23	0.35	0.47	0.70	0.94	1.17	1.40	1.64	1.87	2.11	2.34	2.81	3.51
275	0.22	0.34	0.45	0.67	0.90	1.12	1.34	1.57	1.79	2.02	2.24	2.69	3.36
250	0.21	0.32	0.43	0.64	0.85	1.07	1.28	1.50	1.71	1.92	2.14	2.56	3.21
225	0.20	0.30	0.41	0.61	0.81	1.01	1.22	1.42	1.62	1.82	2.03	2.43	3.04
200	0.19	0.29	0.38	0.57	0.76	0.96	1.15	1.34	1.53	1.72	1.91	2.29	2.87
175	0.18	0.27	0.36	0.54	0.72	0.89	1.07	1.25	1.43	1.61	1.79	2.15	2.68
150	0.17	0.25	0.33	0.50	0.66	0.83	0.99	1.16	1.32	1.49	1.66	1.99	2.48

(4) Application. The hypochlorite solutions shall be applied to the water main with a chemical feed pump designed for feeding chlorine solutions. Feed lines shall be of such material and strength as to withstand safely the maximum pressures that may be created by the pumps. All connections shall be checked for tightness before the hypochlorite solution is applied to the main.

3. Methods of Chlorine Application.

(1) Continuous Feed Method. Water from the existing distribution system or other approved sources of supply shall be made to flow at a constant, measured rate into the newly-laid pipeline. The water shall receive a dose of chlorine, also fed at a constant, measured rate. The two rates shall be proportioned so that the chlorine concentration in the water in the pipe is maintained at a minimum of 50 mg/l available chlorine. To assure that this concentration is maintained, the chlorine shall be measured at intervals not exceeding 2,000 feet in accordance with the procedures described in the current edition of "Standard Methods" and AWWA M12 - "Simplified Procedures for Water Examination." In the absence of a meter, the rate may be determined either by placing a pitot gage at the discharge or by measuring the time to fill a container of known volume. Table 1 gives the amount of chlorine required for each 100 feet of pipe of various diameters. Solutions of 1 percent chlorine may be prepared with sodium hypochlorite or calcium hypochlorite. The latter solution requires approximately 1 pound of calcium hypochlorite in 8.5 gallons of water.

Table 1
Chlorine Required to Produce 50 mg/l Concentration in
100 Feet of Pipe - by Diameter

Pipe Size Inches	100 Percent Chlorine Pounds	1 Percent Chlorine Solutions Gallons
4	0.027	0.33
6	0.061	0.73
8	0.108	1.30
10	0.170	2.04
12	0.240	2.88
16	0.430	5.12
20	0.675	8.00
24	0.972	11.50
30	1.500	18.01
36	2.187	25.92
42	2.977	35.28

During the application of the chlorine, valves shall be manipulated to prevent the treatment dosage from flowing back into the line supplying the water. Chlorine application shall not cease until the entire main is filled with the chlorine solution. The chlorinated water shall be retained in the main for at least 24 hours, during which time all valves and hydrants in the section treated shall be operated in order to disinfect the appurtenances. At the end of this 24 hour period, the treated water shall contain no less than 50 mg/l chlorine throughout the length of the main.

(2) Slug Method (Use only if authorized by the Owner). Water from the existing distribution system or other approved source of supply shall be made to flow at a constant, measured

rate into the newly laid pipeline. The water shall receive a dose of chlorine, also fed at a constant, measured rate. The two rates shall be proportioned so that the concentration in the water entering the pipeline is maintained at no less than 300 mg/l. The chlorine shall be applied continuously and for a sufficient period to develop a solid column or "slug" of chlorinated water that will, as it passes along the line, expose all interior surfaces to a concentration of at least 300 mg/l for at least 3 hours. As the chlorinated waters flow past tees and crosses, related valves and hydrants shall be operated so as to disinfect appurtenances. The application shall be checked at a tap near the upstream end on the line by chlorine residual measurements. Chlorine residuals are to be taken a minimum every 1,200 linear feet.

(3) Tablet Method. Use only when scrupulous cleanliness has been exercised because preliminary flushing cannot be used. Do not use this method if trench water or foreign material has entered the main or if the water is below 41 degrees F (5 degrees C). This method may be used for mains up to 12 inches in diameter and where the total length of the main is less than 2,500 feet.

a. Place tablets in each section of pipe and also in hydrants, hydrant branches, and other appurtenances. Enough tablets shall be used to ensure that a chlorine concentration of 50 mg/l is provided in the water. Attach tablets using ductile iron pipe joint lubricant, except for the tablets placed in hydrants and in the joints between the pipe sections. Place all tablets at the top of the main. If the tablets are attached before the pipe section is placed in the trench, mark the position of the tablet in the pipe and assure that the pipe is placed with the tablet at the top.

b. The following table shows the number of 5-grain HTH tablets necessary per joint of pipe to obtain 50 mg/l chlorine.

Pipe Size	Tablets per Joint
3 inch	1
4 inch	1
6 inch	2
8 inch	3
10 inch	4
12 inch	7

c. When installation is completed, fill the main with water at a velocity of less than 1 foot per second. The water shall remain in the pipe for at least 24 hours. Operate valves so that the strong chlorine solution will not flow back into the line supplying the water.

4. Final Flushing. After the applicable retention period, the heavily chlorinated water shall be flushed from the main and service lines until the chlorine concentration in the water leaving the main is no higher than that generally prevailing in the system, or less than 1 mg/l. Chlorine residual determination shall be made to ascertain that the heavily chlorinated water has been removed from the pipeline. The Contractor shall implement measures to control the discharge of super-chlorinated water to avoid violations of water quality standards.

5. Bacteriologic Tests. After final flushing and before the water main is placed in service, two samples shall be collected 16-hours apart for every 1,200 linear feet and tested for bacteriologic quality and shall show the absence of coliform organisms.

If laboratory results indicate the presence of coliform bacteria, the samples are unsatisfactory. The disinfection shall be repeated until the samples are satisfactory.

6. Cleaning, disinfection, and testing will be the responsibility of the Contractor until satisfactory results are obtained. Water for these operations will be furnished by the Owner, but the Contractor shall include in his bid the cost of loading, hauling, and discharging the water.

7. Testing and disinfection of the completed sections shall not relieve the Contractor of his responsibility to repair or replace any defective pipe. All work necessary to secure a tight line shall be done at the Contractor's expense.

SECTION C-5 - WASTEWATER SYSTEM

5.01 Description. This section specifies all sanitary sewer work on this project.

5.02 Separation of Water Lines and Sanitary Sewers.

A. Follow Virginia Department of Health standards for the separation of sanitary sewer and water distribution systems.

B. Parallel Installation.

(1) Normal Conditions. Sewer lines and manholes shall be constructed at least 10 feet horizontally from a water line whenever possible. The distance shall be measured edge-to-edge.

(2) Unusual Conditions. When local conditions prevent a horizontal separation of at least 10 feet, then maximum horizontal separation shall be provided with vertical separation of bottom of water line at least 18 inches above top of sewer. Where this vertical separation cannot be obtained, the sewer shall be constructed of AWWA approved water pipe pressure-tested in place to 50 PSI without leakage prior to backfilling. The sewer manhole shall be of watertight construction and tested in place.

C. Crossing.

(1) Normal Conditions. Sewers crossing under water lines shall be laid to provide a separation of at least 18 inches between the bottom of the water line and the top of the sewer whenever possible.

(2) Unusual Conditions. When local conditions prevent a vertical separation described in "Crossing, Normal Conditions," paragraph above, the following construction shall be used.

a. Sewers passing over or under water lines shall be constructed of cast or ductile iron pipe with mechanical joints as described in "Parallel Installation, Unusual Conditions" paragraph above.

b. Sewers passing over water lines shall be laid to provide:

(1) Vertical separation of at least 18 inches between bottom of sewer and top of water line,

(2) Adequate structural support for the sewers to prevent excessive deflection of the joints and settling on and breaking water line,

(3) Maximum separation of water and sewer line joints.

(4) Sanitary sewers or sewer manholes - no water pipes shall pass through or come in contact with any part of a sewer or sewer manhole.

5.03 Take all precautions necessary to insure that pipe, fittings, and related items are not damaged in unloading, handling, and placing in trench. Examine each piece of material just prior to installation to determine that no damage has occurred. Remove any damaged material from the site and replace with undamaged material.

1. Keep pipe clean. Exercise care to keep foreign material and dirt from entering pipe during storage, handling, and placing in trench. Close ends of in-place pipe at the end of any work period to prevent entry of animals and foreign material.

2. Bed pipe as specified in Section 3 - Trenching and Backfilling.

3. Do not lay pipe when weather or trench conditions are unsuitable.

5.04 Lay gravity sewers so as to maintain a true alignment and grade as indicated on Drawings. After completion, the pipe shall exhibit a full circle of light when lighted at one manhole and viewed from the next.

1. Commence laying gravity sewers at the lowest point on a section of line and lay pipe with the bell ends uphill. The Contractor shall verify depths of existing sewer, and locations of lateral ties as called for on project plans prior to initiating pipe laying operations to ensure adequate fall for all newly installed sewers.

2. Pipe Joint. Prior to making pipe joints on gravity sewer lines, clean and dry all surfaces of joint pipe and jointing material. Use lubricants, primers, adhesives, and similar materials as recommended by the manufacturers. Place, fit, join, and adjust the jointing materials or factory fabricated joints as recommended by the manufacturer to obtain the degree of watertightness required. As soon as possible after the joint is made, place sufficient backfill material, as specified under Section 3 - Trenching and Backfilling, along each side of the pipe to resist forces that might tend to move the pipe off line and grade.

3. Backfill as specified under Section 3 - Trenching and Backfilling. Place backfill over the pipe immediately after the pipe has been laid.

5.05 Lay pressure piping with bell ends facing the direction of laying. Where the grade is greater than 10 percent, pipe shall be laid with bell ends upgrade.

5.06 Join mechanical joint pipe as follows:

1. Thoroughly clean inside of the bell and 8 inches of the outside of the spigot end of the joining pipe to remove oil, grit, excess coating, and other foreign matter from the joint. Apply gasket lubricant. Slip cast-iron gland on spigot end with lip extension of gland toward end of pipe.

2. Push the spigot end forward to seat in the bell. Then carefully press the gasket into the bell so that it is located evenly around the joint. Move the gland into position, insert bolts, and screw nuts up finger tight. Then tighten all nuts to torque listed below.

Bolts Size - Inches	Torque Feet - Pounds
5/8	40 - 60
3/4	60 - 90
1	70 - 100
1-1/4	90 - 120

3. Tighten nuts on alternate sides of the gland until pressure on the gland is equally distributed.

4. Join lock-type mechanical joint pipe according to manufacturer's recommendations.

5. Permissible deflection in mechanical joint pipe shall not be greater than listed in AWWA C600.

6. Permissible deflection in lock-type mechanical joint pipe shall be as recommended by manufacturer.

5.07 Join ductile iron push-on joint pipe as follows:

1. Thoroughly clean inside of the bell and 8 inches of the outside of the spigot end of the joining pipe to remove oil, grit, excess coating, and other foreign matter. Flex rubber gasket and insert in the gasket recess of the bell socket. Apply a thin film of gasket lubricant supplied by pipe manufacturer to either the gasket or the spigot end of the joining pipe.

2. Start spigot end of pipe into socket with care. The joint shall then be completed by forcing the plain end to the bottom of the socket with a forked tool or jack type device. Field cut pipe shall have the end filed to match the manufactured spigot end.

3. Join restrained push-on joints according to manufacturer's recommendations.

4. Permissible deflection in push-on joint pipe shall not be greater than listed in AWWA C600.

5. Permissible deflection in restrained push-on joint pipe shall be as recommended by manufacturer.

5.08 Join polyvinylchloride (PVC) pipe as recommended by the manufacturer using rubber ring gaskets in bell joints or solvent weld as applicable.

1. Install PVC gravity sewer pipe and fittings in accordance with ASTM D 2321 "Underground Installation of Flexible Thermoplastic Sewer Pipe" and in accordance with the manufacturer's recommendation. Refer to Standard Detail in these specifications for bedding and backfill information.

2. Store PVC gravity sewer pipe in accordance with the manufacturer's recommendations on flat even surfaces and maintain racked on the pallets as delivered to the job site until such time as the trench is ready for placement of the pipe; i.e., PVC pipe shall not be strung out on the job site. Any pipe damaged as a result of improper storage shall not be installed.

5.09 Join pipe of different materials using approved adaptor coupling.

5.10 Construct manhole channel with smooth semicircular bottoms matching inside diameters of the connecting sewers. Change directions of flow with a smooth curve of as large a radius as the manhole size will permit. Change size and grade of channels gradually and evenly. Manhole benches shall be smooth and shall have slope between 2 and 4 inches per foot toward the channels.

5.11 Install marking tape and tracer wire according to Standard Details.

5.12 For sanitary sewer force mains, install sewer line location marker posts every 500 feet, at changes in direction, and at appurtenances along sewer force main. Install marker post as recommended by the manufacturer.

5.13 Setting of Valves and Valve Boxes:

1. Install valves with operator stems in the vertical plane through the pipe axis and perpendicular to the pipe axis. Locate valves where shown on Drawings. Thoroughly clean before installation. Check valves for satisfactory operation.

2. Equip all underground valve operators with valve box adaptors and valve boxes. Set box in alignment with valve stem centered on valve nut. Set the valve box to prevent transmitting shock or stress to the valve. Set the box cover flush with the finished ground surface or pavement.

3. All valve boxes and manhole frames and covers located between edge of pavement and ditch line shall be installed approximately 1 inch below the finished grade. When located in the pavement, they shall be placed flush with the pavement surface unless otherwise directed by the Owner or noted on the plans.

5.14 Install combination air release/vacuum valve assembly at locations indicated on the Drawings and at all high points on the sanitary sewer force main. Installation shall be in accordance with the Standard Details.

5.15 Encase gravity sewers and sanitary sewer force mains crossing under highways and railroads in a larger pipe or conduit called a casing pipe. The casing pipe shall be of the diameter and wall thickness indicated on the Drawings. Joining of steel casing pipe shall meet requirements of AWWA C206 "Standard for Field Welding of Steel Water Pipe Joints." Install casing pipe by jacking or boring.

1. Installation under highways shall meet requirements of VDOT Road and Bridge Specifications and the VDOT Land Use Permit. Seal up casing pipe ends to protect against foreign matter. Prior to beginning work, notify VDOT. Installation under railroads shall be in accordance with AREMA and the utility crossing railroad permit. Prior to beginning work, notify the railroad.

2. The Contractor shall determine for himself the existing conditions both above and below ground prior to installation. The Contractor shall be responsible for installing the casing pipe and the carrier pipe to the required lines and grades.

3. The carrier pipe shall be centered within the casing pipe by the use of casing spacers. Placement intervals for casing spacers shall be as indicated on the Standard Detail or based on manufacturer's recommendation, whichever is more stringent.

4. The seals at each end of the casing pipe shall be preformed flexible rubber seals with stainless steel bands.

5.16 Force main and pressure pipe tests shall be as follows:

1. Supply the pumps, water, calibrated gages and meters, and all the necessary apparatus. Notify the Owner at least 48 hours in advance of the test date and perform tests in the presence of the Owner.

2. Hydrostatic Pressure Test: After the line has been backfilled, a hydrostatic pressure test shall be performed. Carefully fill the system with water at a velocity of approximately 1 foot per second while necessary measures are taken to eliminate all air. After the system has been filled, raise the pressure by pump to 150 PSIG or 1.5 times the working pressure, whichever is greater. Measure pressure at lowest point in system with gage compensated for elevation. Maintain this pressure for at least 2 hours. If pressure cannot be maintained, determine the cause, repair, and repeat the test until successful.

3. A leakage test shall be conducted concurrent with the pressure test. Use calibrated meter to determine leakage. Leakage shall be defined as the quantity of water that must be supplied into the pipe to maintain working pressure, after all air in the pipe line has been expelled and the pipe has been filled with water. Leakage shall not exceed the quantity determined by the formula given below. If leakage exceeds that determined by formula, find and repair the leaks and repeat the test until successful. The formula is as follows:

(1) L equals SD (square root of P)/148,000

(2) Where:

L equals allowable leakage in gallons/hour
S equals length of pipeline tested in feet
D equals nominal diameter of the pipe in inches
P equals average test pressure during leakage test in PSIG

4. All visible leaks shall be repaired.

5. Contractor shall provide temporary air bleed off fittings.

5.17 Testing Gravity Sewer Lines and Manholes.

1. Manhole testing shall be done by vacuum testing. The test shall be made using an inflatable compression band, vacuum pump, and appurtenances specifically designed for vacuum testing manholes. Test procedures shall be in accordance with ASTM C 1244 except the more restrictive requirement in (3) as indicated below.

(1) Manhole acceptance shall be based upon a test after the manhole is backfilled and the cover frame castings are set in place. Test shall include assessment of frame seal to manhole riser.

(2) All lift holes shall be plugged with nonshrink grout and all pipes shall be plugged, taking care to securely brace the plugs and pipe. Plugs shall be tied to an immobile object.

(3) After the testing equipment is in place, a vacuum of 10 inches of HG shall be drawn on the manhole. The manhole will be considered to have passed the test if the vacuum does not drop more than 1 inch of HG within the times shown in Table I.

(4) If the manhole fails the initial test, the Contractor shall locate the leakage and make proper repairs, and retest until a satisfactory test result is obtained.

(5) After the manholes have been backfilled and the cover frame casting sealed in place, and prior to final acceptance of the project, any signs of leaks or weeping visible from the inside of the manhole shall be repaired and the manhole shall be retested.

Table I
Vacuum Test for Manholes
Based on ASTM C 1244

Minimum times for various manhole diameters for pressure drop from 10 inches to 9 inches HG					
	Manhole Diameter, Inches				
Depth (ft)	48	54	60	66	72
	Time (seconds)				
6	15				
8	20	23	26	29	33
10	25	29	33	36	41
12	30	35	39	43	49
14	35	41	46	51	57
16	40	46	52	58	67
18	45	52	59	65	73
20	50	53	65	72	81

2. Test for leakage of installed gravity sewers by low pressure air test, exfiltration, or infiltration test as approved and to the satisfaction of the Owner. Tests shall be conducted on short sections of sewer line; i.e., between manholes. The Contractor shall provide all labor, material, tools, and equipment necessary to make the tests. Equipment and methods used shall be acceptable to the Owner. Monitoring gages shall be subject to calibration if deemed necessary by the Owner. Sewer lines, regardless of size, that cross under streams shall be tested for and exhibit zero infiltration. If any part of the sewer line fails the leakage test, the problem shall be corrected by the Contractor.

   Before final acceptance, all gravity sewers shall be televised and recorded at a velocity of no more than 6" per second at a minimum resolution of 480 x 640 pixels. Lateral connections shall be televised at a full stop position and at a 90 degree angle from the gravity sewer. The Contractor shall provide the Owner with the video inspection media for review. Televised inspection recordings shall include verbal audible narrative or textual description of beginning and ending manhole locations. The Contractor shall provide all labor, material, tools, and equipment necessary to make the inspection record.

3. Low pressure air tests may only be used on pipe diameters 12 inches or less and shall comply with ASTM F 1417.

   (1) If the pipe to be tested is submerged in groundwater, the test pressure shall be increased 1.0 PSI for every 2.31 feet the groundwater level is above the invert of the sewer. To determine groundwater level, the Contractor shall install a 4-inch PVC pipe on the outside of the manhole from the base of the manhole to above ground level. The bottom of this pipe shall be placed in a minimum of 18 inches of pipe bedding material to allow groundwater to enter the bottom of the pipe. Immediately prior to the line test, the groundwater elevation shall be determined by measuring down to the surface of the water in the PVC pipe from ground level. The PVC pipe shall be cut off below grade and capped or filled after an acceptable test has been obtained.

   (2) Other methods of determining groundwater level may be used subject to approval of the Owner.

   (3) It is extremely important that the various plugs be installed and braced in such a way as to prevent blowouts. A force of 250 pounds (1120 N) is exerted on an 8-inch (200-millimeter) plug by an internal pipe pressure of 5 PSI (35 KPA). It should be realized that sudden expulsion of a poorly installed plug or of a plug that is partially deflated before the pipe pressure is released can be dangerous.

      a. As a safety precaution, pressurizing equipment shall include a regulator or relief valve set at 10 PSI (70 KPA) to avoid over-pressurizing and damaging an otherwise acceptable line. No one shall be allowed in the manholes during testing. All plugs shall be secured with tethers to immobile objects to insure they are not flushed downstream as they are removed.

   (4) Table. Air test table was prepared in accordance with ASTM F1417 (Plastic Pipe) formulas.

4. Safety and operation procedures recommended by the equipment manufacturer shall be reviewed and adhered to at all times.

5. Allowable leakage of pipe using infiltration or exfiltration tests shall be limited to 100 gallons per day per inch diameter per mile or 2,400 gallons per day, whichever is less. If groundwater is 4 feet above top of pipe, use infiltration test. If groundwater is less than 4 feet above top of pipe, fill pipe and upstream manhole to produce a minimum 4-foot head over the top of pipe, let stand for 12 hours, refill manhole to original level, and conduct exfiltration test for 1 hour.

Table II
Air Test Table PVC Gravity Sewer
Based on ASTM F1417

Minimum test time in minutes: seconds for pressure drop from 3.5 to 2.5 PSIG

Plastic Pipe diameter d (in)	Minimum time T (min:sec)	Length for minimum time L (ft)	Time for longer length (sec)	Minimum specified time (T) required for 1.0 PSIG pressure drop for size and length of PVC pipe indicated Allowable leakage Q = 0.0015 cu.Ft./min. per sq.ft. of internal pipe surface area T = 0.085DK/Q K=0.000419DL for K > 1, otherwise K=1 Specification time for length shown (min:sec)						
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft
4	3:46	597	.380 l	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	.854 l	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520 l	7:34	7:34	7:34	7:34	7:36	8:52	10:08
10	9:26	239	2.374 l	9:26	9:26	9:26	9:53	11:52	13:51	15:49
12	11:20	199	3.418 l	11:20	11:20	11:24	14:15	17:05	19:56	22:47

SECTION C-6 - SEEDING

6.01 Description. This section specifies all seeding work on this project.

6.02 Fertilizer shall meet requirements of Federal Specification O-F-241. Provide fertilizer that is complete, inorganic, uniform in composition, and suitable for application with approved equipment. Proportions of fertilizer nutrients shall be multiples of the following:

10 pounds of actual Nitrogen
20 pounds of actual Phosphate
10 pounds of actual Potash

6.03 Grass seed, tested within 6 months of sowing, shall have the following characteristics:

1. Permanent Seeding.

Species	Percentages (Minimum) Weight	Purity	Germination
Kentucky 31 Tall Fescue	95	97	85
Improved Perennial Ryegrass	2.5	98	90
Kentucky Bluegrass	2.5	97	85

2. Temporary Seeding.

Seeding Date	Species	Percentages (Min.) Wgt.	Purity	Germ.	Seeding Rate Pounds per acre
Feb 15-Apr 30	Oats	100	98	85	100
May 1-Aug 31	Millet	100	98	80	50
Sept 1-Nov 15	Rye	100	96	85	110

6.04 Lime shall be ground agricultural grade limestone containing not less than 85 percent calcium and magnesium carbonates. Fineness shall be such that 100 percent will pass a No. 20 sieve, and not less than 50 percent will pass a No. 100 sieve. Burnt lime or hydrated lime may be substituted in equivalent carbonates, if requested.

6.05 Materials shall be delivered in unbroken containers, clearly marked by the manufacturer as to contents. Seed, limestone, and fertilizer shall be labeled as to proportions, analysis, and quality. Store all materials in a manner affording protection from damage by weather or vandalism.

6.06 Seed only when wind velocity is less than 15 miles per hour.

6.07 All soil areas disturbed by the Contractor during his construction operations shall be seeded. Whenever the disturbed area is part of a residential lawn, it shall be hand raked thus removing rocks and clodded dirt to the satisfaction of the Owner and the property owner. The Contractor shall reseed any areas where a sufficient stand of grass is not obtained as determined by the Owner.

6.08 Soil Tests. The Contractor shall collect a minimum of one soil sample for every 2 acres, or 2,500 linear feet along linear projects, of land to be seeded and send the samples to the Cooperative Extension Service Soil

Testing Laboratory at Virginia Tech, or by a reputable commercial laboratory for analysis to determine the appropriate amounts of lime and fertilizer to be applied for the various vegetation to be established. Adjustments to the application rates of lime and fertilizer shall be made based on the results of the soils analysis.

6.08 Temporary Seeding.

1. Restore topsoil to original depth or 6 inches.

2. Use in areas when final grading has not been completed or when permanent seeding cannot be done due to the specified permanent seeding dates, or project sequencing requires disturbing the area in a secondary phase of work.

3. Apply fertilizer at a rate of 10 pounds of 10-10-10 per 1,000 square foot (450 pounds per acre) or equivalent. Never apply more than 1 pound of water soluble nitrogen per 1,000 square feet within a 30 day period.

4. Apply lime at a rate determined by the soils analysis. If a soils analysis has not been performed apply lime at the rate of 90 pounds per 1,000 square feet (2 tons per acre).

5. For loose soil, work lime and fertilizer into soil and then seed. For packed or hard soil, loosen top layer while working lime and fertilizer into soil and then seed at the rate required for the temporary seeding species.

6.09 Prepare soil for permanent seeding and hydroseeding by tillage of topsoil in place to loosen thoroughly and break up all clods to a depth of 6 inches. Remove all stumps and roots, coarse vegetation, stones larger than 1-1/2 inches, and all construction debris. Soil shall be worked by suitable agricultural equipment to a depth of not less than 4 inches. Rake to a uniform, smooth, and drainable surface.

1. Apply lime and fertilizer uniformly and mix well into top 4 inches of seed bed. Apply lime at the rate determined by the soils analysis. If a soils analysis has not been performed apply lime at the rate of 90 pounds per 1,000 square feet (2 tons per acre). Apply fertilizer at the rate determined by the soils analysis. If a soils analysis has not been performed apply 10-20-10 fertilizer the equivalent rate of 12 pounds per 1,000 square feet (500 pounds per acre). Rates should be adjusted for other grades of fertilizer. Use controlled release fertilizer and lime. Never apply more than 1 pound of water soluble nitrogen per 1,000 square feet within a 30 day period.

6.10 Sow permanent grass seed between dates of March 1 and April 15 or September 1 and October 15.

6.11 Sow seed by mechanical seeder as follows:

1. Broadcast at rate of 6 pounds of grass seed per 1,000 square feet in cross directions to ensure uniform distribution. Rake surface lightly and roll with appropriate type of lawn roller weighing maximum of 150 pounds per foot of width.

2. Apply either Type I or Type II mulch.

(1) Type I Mulch. Apply uniformly at the following rates:

Straw - 70-90 pounds per 1,000 square feet

Wood Fiber - 25-50 pounds per 1,000 square feet

(2) Anchor Type I mulch by the following methods:

Apply light tack coat of asphalt emulsion (10 gallons per 1,000 square feet).

In residential areas, apply a synthetic mulch binder at rate recommended by manufacturer.

On slopes steeper than 4 horizontal to 1 vertical, secure heavy jute mesh with staples over Type I mulch.

(3) Type II Mulch (Hold/Gro, Curlex, or equal). Apply on slopes 3:1 or steeper and in areas of concentrated flow in accordance with manufacturer's instructions where shown on the Drawings.

6.12 Sow seed by hydroseeding as follows:

1. Mix lime, seed, fertilizer, and wood cellulose fiber in required amount of water to produce a homogeneous slurry. Hydroseeding mix shall incorporate a 16-45-7 seed starting fertilizer to promote germination at a rate of 35 pounds per acre. The above ingredients shall be added and mixed in the following order: lime at 15 pounds per acre, seed at 260 pounds per acre, fertilizer at 35 pounds per acre, and ample wood cellulose fiber to make a slurry. All ingredients are to be designed for use in hydroseeding operations. After thoroughly mixed, apply uniformly at the rate of 260 pounds of grass seed per acre, dry weight.

2. The above mixture shall be applied within 3.0 hours from the time of mixing.

3. All mixtures shall be constantly agitated from the time they are mixed until they are applied to the seed bed.

4. Immediately following the application of the seed slurry mix, make separate application of wood cellulose mulch at the rate of 1,500 pounds, dry weight, per acre.

6.13 Remove all soiling or staining of finished walks, drives, and parking areas resulting from seeding work. Maintain paved areas in clean condition.

6.14 Maintenance of Permanent Seeding.

1. Reseed and mulch areas which do not exhibit a uniform stand of grass within 6 weeks, provide additional topsoil as required.

2. In the event that growth is not established by final project inspection, continue the specified attention until stand is accepted by the Owner.

3. Correct or repair all undue settling as evidenced by complaints received within 1 year after Substantial Completion.

SECTION D

STANDARD DETAILS

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SECTION - D

TABLE OF CONTENTS - DETAILS

COMMON

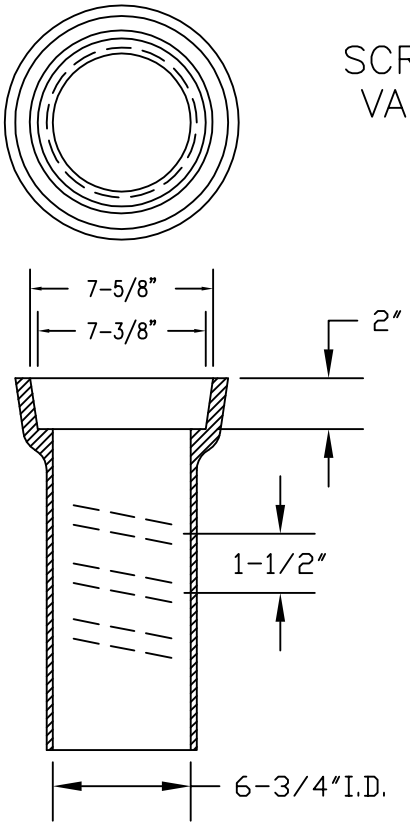
WATER

TABLE OF CONTENTS - DETAILS

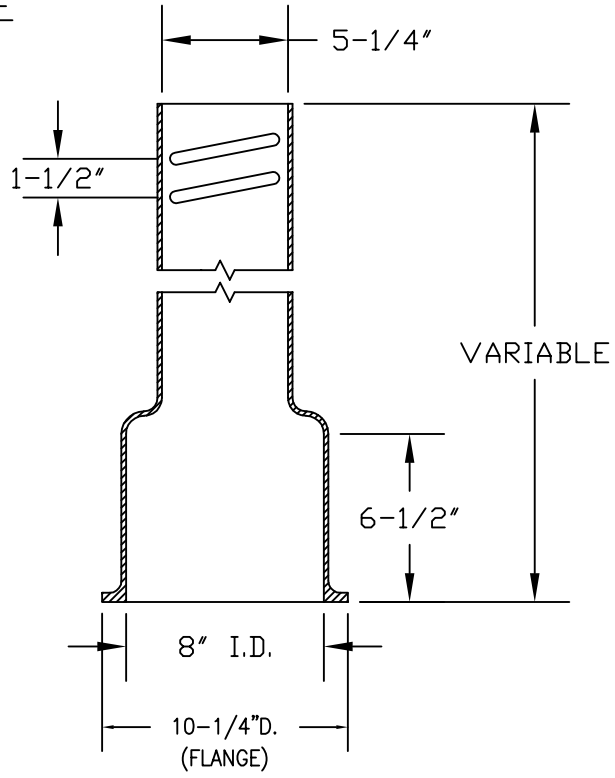
WASTEWATER

CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY

SCREW TYPE VALVE BOX



TOP SECTION



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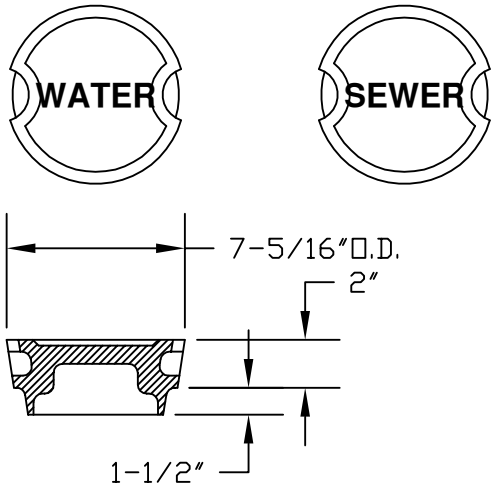
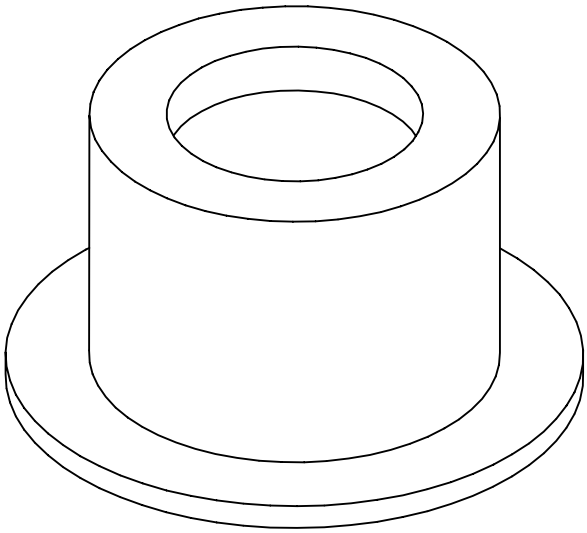


COVER

WATER & SEWER VALVE BOX AND COVER	DATE: APR. 2019 REVISION:	DWG. NO. C-110

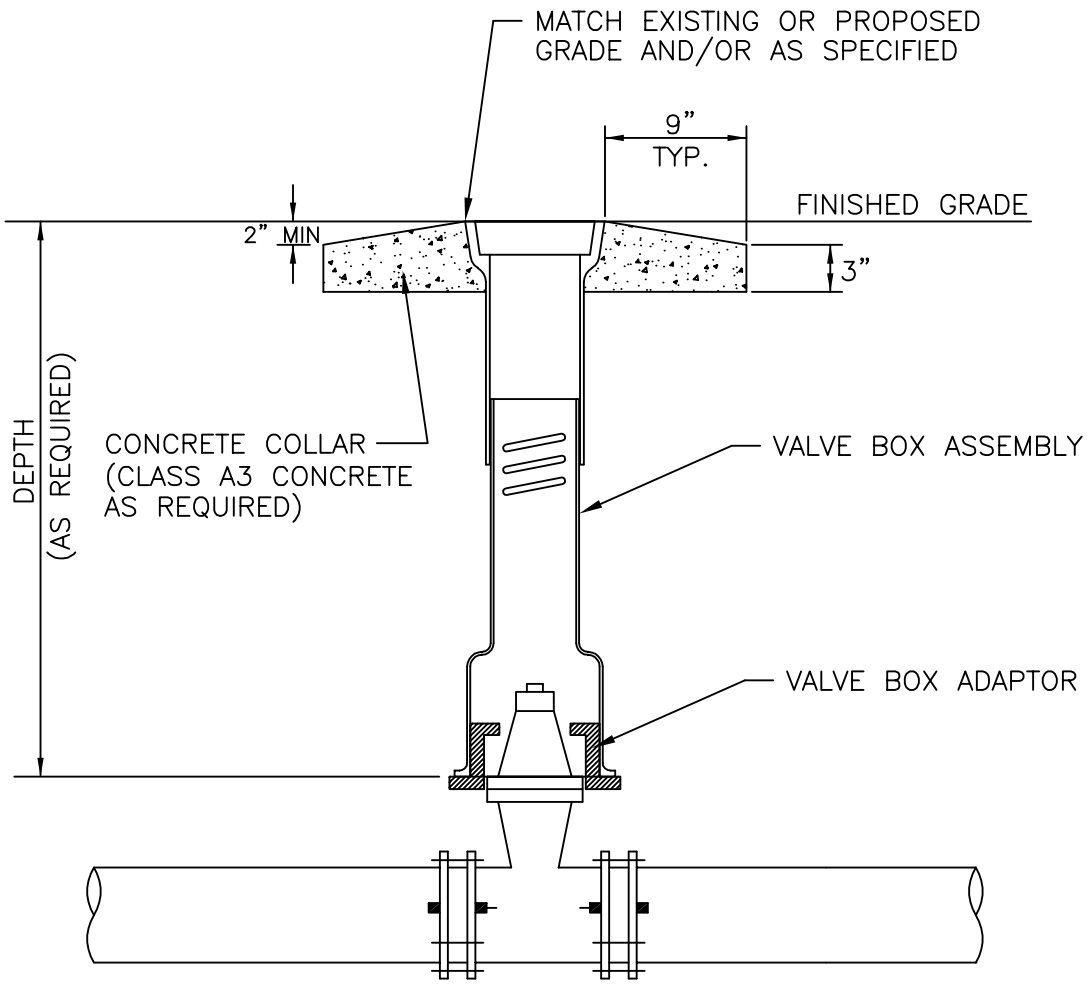
CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY



VALVE BOX ADAPTOR
(TYPE A–H)

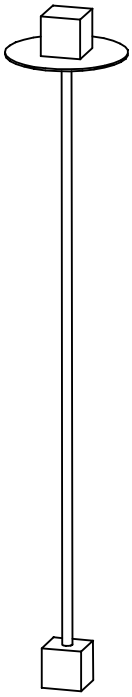
VALVE BOX ADAPTOR	DATE: **APR. 2019**	DWG. NO.
	REVISION:	C–120

CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY



VALVE BOX INSTALLATION	DATE: APR. 2019	DWG. NO.
	REVISION:	C–130

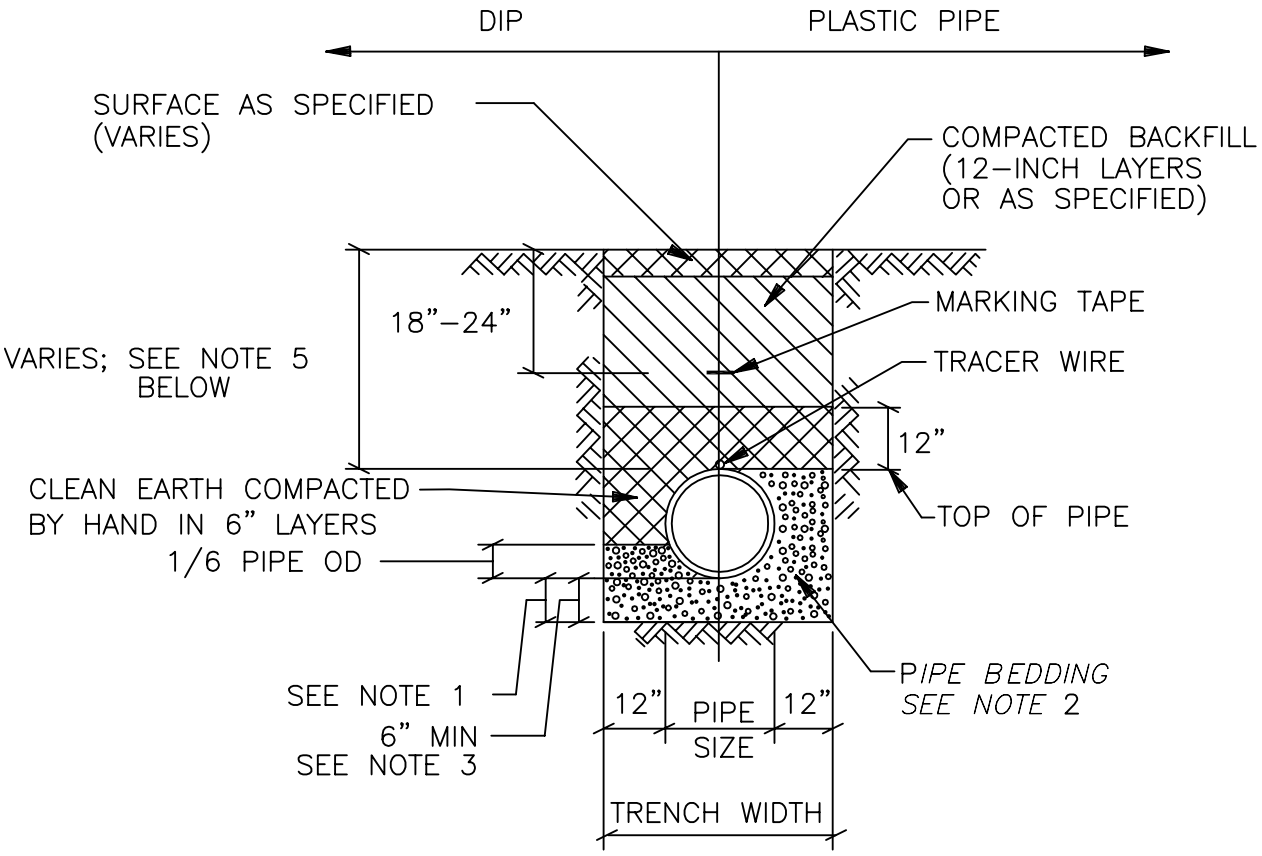
CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY



CENTERING RING TO KEEP ALIGNED IN VALVE BOX. 2" SQUARE SOCKET ON ONE END AND 2" SQUARE NUT ON THE OTHER.

VALVE STEM EXTENSION	DATE: **APR. 2019** REVISION:	DWG. NO. C-140

CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY

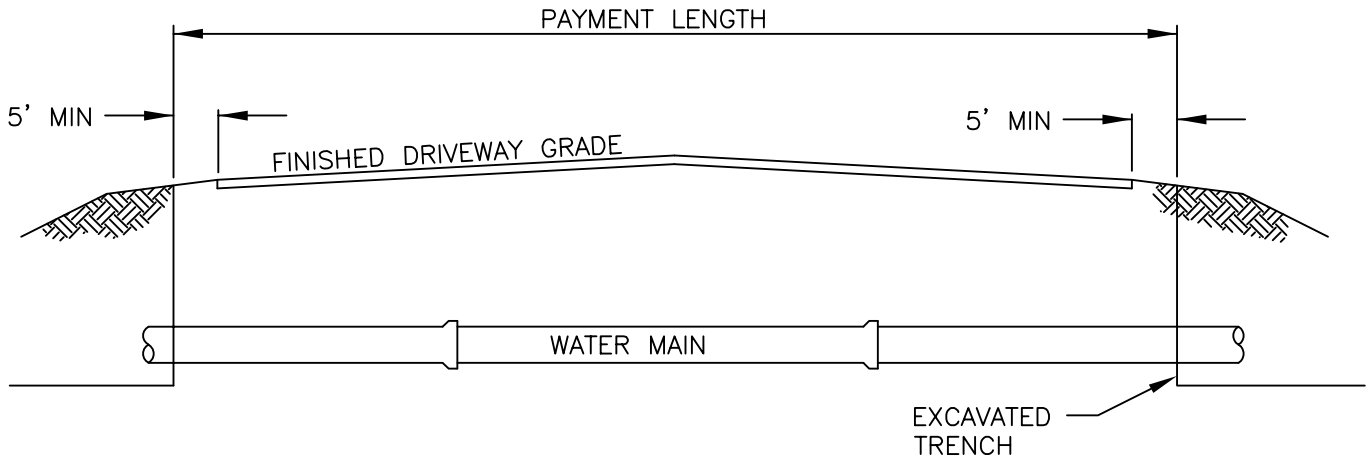


NOTES:

1. 4" MIN BEDDING REQUIRED FOR DUCTILE IRON PIPE LARGER THAN 12", AND FOR ALL PIPE SIZES WHEN COVER EXCEEDS 10 FEET.
2. BEDDING FOR PLASTIC PIPE SHALL BE FROM TOP OF PIPE TO 6" MIN. BELOW PIPE.
3. DEPTH OF BEDDING FOR ALL TYPES OF PIPE SHALL BE 6" WHEN TRENCH BOTTOM IS LOCATED IN ROCK.
4. BEDDING STONE SHALL BE #57 OR #68.
5. MIN COVER FOR WATER PIPE SHALL BE 36" MIN FOR PIPE DIAMETERS SMALLER THAN 12" AND 48" FOR PIPE DIAMETERS 12" AND GREATER. MIN COVER FOR SEWER PIPE SHALL BE 48". MIN COVER IF WITHIN RIGHT OF WAY SHALL BE 36" BELOW EDGE OF PAVEMENT.

PIPE TRENCH	DATE: APR.2019	DWG. NO.
	REVISION:	C–150

CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY



NOTES:

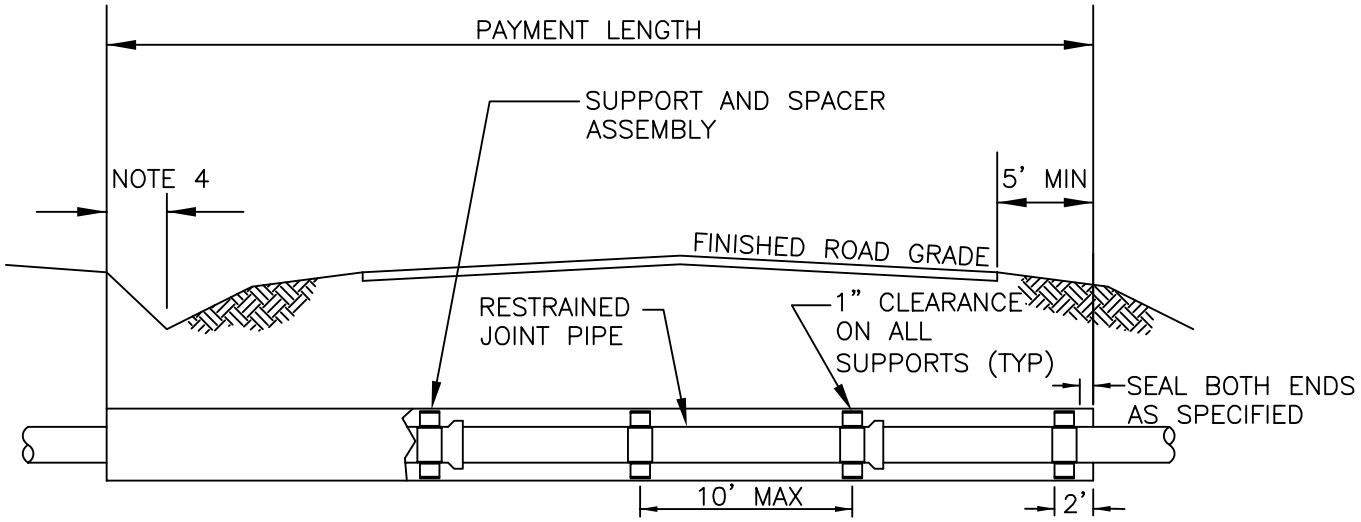
1. DUCTILE IRON WATER LINE PIPE SHALL BE JACKED UNDER PAVED DRIVEWAYS AS DIRECTED BY THE AUTHORITY.

2. NO CASING PIPE REQUIRED UNDER DRIVEWAYS.

3. CONTRACTOR SHALL BE CAREFUL NOT TO DAMAGE THE EXISTING PAVEMENT WITH MATERIALS OR EQUIPMENT. ANY DAMAGES SHALL BE REPAIRED TO THE AUTHORITY'S SATISFACTION.

FREE BORE AND JACK	DATE: **APR. 2019**	DWG. NO.
	REVISION:	C-160

CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY



2 SUPPORTS PER PIPE JOINT, EVENLY SPACED (3 SUPPORTS PER PIPE JOINT FOR PIPE LARGER THAN 16" DIA.)

NOTES:

1. STEEL CASING SHALL EXTEND TO A MINIMUM OF 5' BEYOND THE EDGE OF ROADWAY.
2. STEEL CASING PIPE SHALL BE 0.500" WALL, ASTM A139, GRADE B OR 0.375" WALL, ASTM A53 STANDARD WEIGHT CLASS.
3. ROAD CROSSING FOR SERVICE LINES SHALL BE IN ACCORDANCE WITH WATER SERVICE CONNECTION DETAILS.
4. CASING SHALL EXTEND A MIN. OF 3' BEYOND DITCH INVERT IF DITCH INVERT IS LESS THAN 8' FROM EDGE OF PAVEMENT.

MINIMUM CASING SIZE

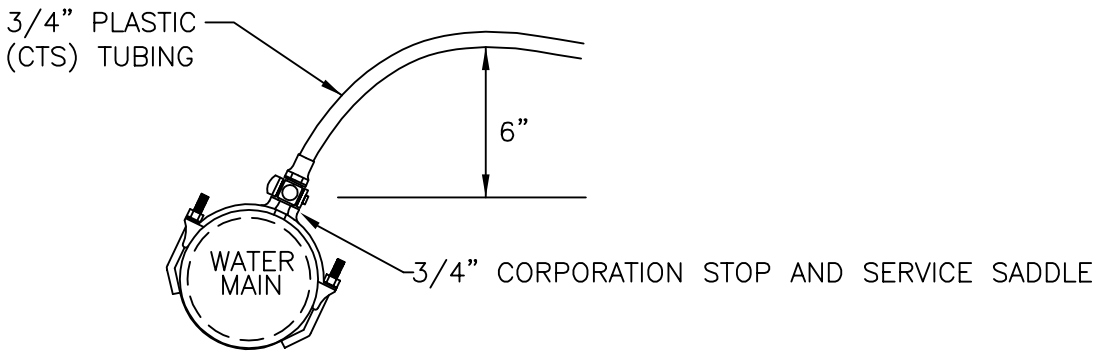
CARRIER PIPE	STEEL CASING PIPE	WALL THICKNESS FOR ASTM A53 (FOR ROADS)	WALL THICKNESS FOR ASTM A139 (FOR ROADS)
6"	16"	0.375"	0.500"
8"	18"	0.375"	0.500"
12"	24"	0.375"	0.500"
16"	30"	0.375"	0.500"
20"	36"	0.375"	0.500"

BORED CROSSING WITH CASING PIPE

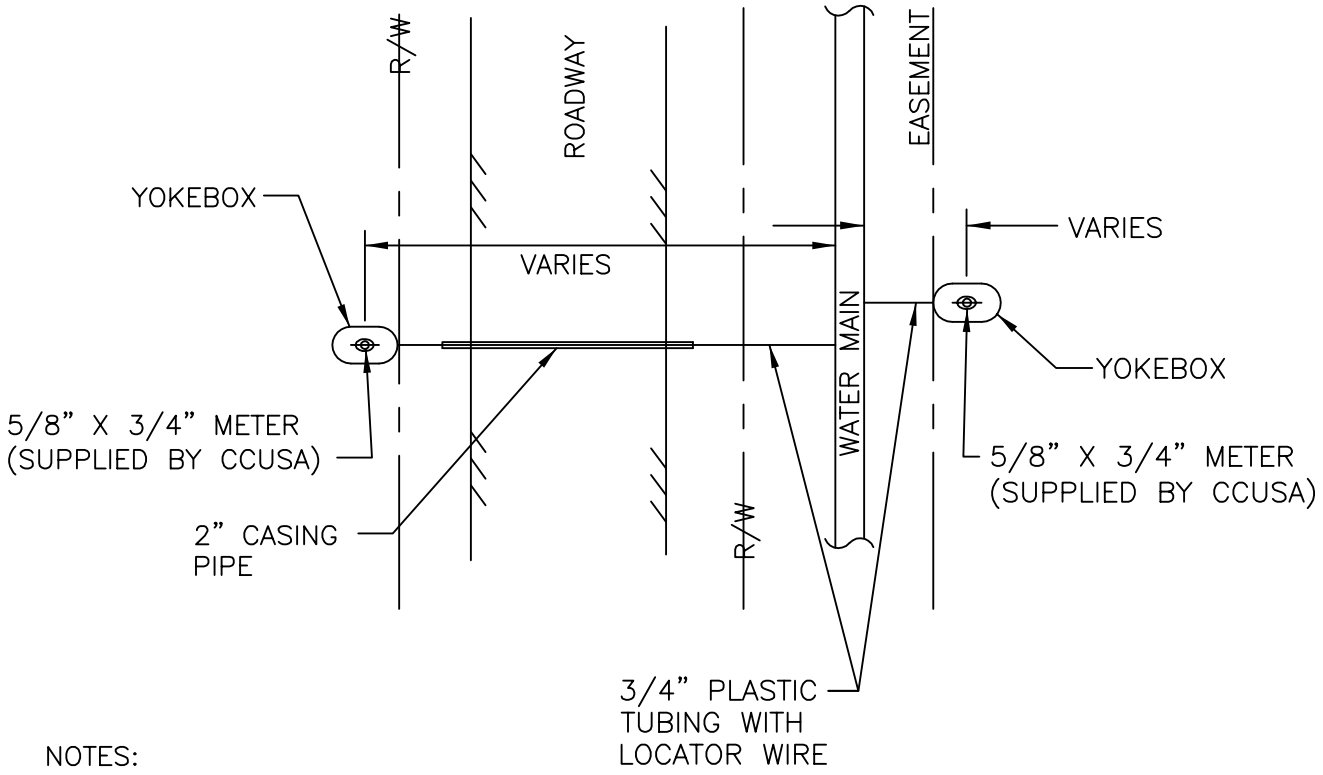
DATE: APR. 2019
REVISION:

DWG. NO. C-170

CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY



CONNECTION DETAIL



NOTES:

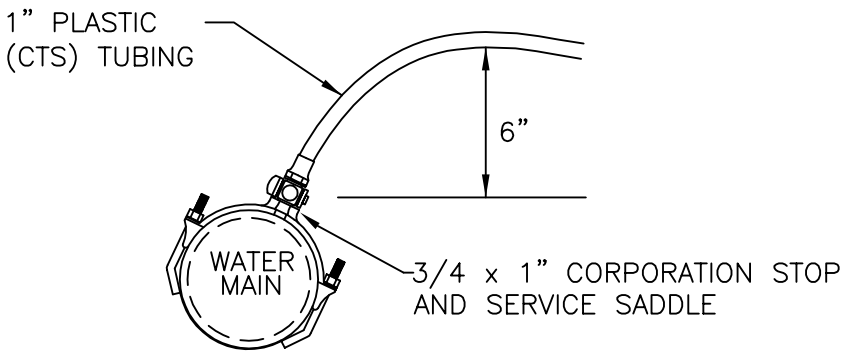
1. MAINTAIN 3' OF COVER FOR ALL SERVICE LINES. METER BOX FRAME AND COVER TO BE INSTALLED FLUSH WITH EXISTING GRADE.

2. LOCATOR WIRE SHALL BE INSTALLED ALONG ENTIRE LENGTH OF SERVICE AND SHALL BE 12 AWG SOLID CONDUCTOR, COPPER CLAD STEEL. THE STEEL CORE SHALL BE AISI 1006 OR 1010 FOR DIRECT BURY AND AISI 1055 FOR DIRECTIONAL DRILLING AND BORING.

3. 2" CASING PIPE SHALL BE BORED UNDER ROADWAYS AND EXTEND A MINIMUM OF 3' BEYOND THE EDGE OF THE PAVEMENT ON EACH SIDE.

3/4" SINGLE SERVICE CONNECTION	DATE: **DEC. 2016**	DWG. NO.
	REVISION:	**W–110**

CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY



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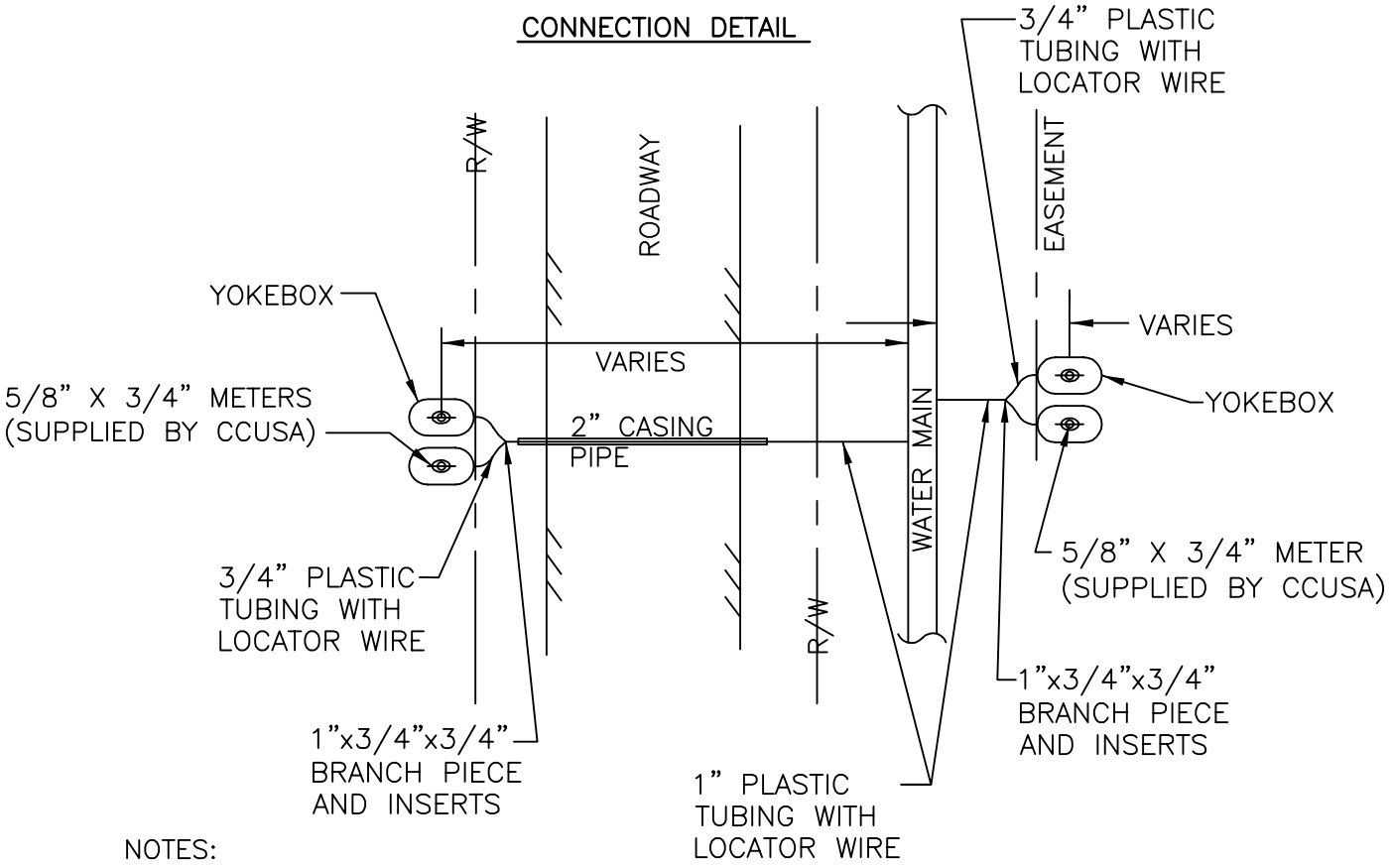


NOTES:

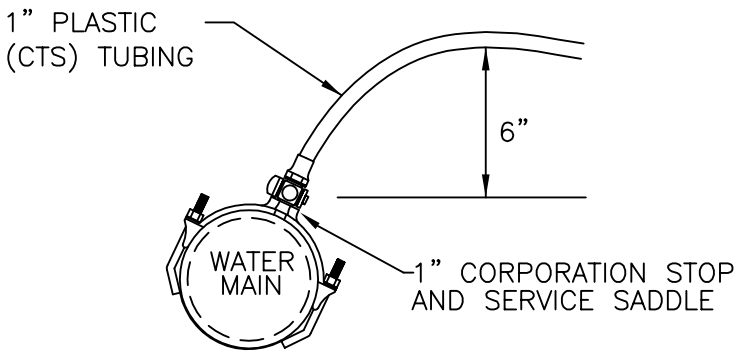
1. MAINTAIN 3' OF COVER FOR ALL SERVICE LINES. METER BOX FRAME AND COVER TO BE INSTALLED FLUSH WITH EXISTING GRADE.

2. LOCATOR WIRE SHALL BE INSTALLED ALONG ENTIRE LENGTH OF SERVICE AND SHALL BE 12 AWG SOLID CONDUCTOR, COPPER CLAD STEEL. THE STEEL CORE SHALL BE AISI 1006 OR 1010 FOR DIRECT BURY AND AISI 1055 FOR DIRECTIONAL DRILLING AND BORING.

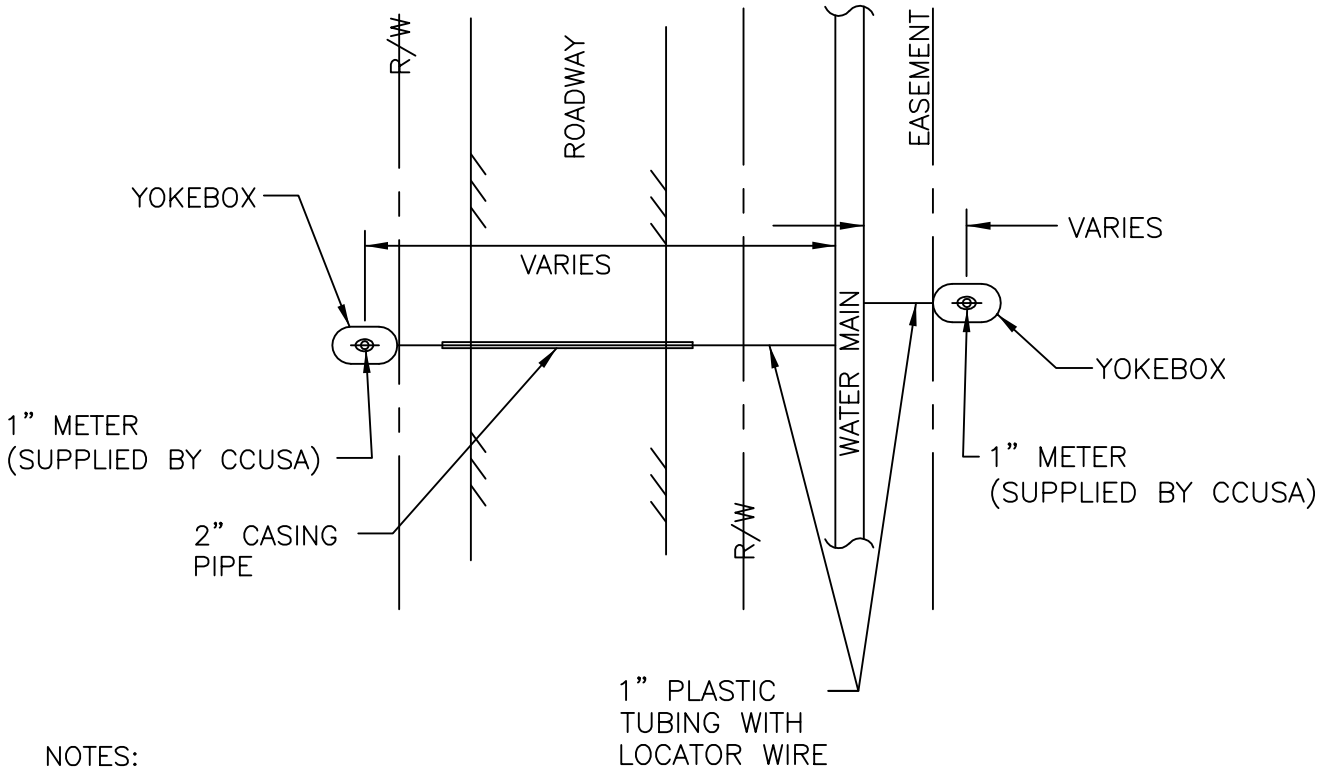
3. 2" CASING PIPE SHALL BE BORED UNDER ROADWAYS AND EXTEND A MINIMUM OF 3' BEYOND THE EDGE OF THE PAVEMENT ON EACH SIDE.

3/4" DOUBLE SERVICE CONNECTION	DATE: **DEC. 2016**	DWG. NO.
	REVISION:	**W–120**

CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY



CONNECTION DETAIL



NOTES:

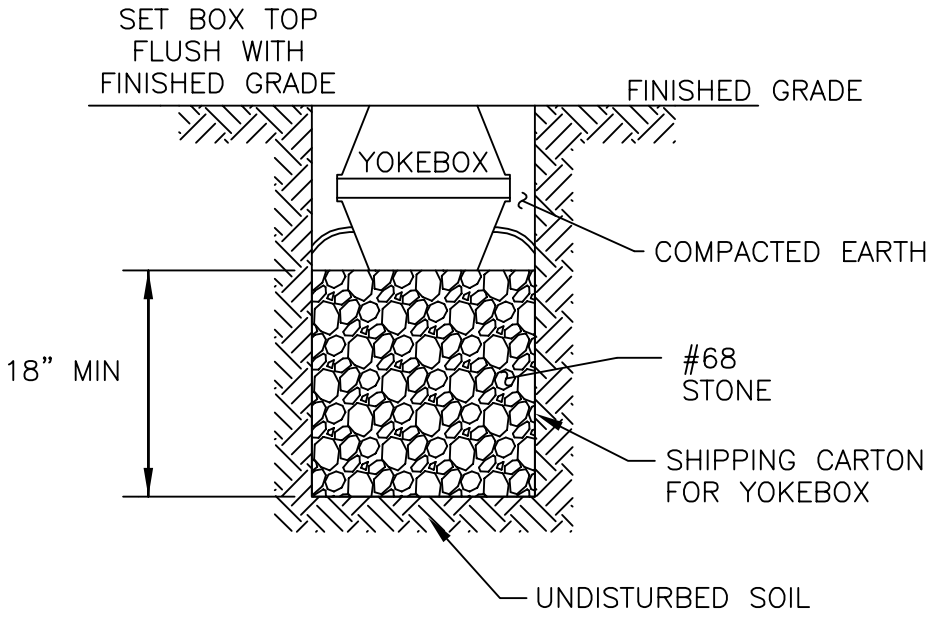
1. MAINTAIN 3' OF COVER FOR ALL SERVICE LINES. METER BOX FRAME AND COVER TO BE INSTALLED FLUSH WITH EXISTING GRADE.

2. LOCATOR WIRE SHALL BE INSTALLED ALONG ENTIRE LENGTH OF SERVICE AND SHALL BE 12 AWG SOLID CONDUCTOR, COPPER CLAD STEEL. THE STEEL CORE SHALL BE AISI 1006 OR 1010 FOR DIRECT BURY AND AISI 1055 FOR DIRECTIONAL DRILLING AND BORING.

3. 2" CASING PIPE SHALL BE BORED UNDER ROADWAYS AND EXTEND A MINIMUM OF 3' BEYOND THE EDGE OF THE PAVEMENT ON EACH SIDE.

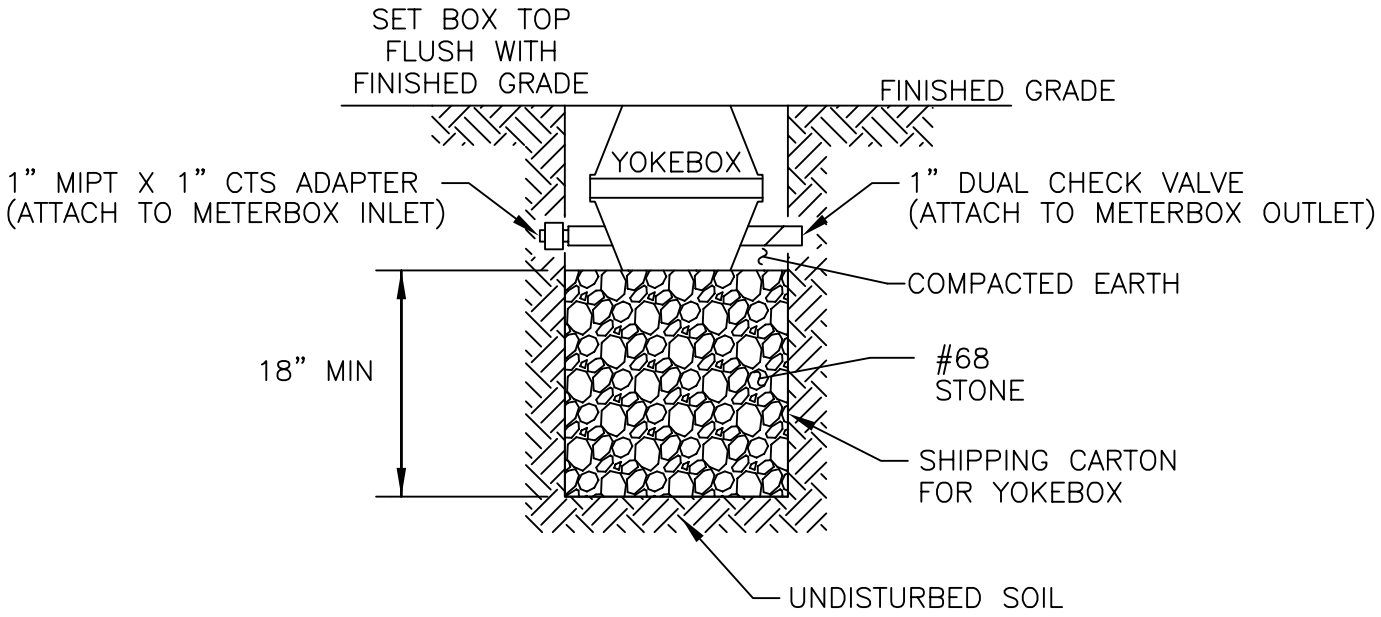
1" SINGLE SERVICE CONNECTION	DATE: **DEC. 2016**	DWG. NO.
	REVISION:	**W–130**

CAMPBELL COUNTY UTILITIES
AND SERVICE AUTHORITY



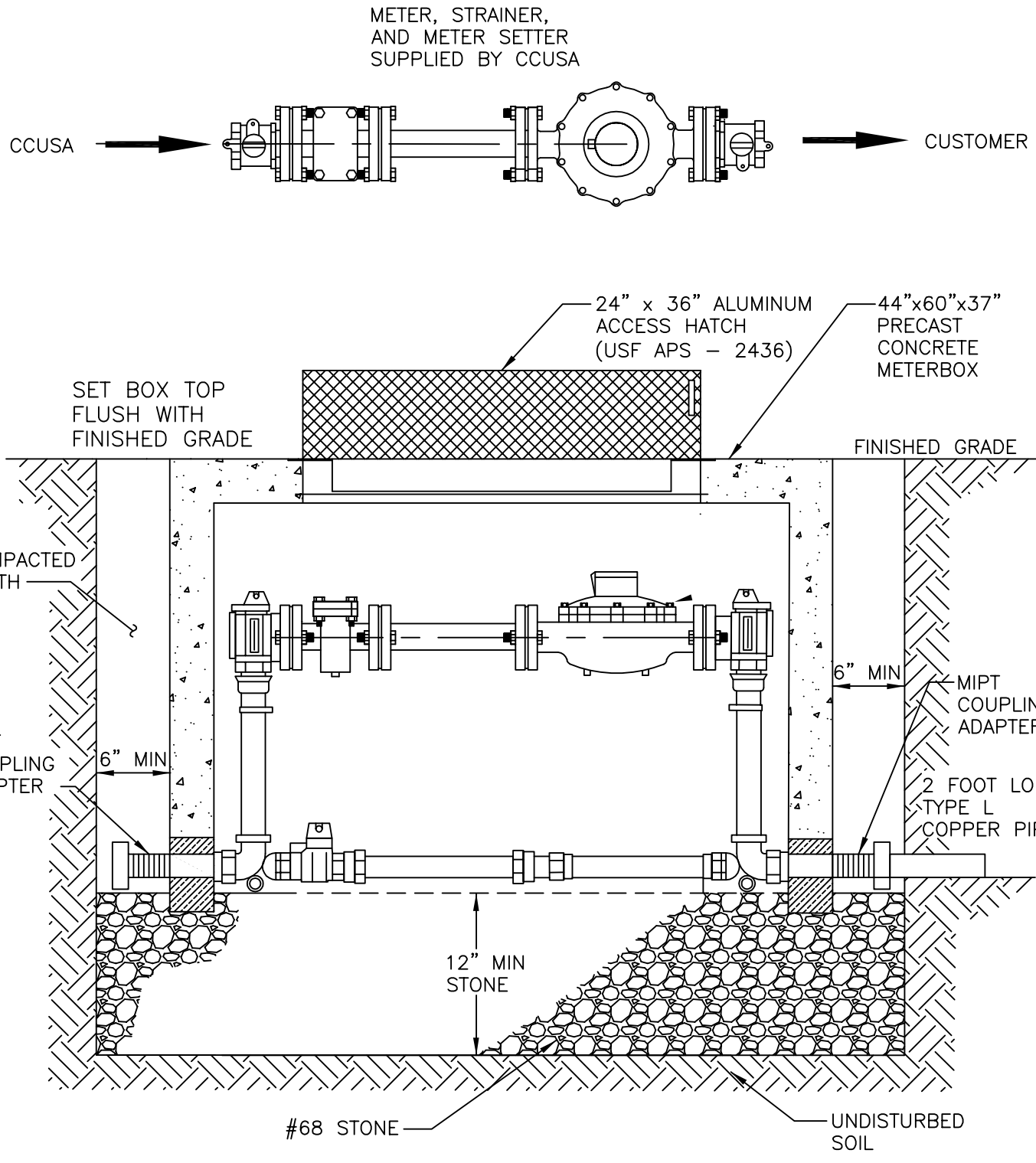
3/4" YOKEBOX	DATE: **DEC. 2016**	DWG. NO.
	REVISION:	**W-140**

CAMPBELL COUNTY UTILITIES
AND SERVICE AUTHORITY



1" YOKEBOX	DATE: APR. 2019 REVISION:	DWG. NO. W-150

CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY



2" METER SETTING	DATE: **DEC. 2016**	DWG. NO.
	REVISION:	**W–160**

CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY

TRACER WIRE INSTALLATION

1. WRAP OR TAPE THE WIRE TO THE TUBING.

2. STRIP INSULATION FROM EACH END (WHERE CONNECTIONS WILL BE MADE) A MINIMUM OF 12–INCHES.

3. WRAP AND SECURE THE BARE STRIPPED WIRE TO THE METER BOX'S COMPRESSION FITTING.

4. WRAP AND SECURE THE BARE STRIPPED WIRE TO THE CORPORATION STOP COMPRESSION FITTING.

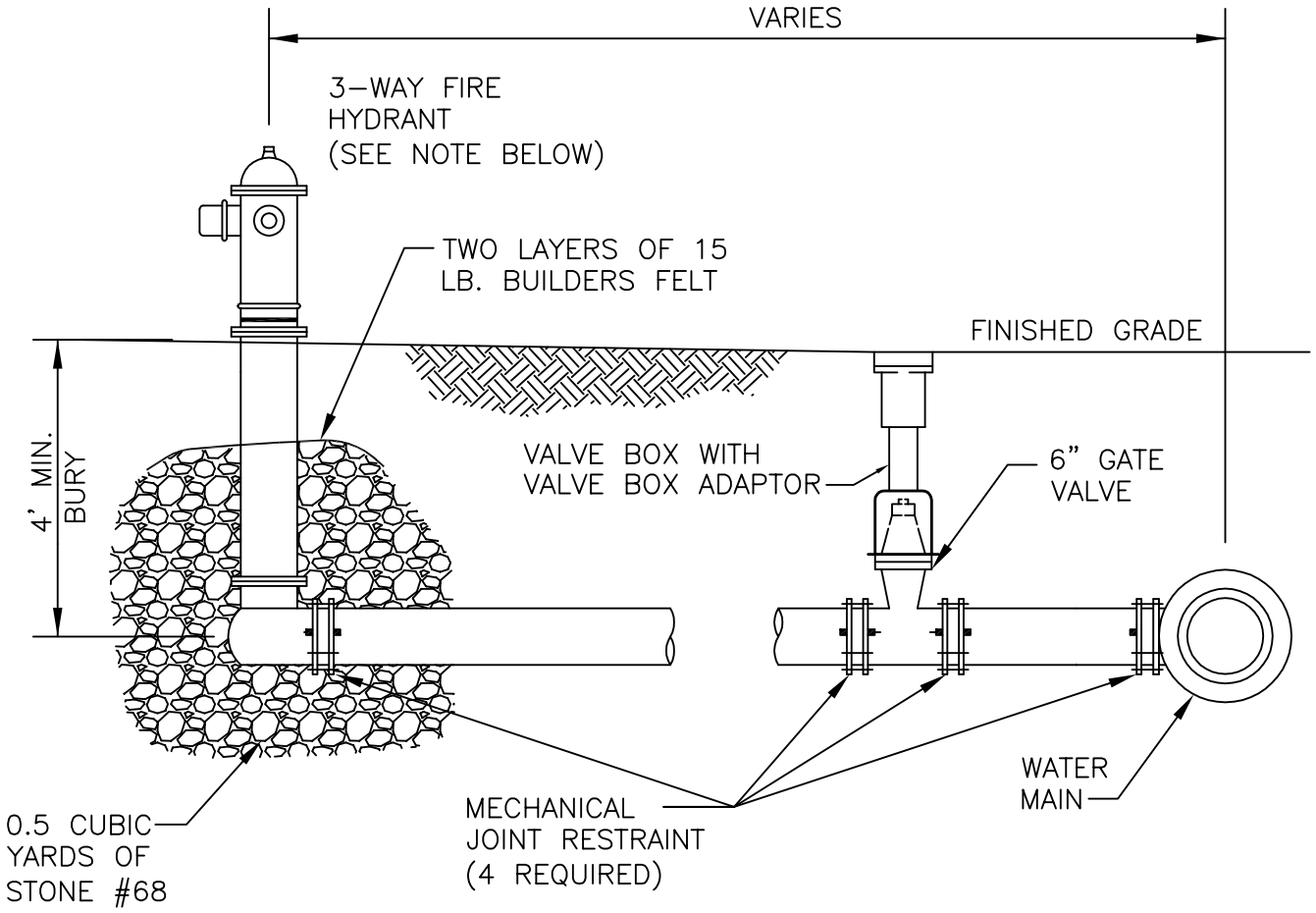
5. TRACER WIRE ON ALL OTHER PVC PIPING (OTHER THAN SERVICE TUBING) MUST BE CONNECTED TO ALL SERVICES TO MAKE A COMPLETE, TRACEABLE CIRCUIT.

6. TRACER WIRE IS TO BE 12 AWG SOLID CONDUCTOR, COPPER CLAD STEEL THE STEEL CORE SHALL BE AISI 1006 OR 1010 FOR DIRECT BURY AND AISI 1055 FOR DIRECTIONAL DRILLING AND BORING.

7. TRACER WIRE MAY BE 19 AWG TIN COATED SOLID COPPER CONDUCTOR, WITH A MINIMUM BREAK STRENGTH OF 38.95 LBS. NOMINAL, WITH A WOVEN POLYESTER AND WATER BLOCKING POLYESTER YARN CORE, POLYETHYLENE INSULATION, AND AN OUTER JACKET OF HDPE.

TRACER WIRE INSTALLATION	DATE: **APR. 2019**	DWG. NO.
	REVISION:	**W–170**

CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY

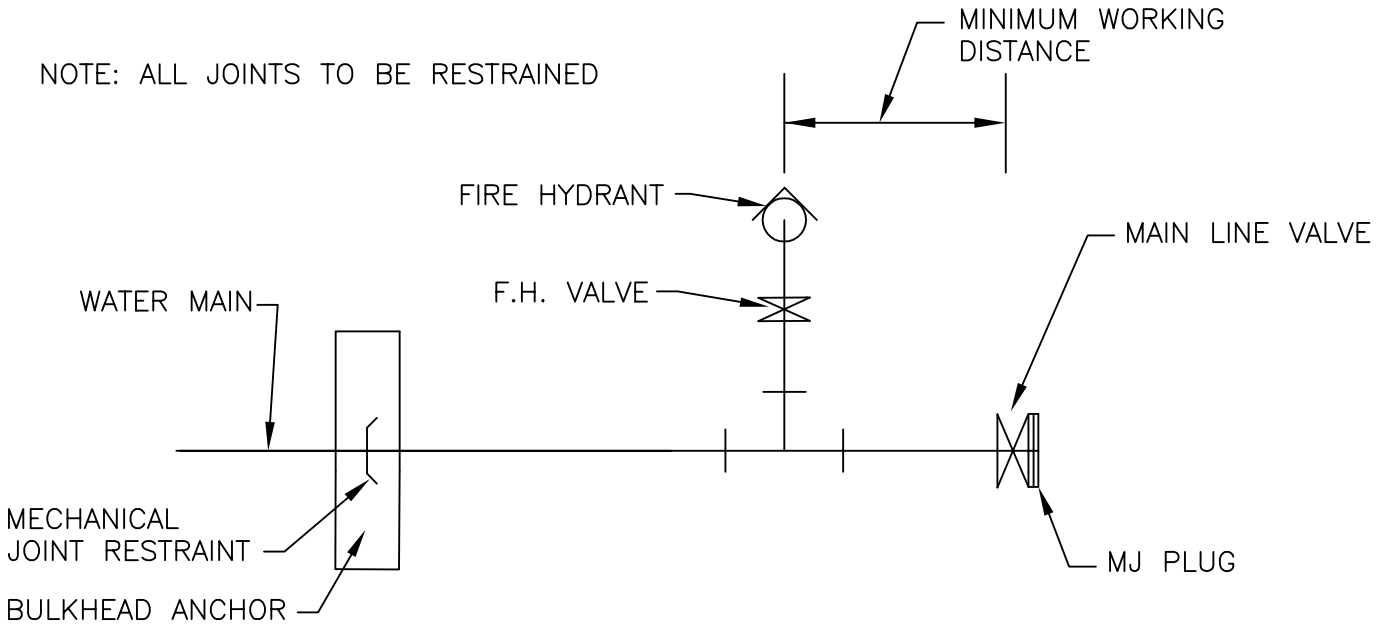


NOTES:

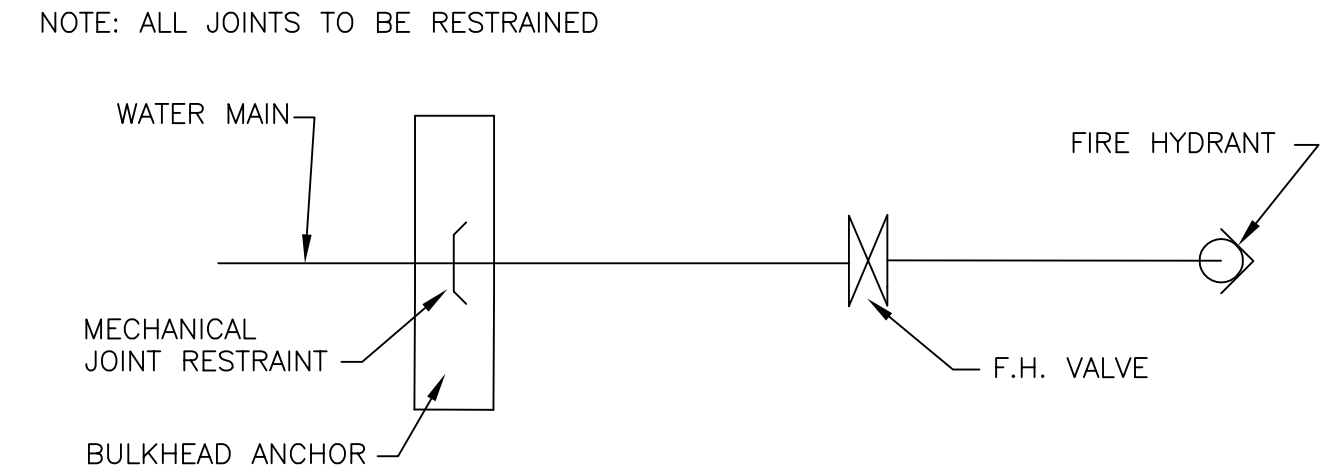
1. VALVE SHALL BE LOCATED AS DIRECTED BY CCUSA.
2. ORIENT HYDRANT NOZZLES AS DIRECTED BY CCUSA.
3. LOCATION OF HYDRANT BURY LINE IN RELATION TO FINISHED GRADE SHALL BE AS RECOMMENDED BY HYDRANT MANUFACTURER.
4. WEEP HOLES ARE TO BE PLUGGED IN AREAS OF HIGH GROUNDWATER.

FIRE HYDRANT ASSEMBLY	DATE: APR. 2019	DWG. NO.
	REVISION:	W–210

CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY



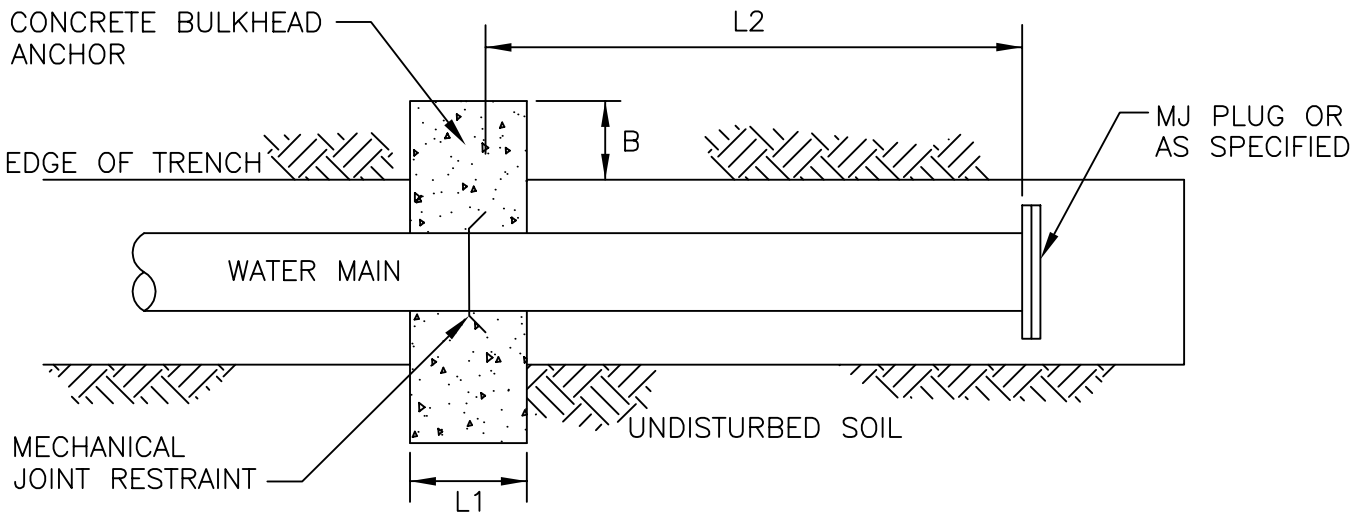
FUTURE MAIN EXTENSION WITH FIRE HYDRANT



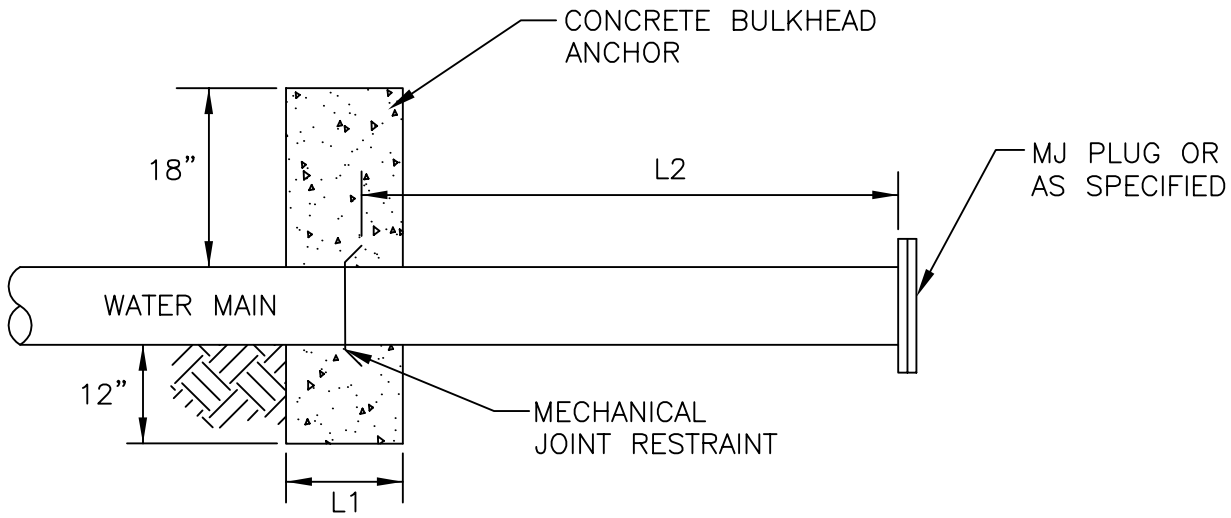
END OF MAIN FIRE HYDRANT

MAIN TERMINATION WITH FIRE HYDRANT	DATE: APR. 2019	DWG. NO.
	REVISION:	W-220

CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY



PLAN VIEW



SECTION VIEW

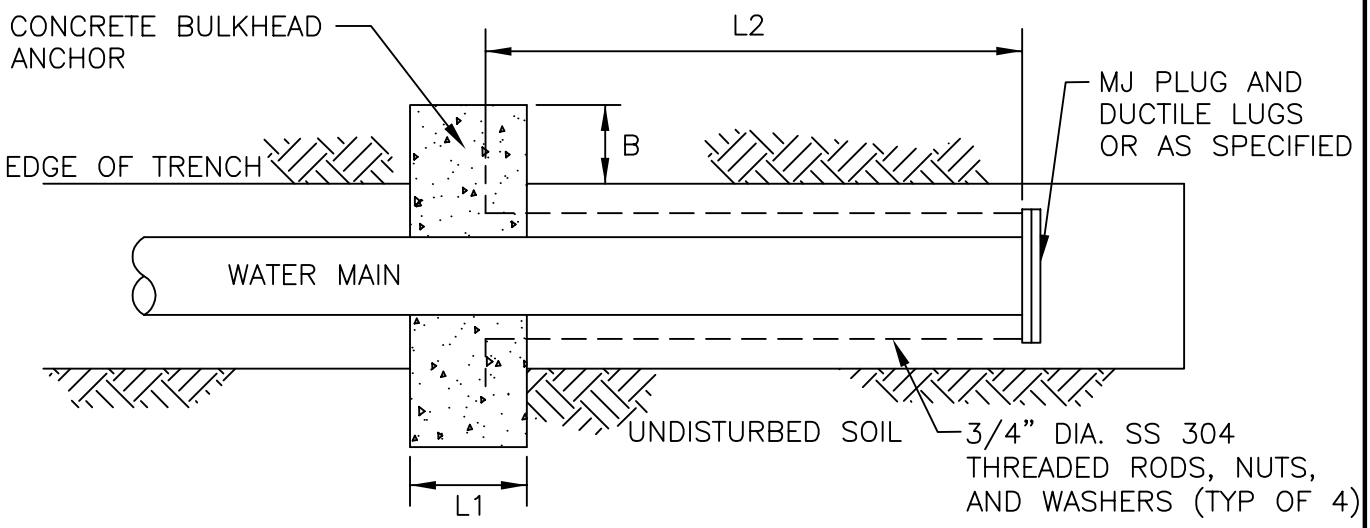
BULKHEAD ANCHORS MAY BE USED FOR OTHER RESTRAINT CONDITIONS AND APPLICATIONS.

PIPE DIAMETER (IN)	B MIN (IN)	L1 MIN (IN)	L2 MIN (IN)
4–8	12	18	27
10–12	27	33	50
14–16	44	50	75

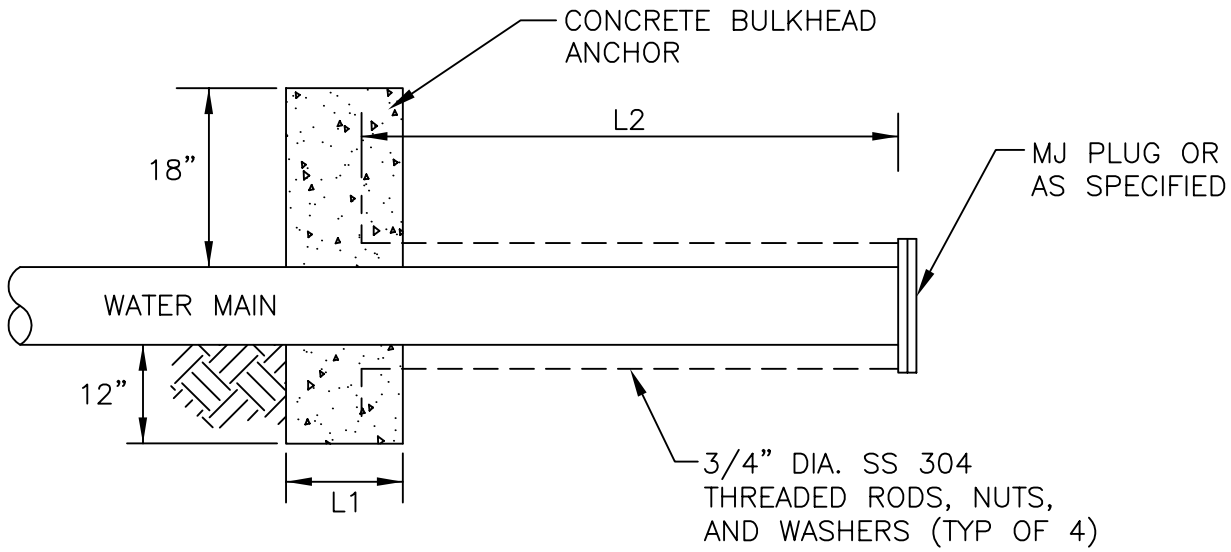
NOTE: FOR USE WITH TEST OR WORKING PRESSURES OF 200 PSI OR LESS

BULKHEAD ANCHOR	DATE: **DEC. 2016**	DWG. NO. **W–230**
	REVISION:	

CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY



PLAN VIEW



SECTION VIEW

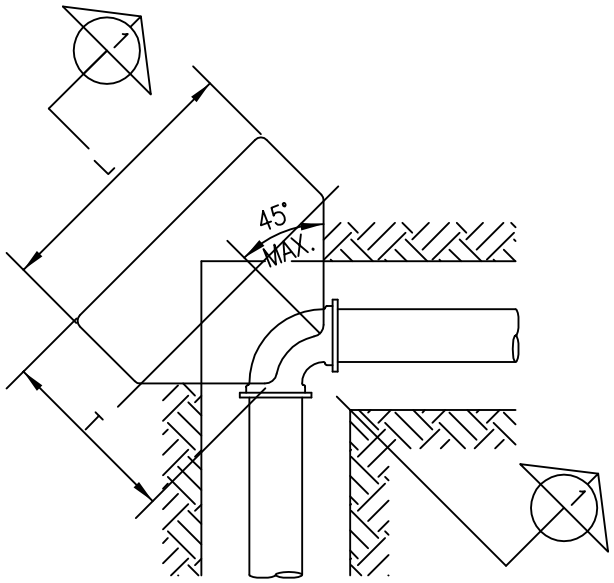
BULKHEAD ANCHORS MAY BE USED FOR OTHER RESTRAINT CONDITIONS AND APPLICATIONS.

PIPE DIAMETER (IN)	B MIN (IN)	L1 MIN (IN)	L2 MIN (IN)
4–8	12	18	27
10–12	27	33	50
14–16	44	50	75

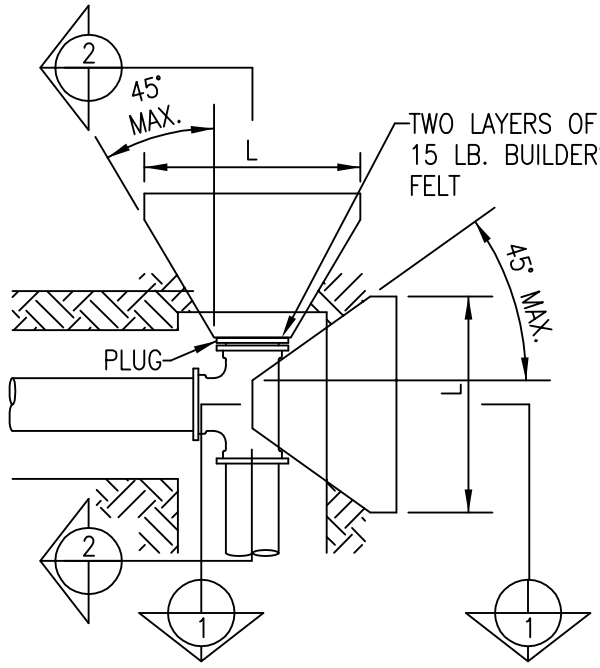
NOTE: FOR USE WITH TEST OR WORKING PRESSURES OF 200 PSI OR LESS

BULKHEAD ANCHOR FOR AC PIPE	DATE: **DEC. 2016**	DWG. NO. **W–235**
	REVISION:	

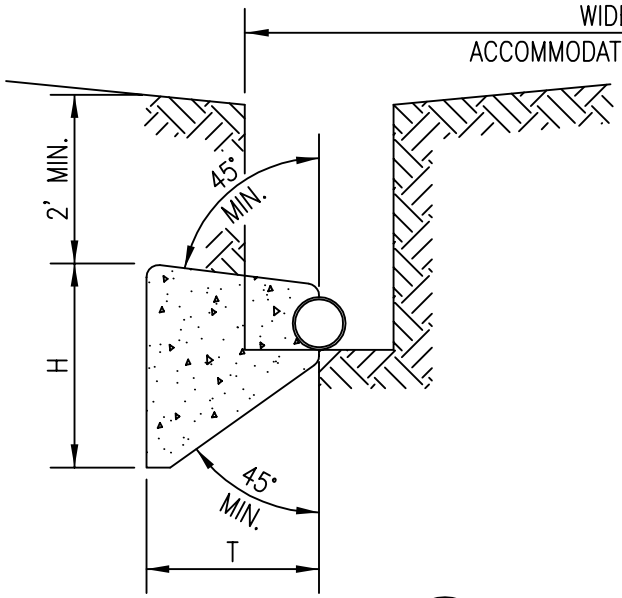
CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY



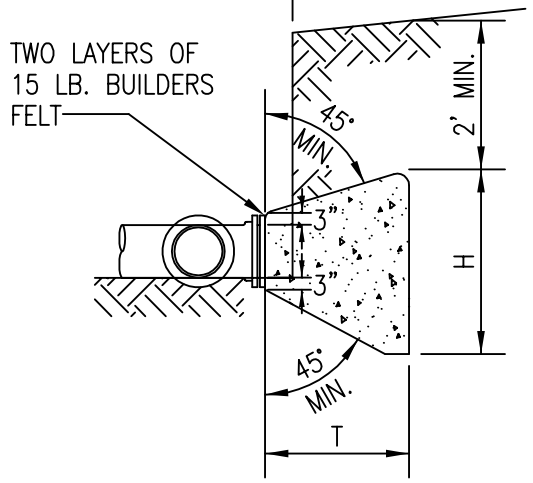
FOR ALL BENDS



FOR TEE AND PLUG FITTINGS



SECTION – 1



SECTION – 2

CONCRETE REACTION ANCHORS ARE TO BE USED ONLY WHERE DESIGNATED ON THE DRAWINGS OR WHERE DESIGNATED BY CCUSA. ALL FITTINGS SHALL BE RESTRAINED WITH MECHANICAL JOINT RESTRAINTS AND RETRAINED JOINT PIPE A MIN OF 50 FT FROM FITTINGS.

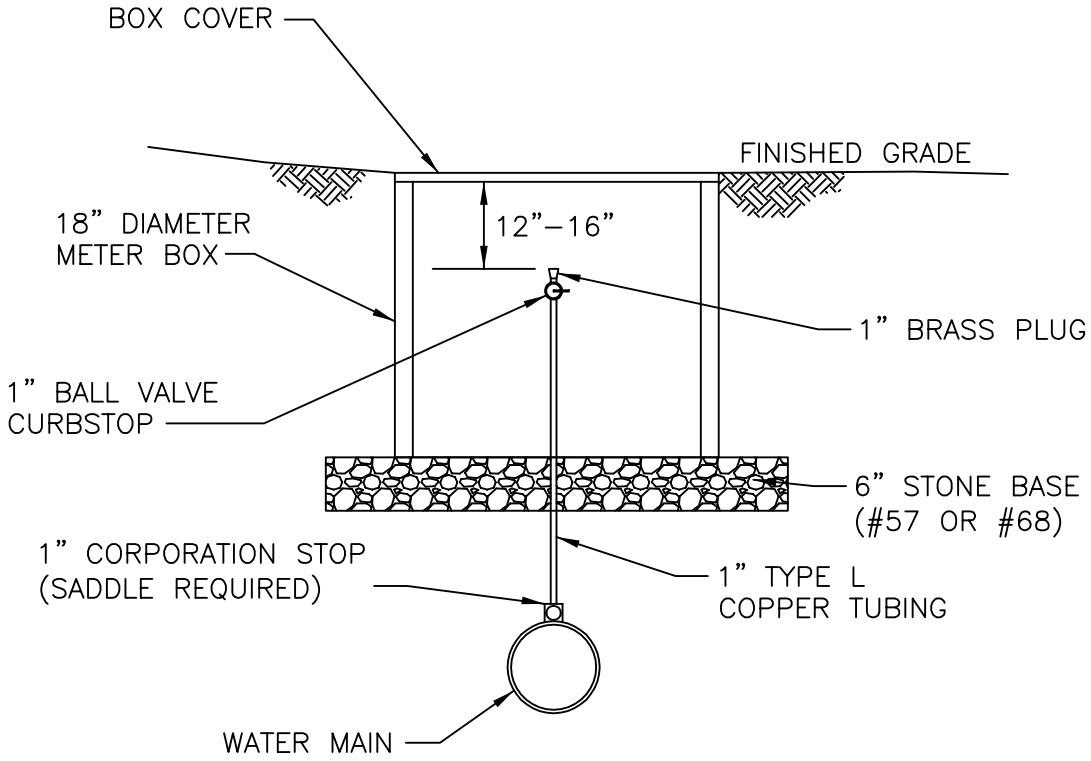
TYPE "F" HORIZONTAL ANCHOR	DATE: **DEC. 2016**	DWG. NO.
	REVISION:	**W–240**

CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY

TYPE "F" HORIZONTAL ANCHOR BLOCK DATUM					
TYPE FITTING	PIPE SIZE, INCH	DIMENSIONS (FT.)			VOL. CONC.
		L	H	T	CU. YARDS
	TEST PRESSURE = 150 PSI				
11 1/4°	6	1.50	2.00	2.50	0.10
22 1/2°	6	1.50	2.00	2.52	0.10
45°	6	2.00	2.25	2.60	0.15
90°	6	2.50	2.50	3.01	0.24
TEE	6	2.00	2.25	2.50	0.15
PLUG	6	2.00	2.25	2.50	0.15
11 1/4°	8	1.66	2.16	2.67	0.13
22 1/2°	8	1.66	2.16	2.69	0.13
45°	8	2.66	2.66	2.77	0.26
90°	8	3.66	3.16	3.21	0.48
TEE	8	3.16	2.91	2.66	0.32
PLUG	8	3.16	2.91	2.66	0.32
11 1/4°	12	2.00	2.50	3.00	0.22
22 1/2°	12	2.50	2.75	3.02	0.30
45°	12	4.00	3.50	3.12	0.58
90°	12	5.50	4.25	3.62	1.10
TEE	12	4.50	3.75	3.00	0.67
PLUG	12	4.50	3.75	3.00	0.67
	TEST PRESSURE = 200 PSI				
11 1/4°	6	1.50	2.00	2.50	0.10
22 1/2°	6	1.50	2.00	2.52	0.10
45°	6	2.00	2.55	2.60	0.15
90°	6	3.00	2.75	3.01	0.32
TEE	6	2.50	2.50	2.50	2.00
PLUG	6				
11 1/4°	8	1.66	2.16	2.67	0.13
22 1/2°	8	2.16	2.41	2.69	0.19
45°	8	3.16	2.91	2.77	0.34
90°	8	4.16	3.41	3.21	0.59
TEE	8	3.66	3.16	2.66	0.40
PLUG	8	3.66	3.16	2.66	0.40
11 1/4°	12	2.00	2.50	3.00	0.22
22 1/2°	12	3.00	3.00	3.02	0.38
45°	12	4.50	3.75	3.12	0.70
90°	12	6.50	4.75	3.62	1.44
TEE	12	5.50	4.25	3.00	0.91
PLUG	12	5.50	4.25	3.00	0.91
	TEST PRESSURE = 250 PSI				
11 1/4°	6	1.50	2.00	2.50	0.10
22 1/2°	6	1.50	2.00	2.52	0.10
45°	6	2.50	2.50	2.60	0.21
90°	6	3.50	3.00	3.01	0.41
TEE	6	3.00	2.75	2.50	0.26
PLUG	6	3.00	2.75	2.50	0.26
11 1/4°	8	1.66	2.16	2.67	0.13
22 1/2°	8	2.16	2.41	2.69	0.19
45°	8	3.66	3.16	2.77	0.42
90°	8	4.66	3.66	3.21	0.71
TEE	8	4.16	3.41	2.66	0.49
PLUG	8	4.16	3.41	2.66	0.49
11 1/4°	12	2.50	2.75	3.00	0.30
22 1/2°	12	3.50	3.25	3.02	0.47
45°	12	5.50	4.25	3.12	0.95
90°	12	7.50	5.25	3.62	1.82
TEE	12	6.00	4.50	3.00	1.05
PLUG	12	6.00	4.50	3.00	1.05

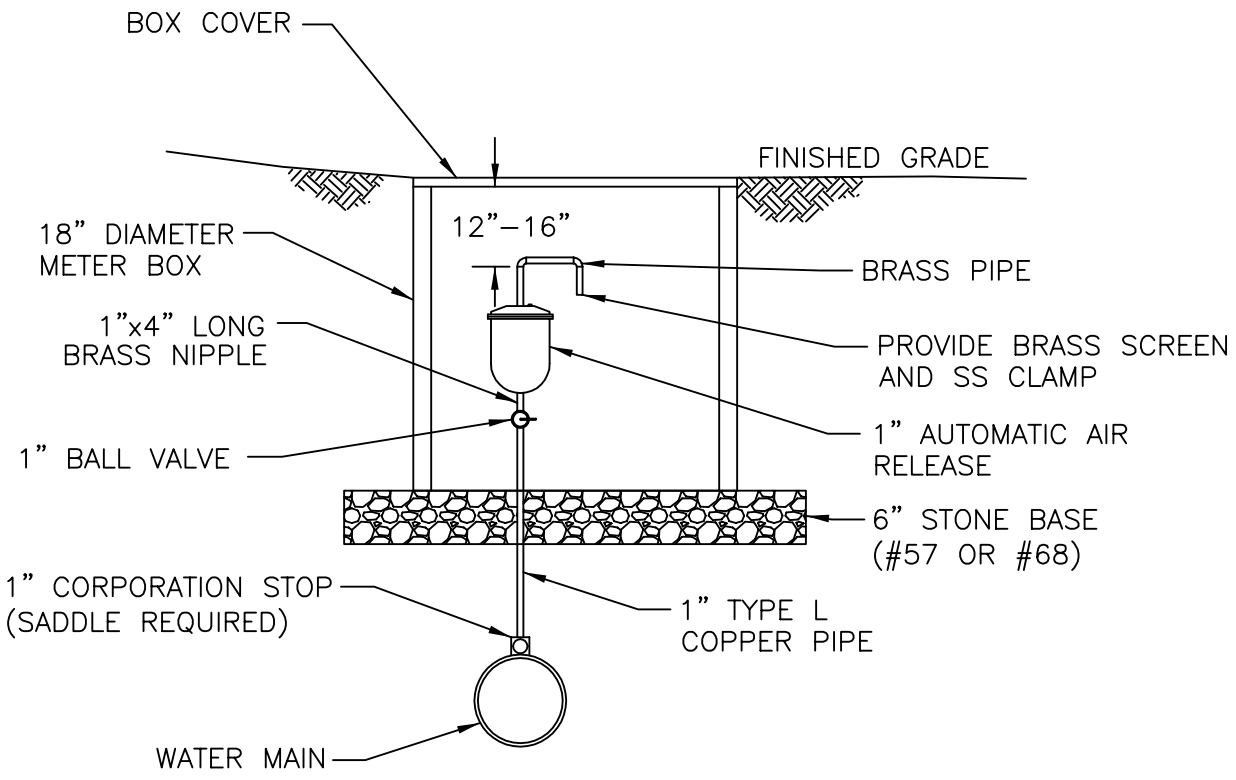
TYPE "F" HORIZONTAL ANCHOR	DATE: APR. 2019	DWG. NO.
	REVISION:	W-241

CAMPBELL COUNTY UTILITIES
AND SERVICE AUTHORITY



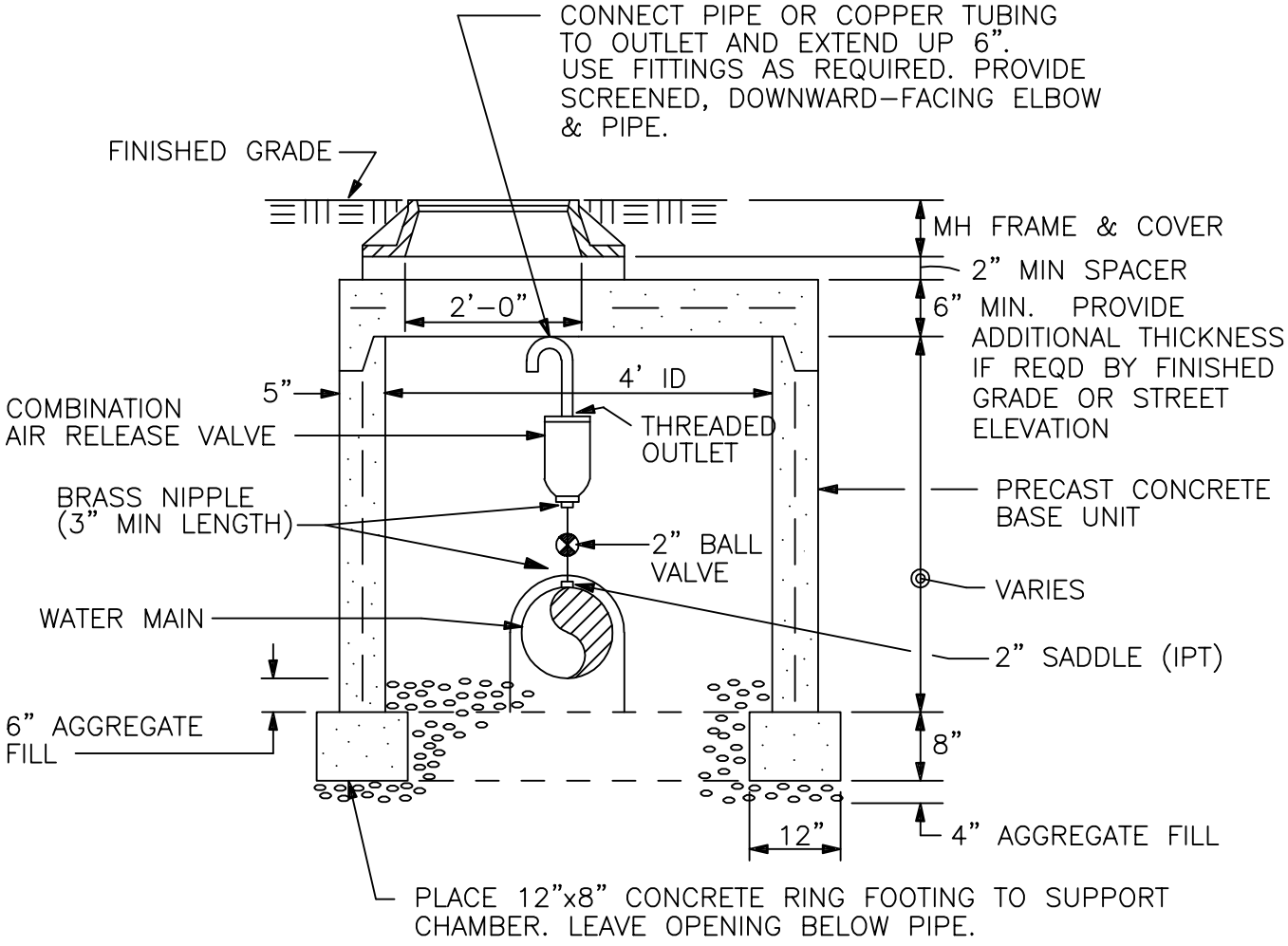
1" MANUAL AIR RELEASE ASSEMBLY	DATE: **APR. 2019**	DWG. NO.
	REVISION:	**W–310**

CAMPBELL COUNTY UTILITIES
AND SERVICE AUTHORITY



1" AUTOMATIC AIR RELEASE ASSEMBLY	DATE: **APR. 2019**	DWG. NO.
	REVISION:	**W–320**

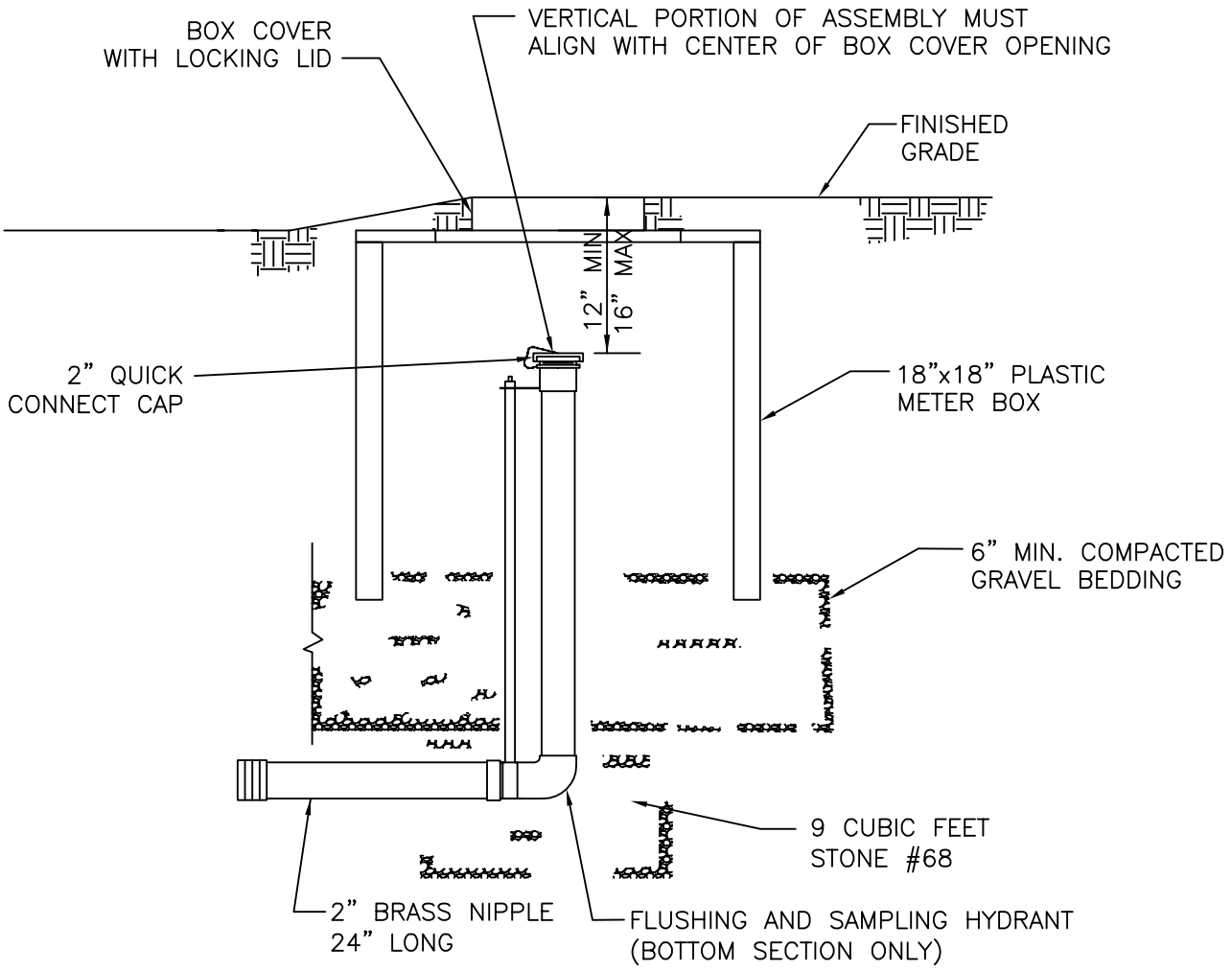
CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY



NOTE: MANHOLE MATERIALS AND FABRICATION SHALL BE IN ACCORDANCE WITH ASTM C478. SIZE OF AIR RELEASE VALVE, GATE VALVE, AND FITTINGS AS SHOWN ON THE DRAWINGS.

2" COMBINATION AIR RELEASE ASSEMBLY	DATE: **APR. 2019**	DWG. NO.
	REVISION:	**W-330**

CAMPBELL COUNTY UTILITIES
AND SERVICE AUTHORITY

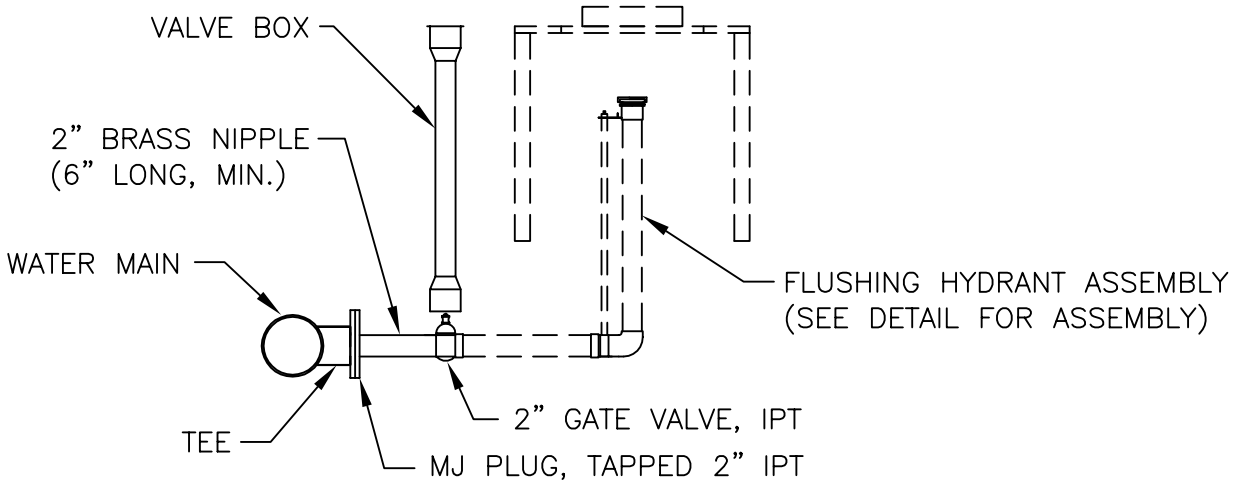


NOTES:

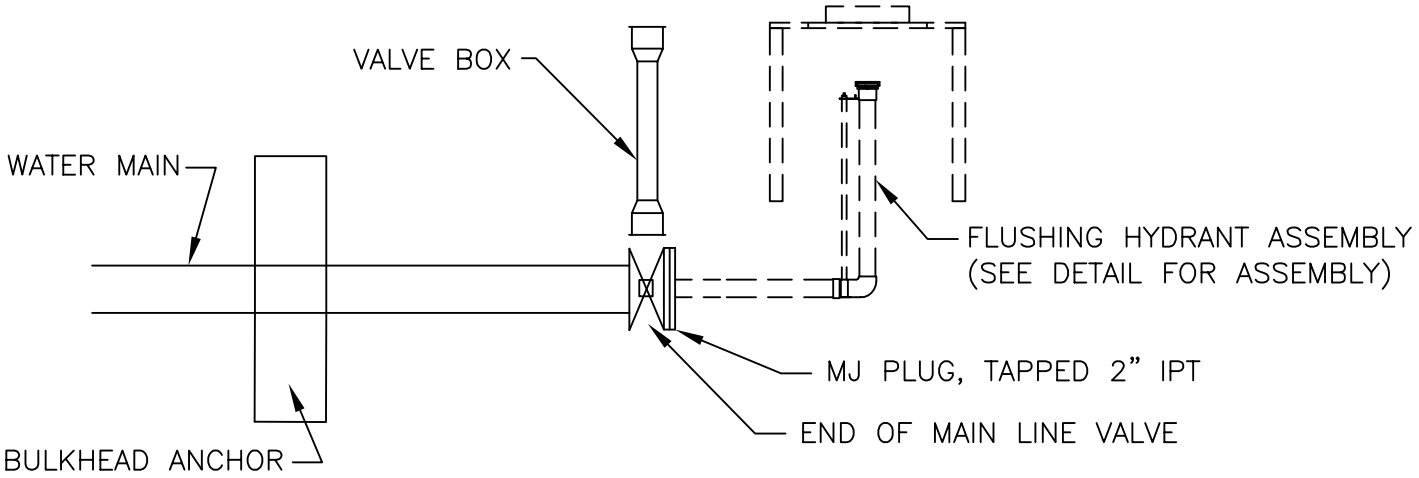
1. WEEP HOLES ARE TO BE PLUGGED IN AREAS OF HIGH GROUNDWATER.

2" FLUSHING HYDRANT ASSEMBLY	DATE: **APR. 2019**	DWG. NO.
	REVISION:	**W-410**

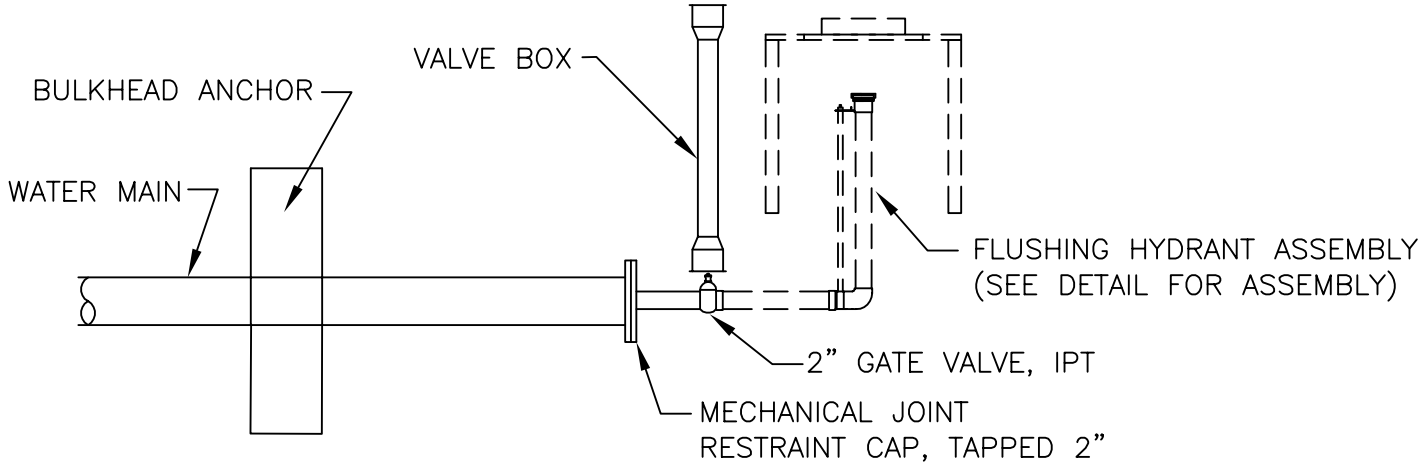
CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY



MAIN IN-LINE FLUSHING HYDRANT DETAIL



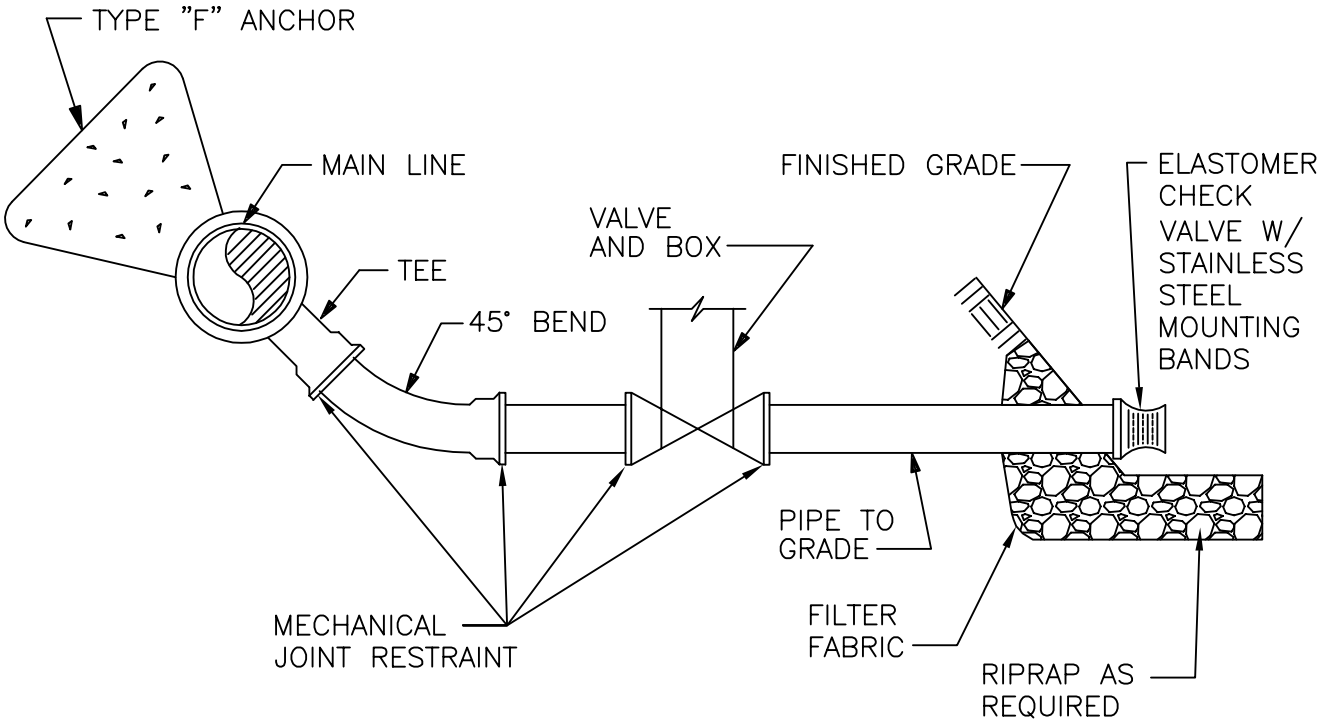
END OF MAIN LINE (WITH MAIN LINE VALVE)-FLUSHING HYDRANT DETAIL



END OF MAIN LINE (WITH 2" VALVE)-FLUSHING HYDRANT DETAIL

APPLICATION OF FLUSHING HYDRANT ASSEMBLIES	DATE: APR. 2019	DWG. NO.
	REVISION:	W-420

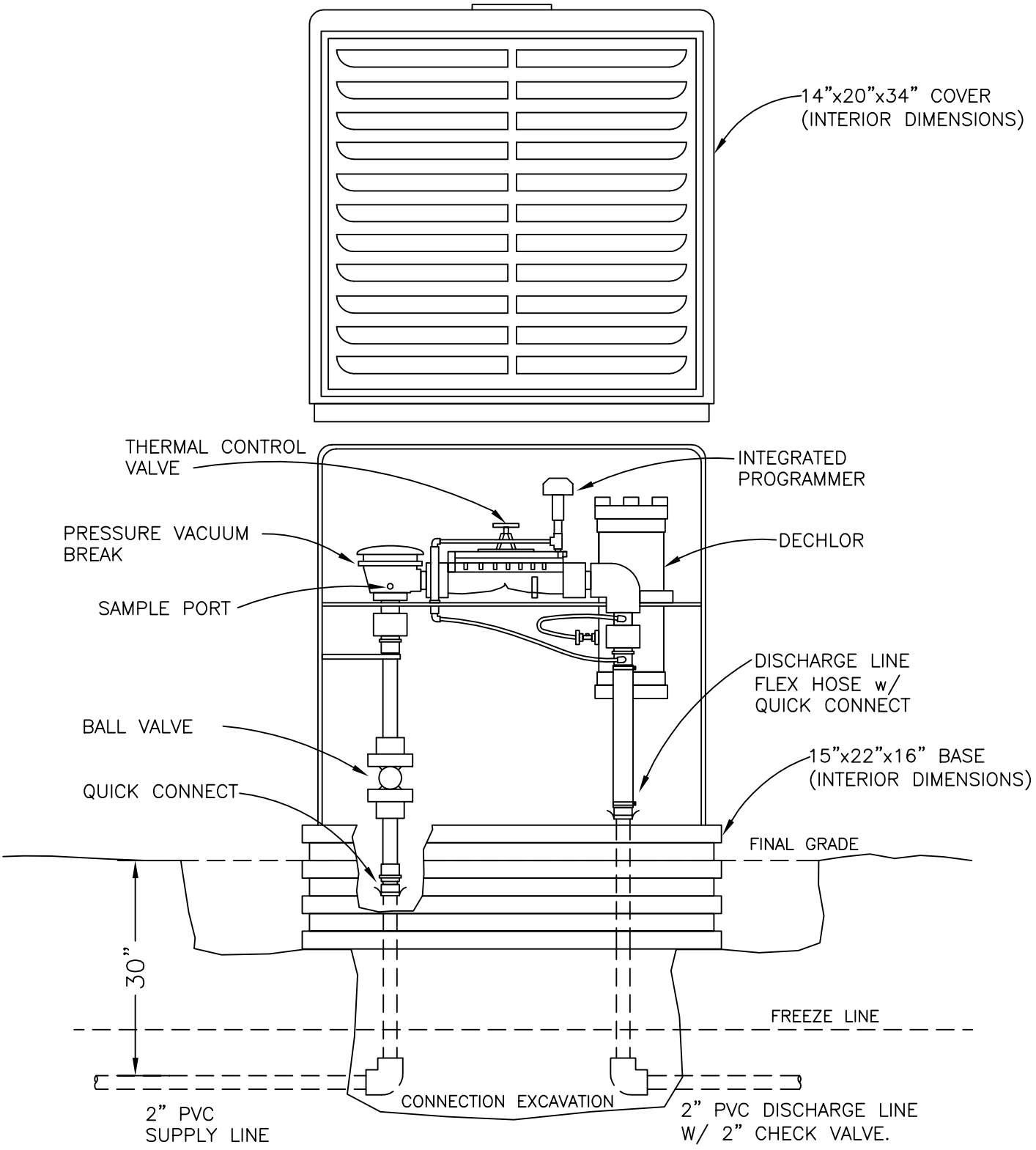
CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY



(FLUSHING LINE 3–INCH DI OR LARGER)

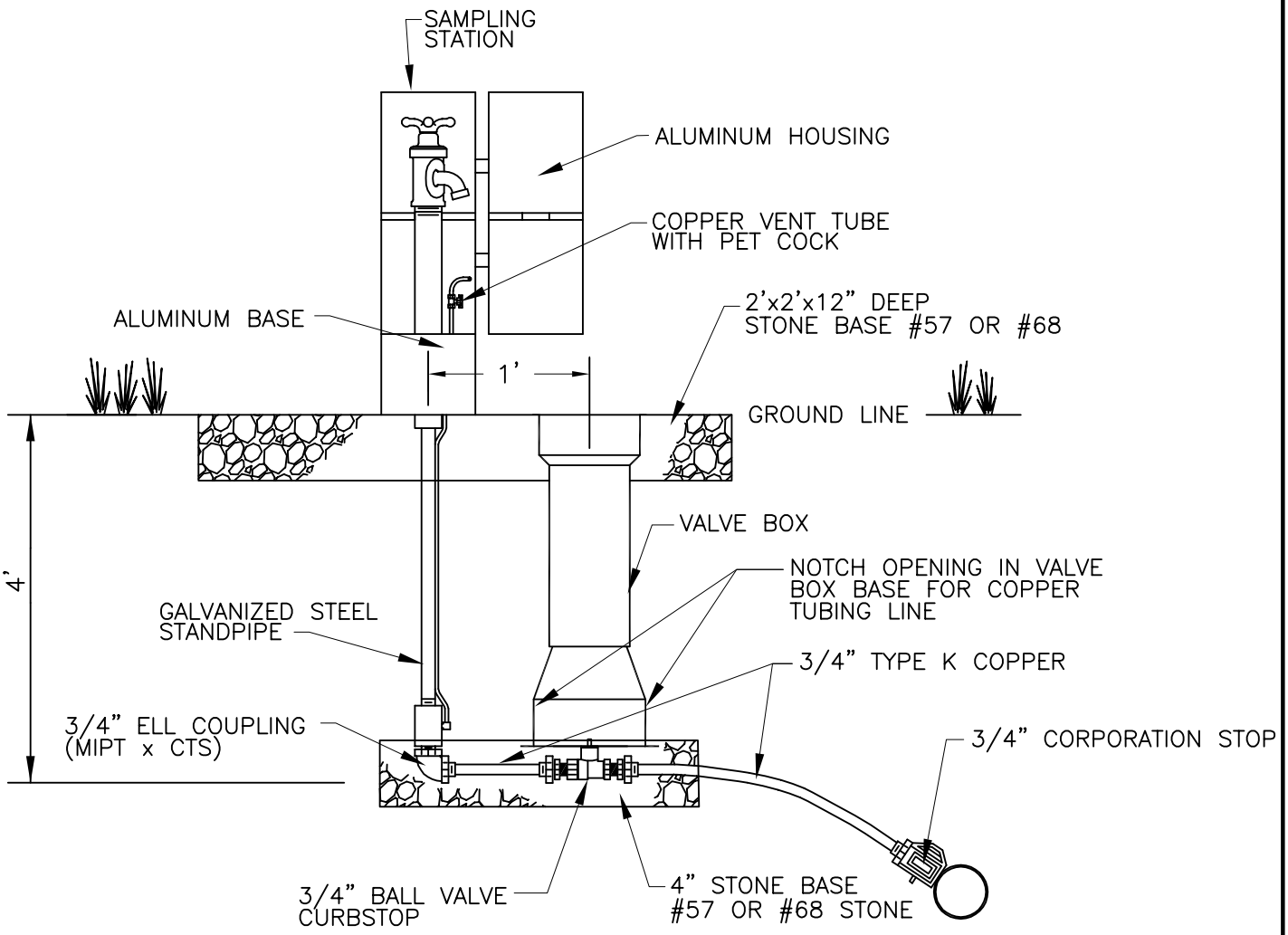
MAIN LINE FLUSHING ASSEMBLY	DATE: APR. 2019	DWG. NO.
	REVISION:	W–430

CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY



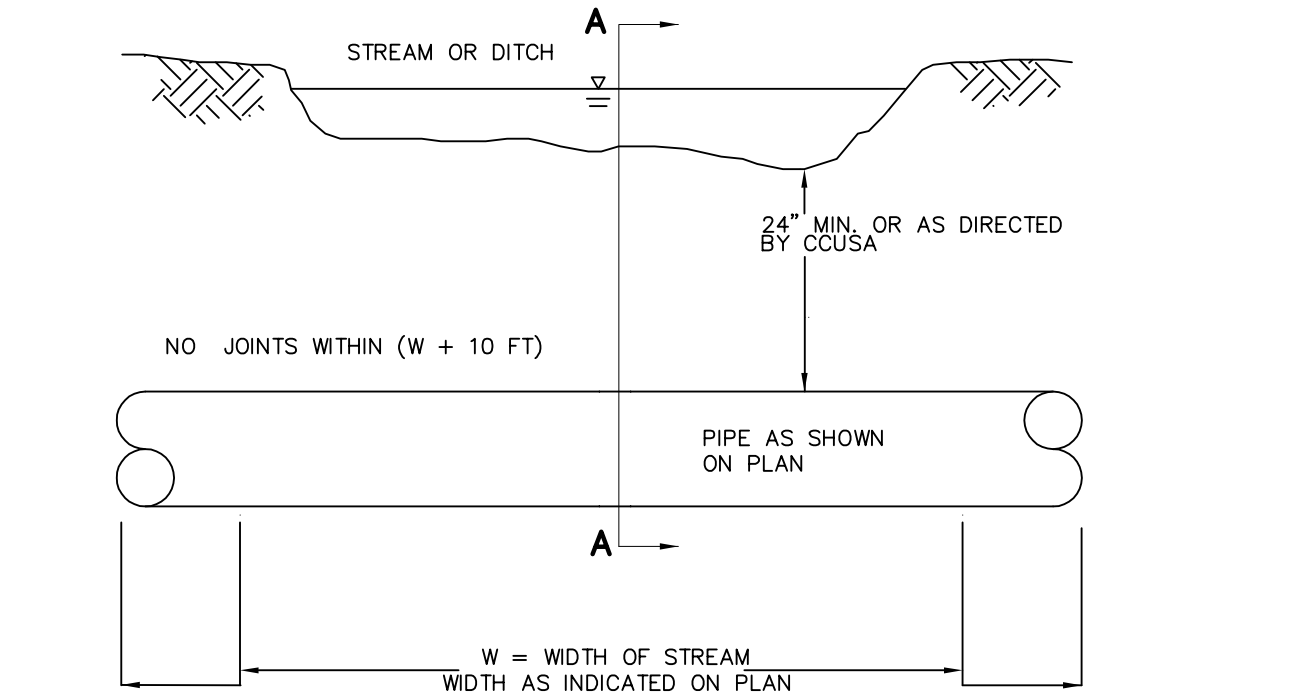
AUTOMATIC FLUSHING VALVE ASSEMBLY	DATE: **APR. 2019**	DWG. NO.
	REVISION:	**W–440**

CAMPBELL COUNTY UTILITIES
AND SERVICE AUTHORITY

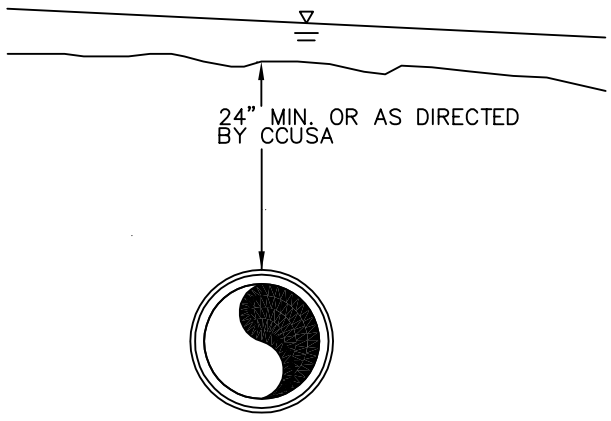


SAMPLING STATION ASSEMBLY	DATE: **APR. 2019**	DWG. NO.
	REVISION:	**W–450**

CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY



PROFILE

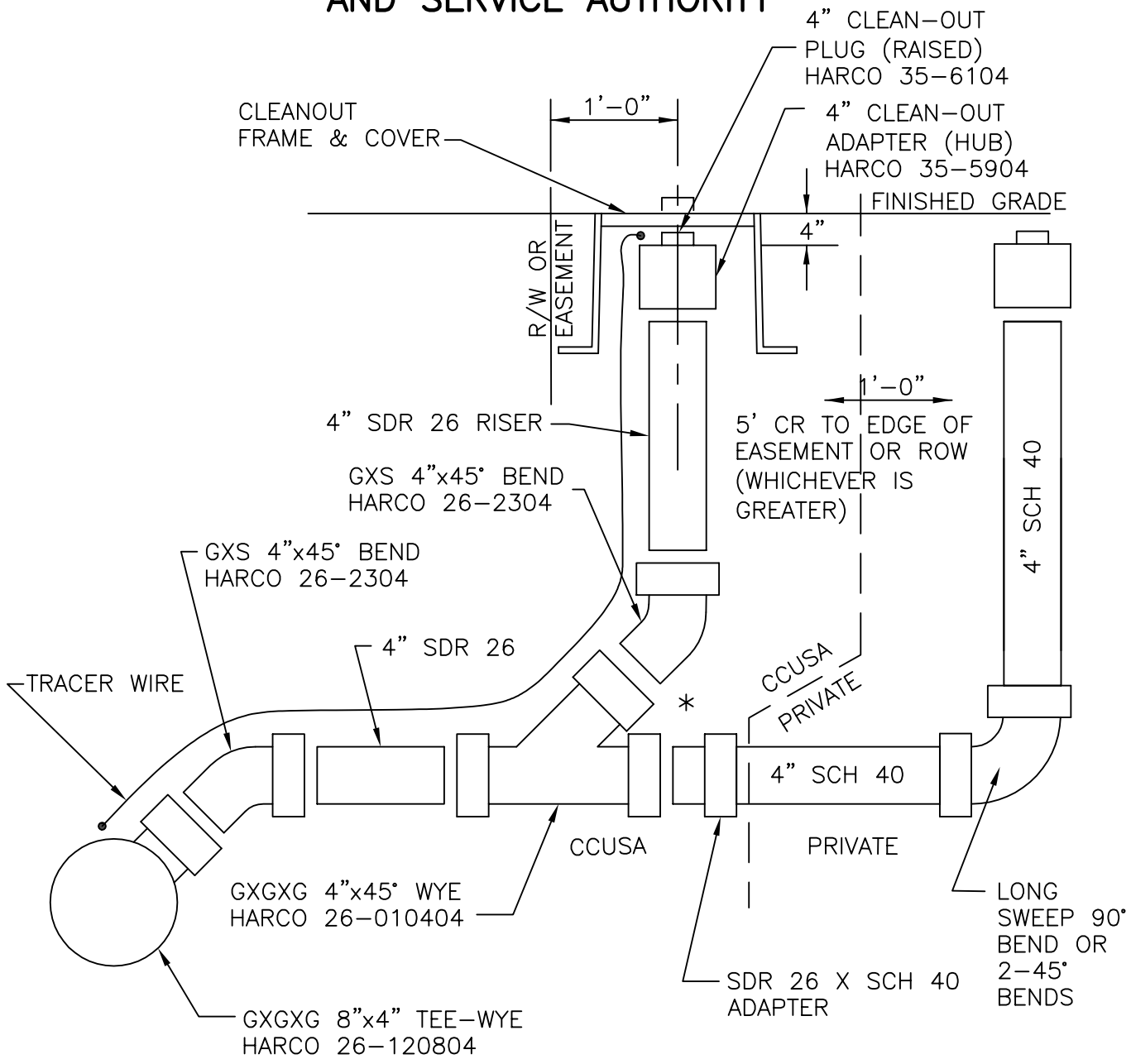


SECTION A–A

STREAM CROSSING (WIDTH 10 FT OR LESS)

SMALL STREAM CROSSING	DATE: APR. 2019	DWG NO.
	REVISION:	W–510

CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY



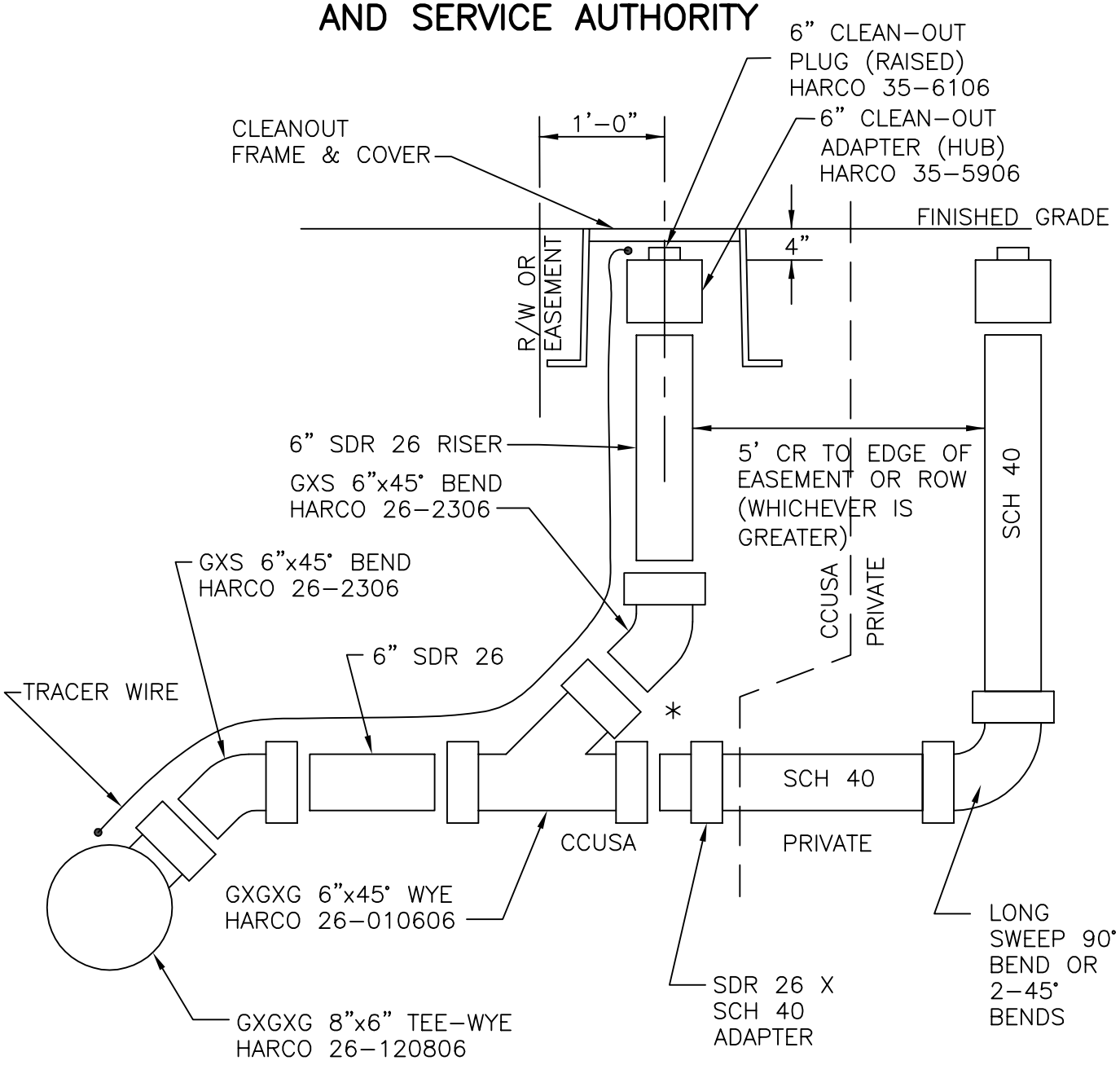
NOTES:

1. SERVICE LATERALS SHALL BE RUN PERPENDICULAR TO THE MAIN.
2. 4" SERVICE LATERALS SHALL NOT BE CONNECTED DIRECTLY TO MANHOLES.
3. SERVICE LATERAL CLEANOUTS SHALL BE LOCATED 1'-0" ON THE CUSTOMER SIDE OF THE RIGHT-OF-WAY LINE OR EDGE OF UTILITY EASEMENT.

*HARCO 26-060404 MAY BE SUBSTITUTED FOR 4" WYE & 4"x45° BEND

4" SEWER SERVICE CONNECTION	DATE: APR. 2019	DWG. NO.
	REVISION:	S-110

CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY



NOTES:

1. SERVICE LATERALS SHALL BE RUN PERPENDICULAR TO THE MAIN.

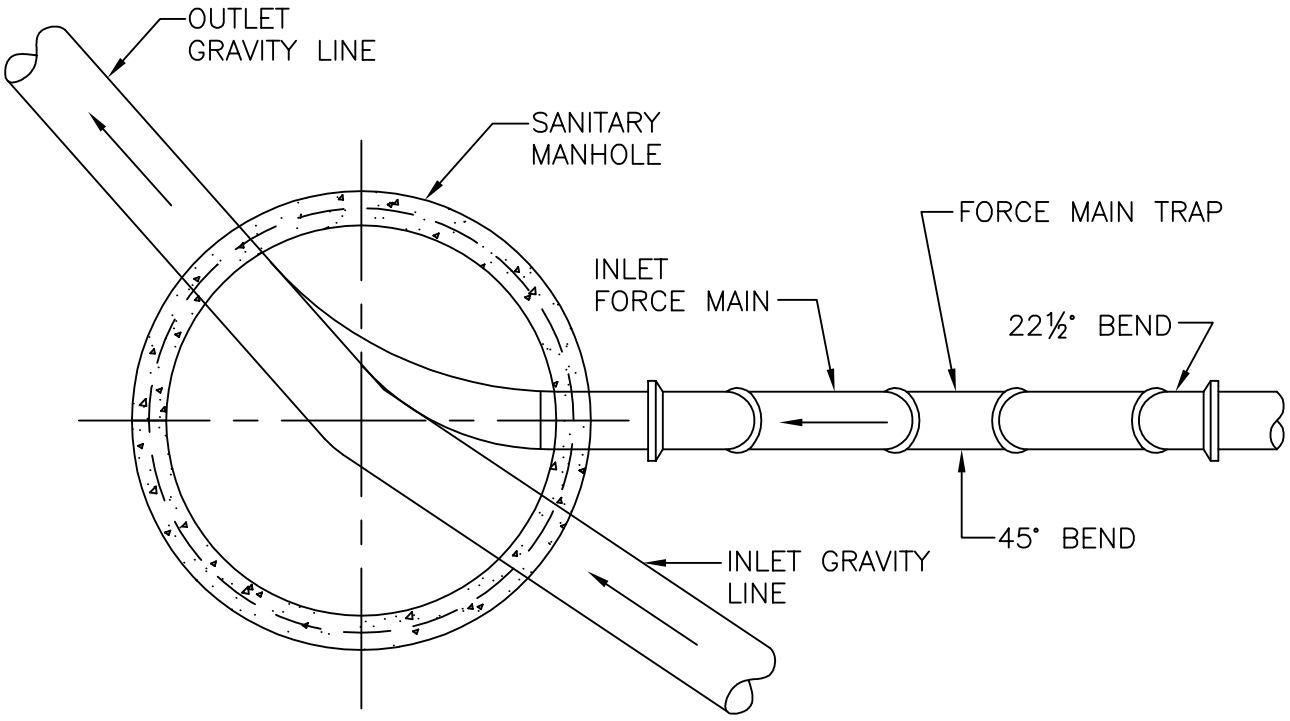
2. 6" SERVICE LATERALS CAN BE CONNECTED DIRECTLY TO MANHOLES, PROVIDED THE MANHOLE INVERT IS FORMED AND A FLEXIBLE CONNECTOR IS CAST INTO THE MANHOLE WALL.

3. SERVICE LATERAL CLEANOUTS SHALL BE LOCATED 1'-0" ON THE CUSTOMER SIDE OF THE RIGHT-OF-WAY LINE OR EDGE OF UTILITY EASEMENT.

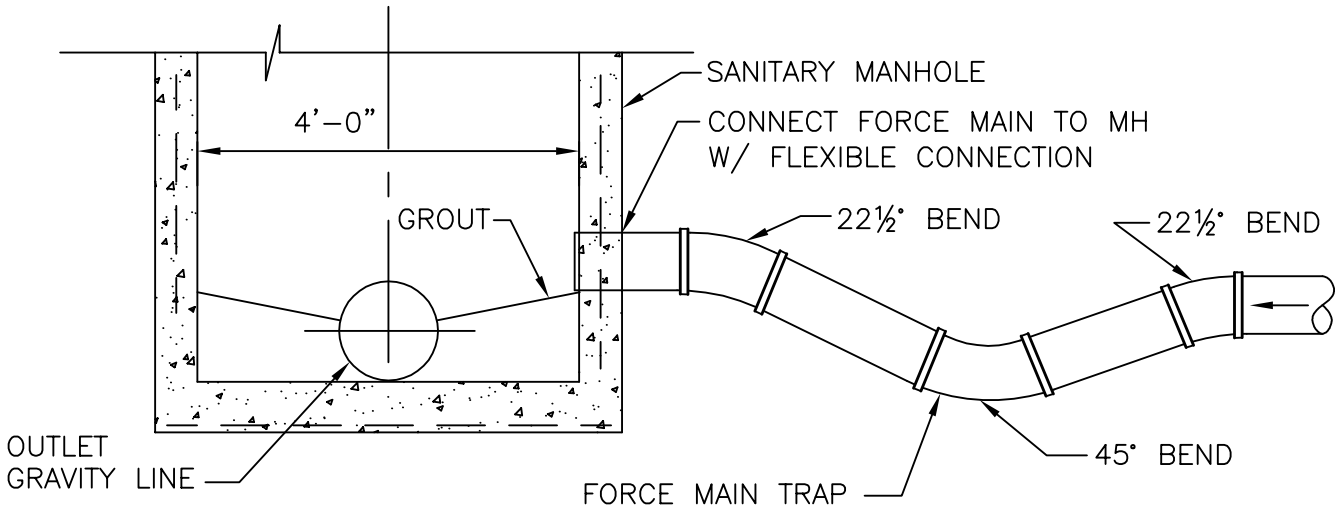
*HARCO 26-060606 MAY BE SUBSTITUTED FOR 6" WYE & 6"x45° BEND

6" SEWER SERVICE CONNECTION	DATE: APR. 2019	DWG. NO.
	REVISION:	S-120

CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY



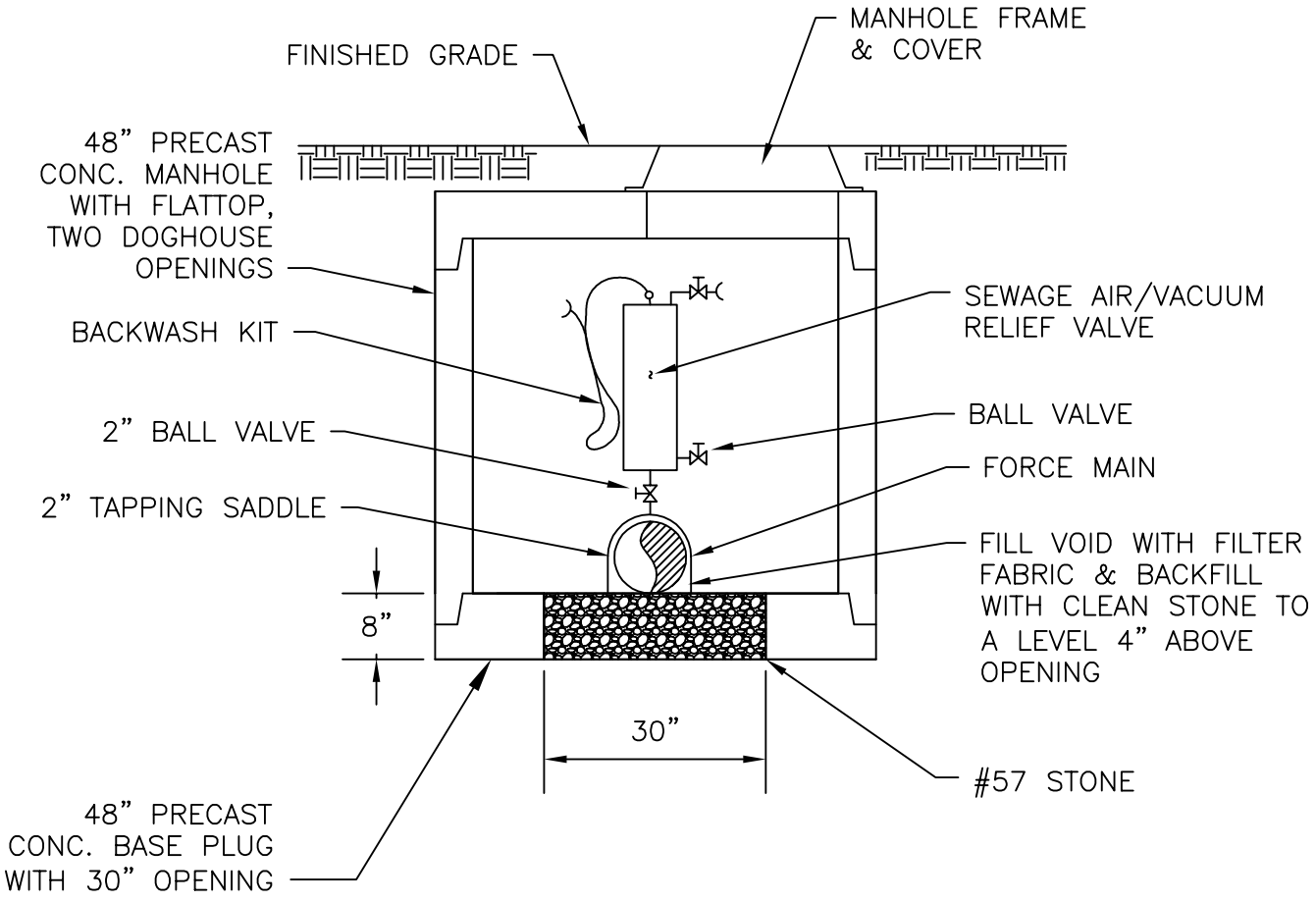
PLAN



SECTION

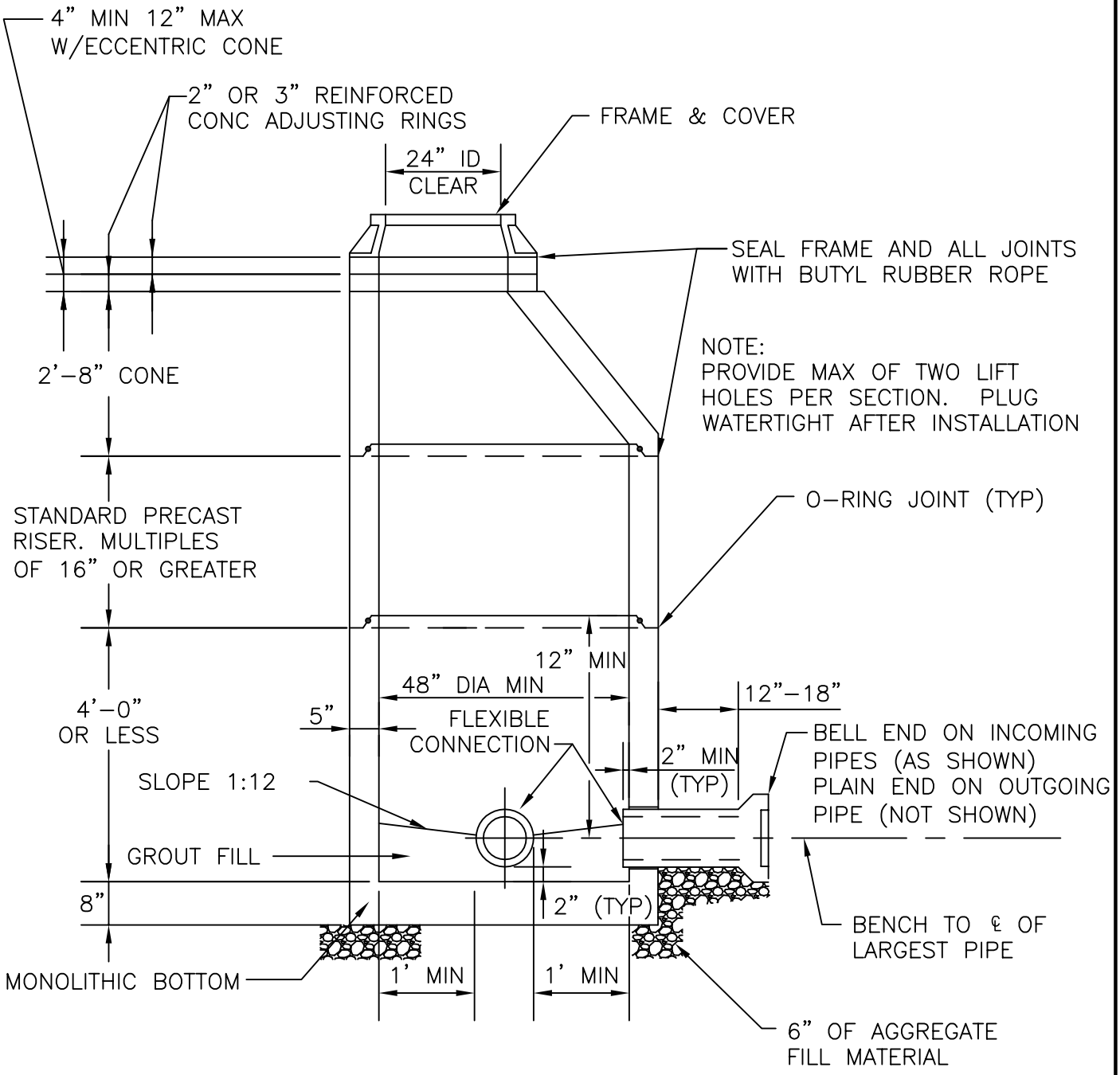
TYPICAL FORCE MAIN MANHOLE CONNECTION	DATE: APR. 2019	DWG. NO.
	REVISION:	S-210

CAMPBELL COUNTY UTILITIES
AND SERVICE AUTHORITY



SEWAGE FORCE MAIN AIR/VACUUM RELIEF VALVE	DATE: APR. 2019	DWG. NO.
	REVISION:	S-220

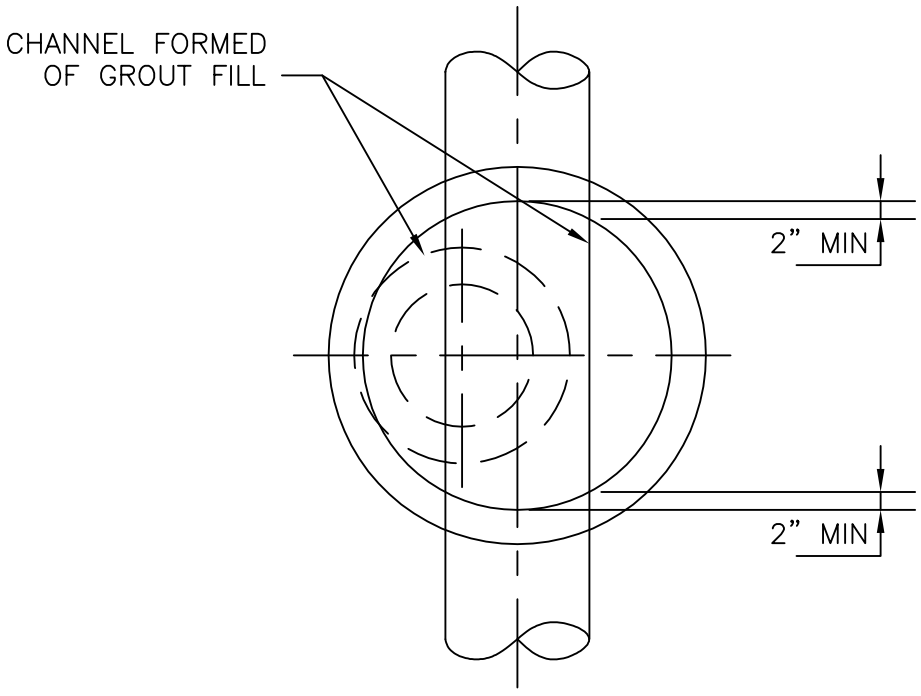
CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY



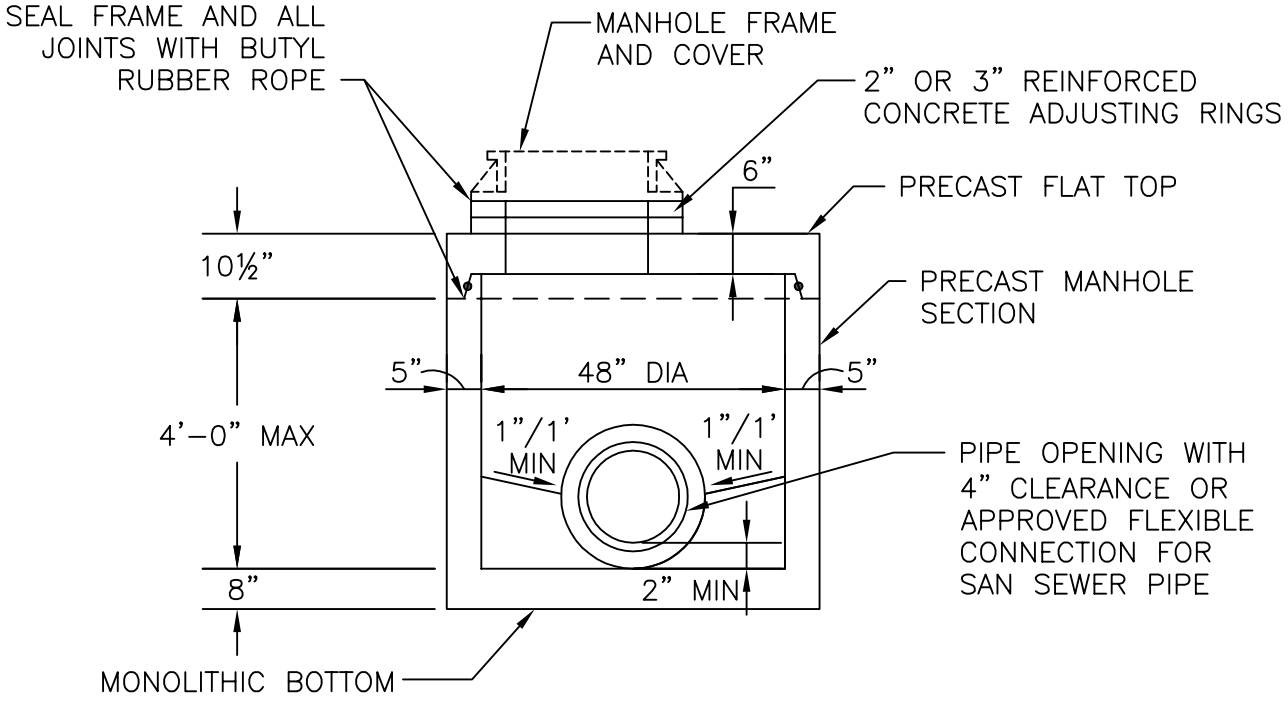
NOTE:
WHERE STUBS OR KNOCKOUTS ARE
PROVIDED FOR FUTURE CONNECTIONS
BENCH SHALL BE IN THIS CONTRACT

STANDARD PRECAST MANHOLE	DATE: **APR. 2019**	DWG. NO.
	REVISION:	S-310

CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY



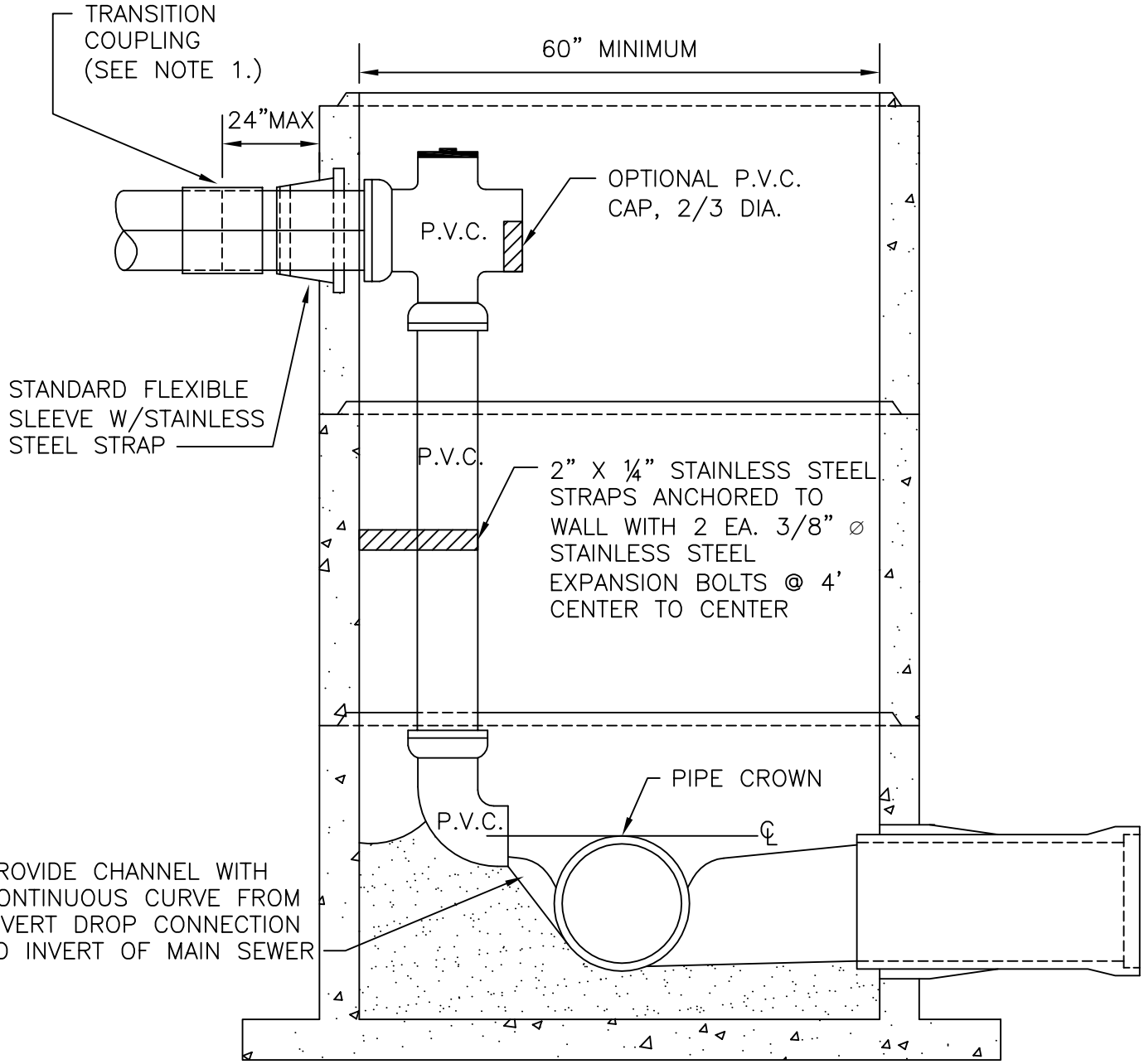
PLAN



DETAIL

SHALLOW MANHOLE	DATE: APR. 2019	DWG. NO.
	REVISION:	S-320

CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY



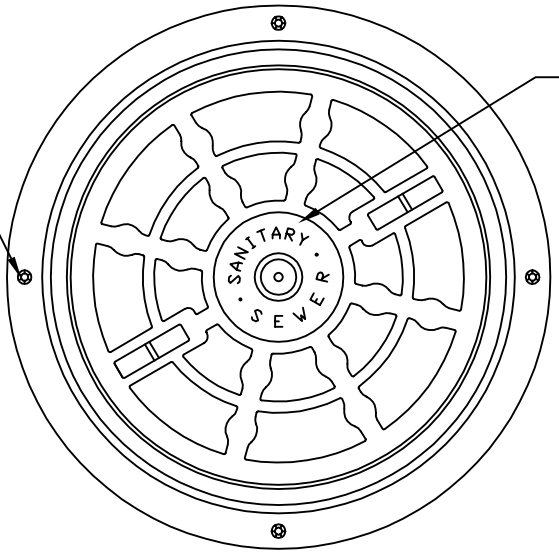
NOTES:

1. MAINLINE TO PVC DROP CONNECTION SHALL BE MADE WITH APPROVED COUPLING. PROVIDE SOLVENT/GLUE JOINTS ON ALL INSIDE PIPING & FITTINGS.
2. DROP CONNECTION SHALL NOT CONFLICT WITH THE LOCATION OF MANHOLE STEPS.
3. BOTTOM 90° BEND SHALL BE AT 45° WITH RESPECT TO THE DOWNSTREAM FLOW.

GRAVITY SEWER INSIDE DROP MANHOLE	DATE: **APR. 2019**	DWG. NO.
	REVISION:	S–330

CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY

4 BOLT HOLES AND 4 STAINLESS STEEL BOLTS, NUTS AND WASHERS REQUIRED FOR WATERTIGHT FRAME AND COVER. BOLTS MUST EXTEND 3" MINIMUM INTO CONE SECTION.

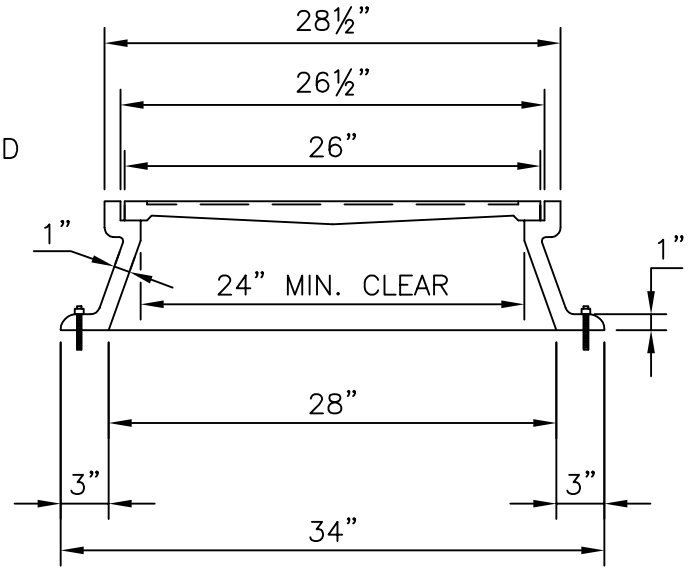


LETTERING REQUIRED

2 STAINLESS STEEL BOLTS, NUTS AND WASHERS REQUIRED FOR NON–WATERTIGHT FRAME AND COVER ABOVE GRADE. BOLTS MUST EXTEND 3" MINIMUM INTO CONE SECTION.

NO BOLTS REQUIRED FOR NON–WATERTIGHT FRAME AND COVER SET FLUSH WITH GRADE.

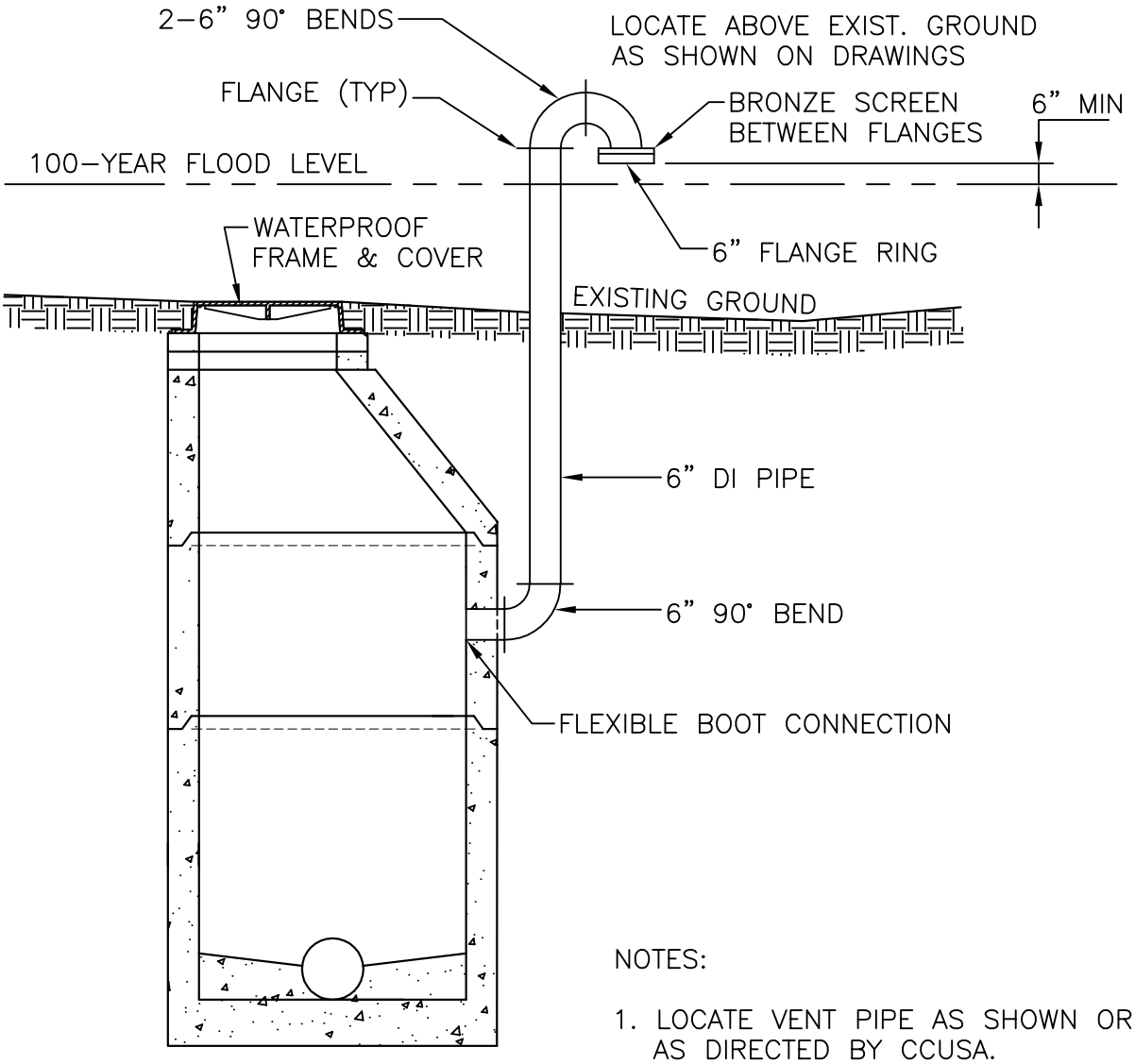
BUTYL RUBBER MASTIC REQUIRED BEWTEEN FRAME AND PRECAST CONCRETE FOR ALL APPLICATIONS.



CHIMNEY SEAL REQUIRED FOR WATERTIGHT FRAME AND COVER.

MANHOLE FRAME & COVER	DATE: APR. 2019	DWG. NO.
	REVISION:	S–340

CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY



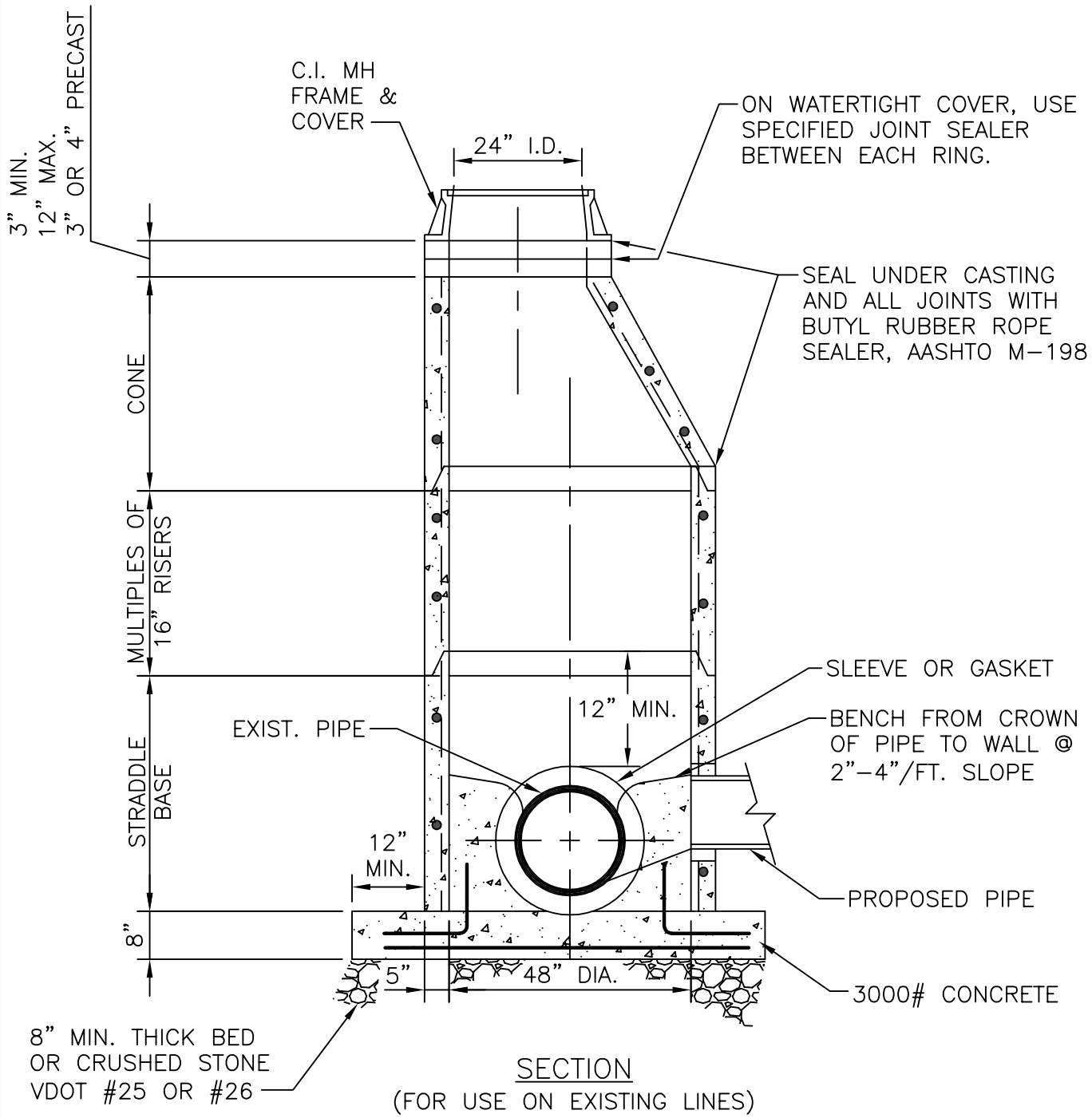
NOTES:

1. LOCATE VENT PIPE AS SHOWN OR AS DIRECTED BY CCUSA.

2. CONNECT 6" DI VENT PIPE TO MANHOLE WITH FLEXIBLE BOOT.

MANHOLE VENT PIPE	DATE: APR. 2019	DWG. NO.
	REVISION:	S–350

CAMPBELL COUNTY UTILITIES AND SERVICE AUTHORITY



SECTION

(FOR USE ON EXISTING LINES)

NOTES:

1. MATERIALS AND FABRICATION IN ACCORDANCE WITH ASTM C478, CONE WILL BE ECCENTRIC TYPE, GROUT PIPE INTO MANHOLE WALL.

2. SAW CUT TOP OUT OF EXISTING PIPE.

PRECAST CONCRETE STRADDLE MANHOLE	DATE: APR. 2019	DWG. NO.
	REVISION:	S-360

SECTION E

DESIGN STANDARDS

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SECTION - E

SECTION E-1

GENERAL ITEMS

1.01 Introduction. The purpose of these standards is to provide for the proper engineering design of water supply and distribution and sanitary sewage collection for the residents of Campbell County. A further purpose of this publication is to establish and furnish information on the construction requirements which have been developed by the Campbell County Utilities and Service Authority, as agent for the Board of Supervisors of Campbell County, and which are applicable to the public water and sewage facilities now existing or which may, in the future, be operated by the Authority. This publication provides the standards and specifications to which all planning, construction, and connection of these utilities shall conform when such utilities are proposed within Campbell County, except for the areas served by the chartered towns.

Inquiry for information or clarification of any item herein pertinent to other matters concerning these facilities shall be directed to the Administrator, Campbell County Utilities and Service Authority, at the Authority Business Office.

1.02 Validity. If any section, subsection, sentence, clause, or phrase of these standards is, for any reason, held to be invalid, such decision shall not affect the validity of any other part of the standards which can be given effect without such invalid part or parts.

No statement nor regulation contained in this publication shall be construed to interfere with any additional requirements which may be imposed by the Department of Health, Department of Environmental Quality, the Department of Transportation or any other regulatory agency of the United States, Commonwealth of Virginia, or local government having jurisdiction over the installation and operation of the Authority's water and sewage facilities.

1.03 Local System Design. All designs for utility systems proposed for new subdivision development shall be completed in accordance with the final approved subdivision plat. Additional costs of engineering design, construction, or inspection caused by changes to the subdivision plat after final approval shall be the responsibility of the Developer of the subdivision.

1.04 Contacting Property Owners. Prior to performing any survey and design work on private property, the Engineer/Surveyor shall notify all landowners that may be affected by the design or installation of the proposed utility line. Notification shall be made in the form of a letter to be sent to the property owner a minimum of 10 days before commencing work. Copies of such letters shall be provided to the Authority along with the initial plan submittal.

1.05 Definitions. Unless the context specifically indicates otherwise, the meaning or terms used herein shall be as follows:

1. "Authority" shall mean the Campbell County Utilities and Service Authority.

2. "Authority Board" shall mean the governing body of the Authority, duly appointed by the Campbell County Board of Supervisors.

3. "County Board" shall mean the Board of Supervisors, the governing body of Campbell County, Virginia, duly elected by the citizens of Campbell County.

4. "County" shall mean the County of Campbell, Virginia.

5. "City" shall mean the incorporated City of Lynchburg, Virginia.

6. “Contractor” shall mean any person, firm, corporation, or association that is certified by the State Registration Board for Contractors as a Class A General Contractor, with Utilities Designation, who has the personnel, equipment, and experience to construct water distribution and sewage collection facilities.

7. “Developer” shall mean any person, firm, corporation, or association having an interest, whether legal or equitable, sole or partial, in any premise which is, or may in the future, be responsible for design and construction, directly or indirectly, of facilities which will be under the jurisdiction of the Authority or will become a part of the public utilities system of the Authority.

8. “Engineer” shall mean the Authority’s representative in all matters of design, construction, inspection, contract negotiation, and interpretation related to existing or proposed facilities of the Authority or a Professional Engineer registered in the Commonwealth of Virginia with sufficient experience in water and sewage utilities design and approved by the Authority for such service.

9. “Facilities of the Authority” shall mean any and all component and pertinent parts of the entire system of the water or sewage utility under the jurisdiction of the Campbell County Utilities and Service Authority, such water and sewage mains and their appurtenances, water storage tanks, pumping stations, and treatment facilities, including these items and others now constructed, installed, operated, or maintained by the Authority.

10. “Premise” shall mean any building, group of buildings, or land upon which buildings are to be constructed, which is or may be served by the facilities of the Authority.

11. “Sanitary sewer” shall mean any pipe or conduit that transports residential, commercial, or industrial wastewater.

12. “Sewage” shall mean the combination of domestic or industrial wastes present in groundwater or surface water that is unfit for consumption.

13. “Sewerage” shall mean the system of laterals, collectors, interceptors, pump stations, treatment and disposal facilities, or any parts thereof, used to convey sewage or wastewater to disposal.

14. “Survey control” shall mean horizontal and vertical location. Horizontal shall be based on Virginia State Plane Coordinate Grid, South Zone, NAD 83 Datum. Vertical shall be based on NGVD 1988 Datum with measurements made in U.S. survey feet.

15. “Water main” shall mean a pipe or conduit for transporting potable water.

SECTION E-2

WATER FACILITIES

2.01 General Requirements. Water distribution systems shall be designed by a Professional Engineer registered in the Commonwealth of Virginia and approved by the Authority. Designs shall be performed in accordance with the Virginia Department of Health Waterworks Regulations, the Department of Environmental Quality regulations, and the following criteria.

2.02 Water Main Design.

1. All water systems shall be designed to provide adequate flow and pressure for both domestic supply and fire suppression capability. The design professional shall utilize existing elevation, pipe size, and related data to furnish computer simulation results for a determination of fire flow and pressure availability based upon a Hazen-Williams "C" value of 120 for the existing and proposed facilities. Average daily flows shall be determined from the Department of Health Waterworks Regulations. The primary main or mains of a sub-system shall be no smaller than 8-inch diameter. Water mains shall be sized to deliver 1,500 GPM (or higher quantity as development may dictate), so that pressures with the distribution system do not fall below 20 PSI. All information used for design of the water system shall be submitted in a written report to the Authority.

2. Minimum pipe size may be 4 inches as long as no fire hydrants are connected thereto and there can be no extension of the 4-inch main. For dead end mains, the last 300 feet may be 2 inches; however, dead end mains shall be limited.

3. The water system shall be designed to deliver water at a minimum pressure of 30 PSI at the meter under normal operating conditions.

4. Water mains shall be installed at the depth of cover shown on the Drawings or a minimum of 36 inches over the pipe for pipes 8 inches in diameter or smaller. 10 inch and larger water mains shall be installed with a minimum of 48 inches of cover. Water mains located within VDOT rights-of-way shall be located a minimum of 36 inches below edge of pavement for mains 8 inches and smaller and 48 inches below edge of pavement for mains 10 inches and larger.

2.03 Water Course Crossing Design. Aerial crossings of water courses will not be permitted. Should crossings under water be designed, water main shall be encased in concrete, horizontal directional drilled, or direct buried with flexible (ball and socket) watertight joints. Unless ball and socket pipe is used, all crossing pipe shall be ductile iron with restrained joints. Valves and sample taps shall be provided on each side of the crossing, shall be easily accessible, and shall be located in a position adjacent to the crossing but not subject to flooding.

2.04 Railroad Track Crossing Design. Crossings of railroad tracks shall be designed in accordance with American Railway Engineering and Maintenance Association (AREMA) Specifications and the requirements of the affected railway company. The crossings shall be designed as auger-bored installations in steel casing with length of casing, depth of cover from top of rail to top of pipe, valves furnished and other details all as required by the AREMA and the railway company. Carrier pipe shall be ductile iron with restrained joints or butt fusion weld HDPE and be fitted with spider type guides inside the casing pipe.

2.05 Highway Crossing Design.

1. Crossings of federal, state primary, or major secondary roads shall be designed as auger-bored crossings in steel casing and in accordance with VDOT requirements.

2. Crossings of minor secondary and subdivision roads shall be auger-bored or open-cut crossings in steel casing pipe with pavement repair where applicable, as shown in the details, and as allowed by VDOT.

3. Water main pipe for all crossings shall be ductile iron with restrained joints and be fitted with spider type guides inside the casing pipe.

2.06 Water Service Design.

1. General. Water services and plumbing shall be designed in accordance with the Uniform Statewide Building Code and these standards. All services shall be metered.

2. Services. Single-family residential services shall be designed in accordance with the Standard Details. Minimum size shall be 3/4-inch copper tubing size (CTS) service with 5/8-inch meter. If the delivery pressure at such meter shall be less than 40 PSI, the service tubing shall be 1-inch CTS to the meter.

   If less than 40 PSI at the house location, the following shall be added to the construction Drawings. "It is recommended that the service tubing from meter to house be a minimum of 1 inch CTS and should pressure at the house be insufficient, a booster pump may be included as part of the house plumbing."

   Services for other than single-family use shall be designed as required for the contemplated use.

3. Pressure Reducing Valves. If pressures greater that 80 PSI are anticipated at a service, the following note shall be added to the Drawings. "Should service pressures greater than 80 PSI be present, individual pressure reducing valves shall be installed as part of the house plumbing as required by the Uniform Statewide Building Code."

4. When water service taps are located under pavement, the service line shall be copper and encased as shown on the Standard Details.

5. Water meter boxes shall be located a minimum of 3 feet from driveways or other vehicle travel ways.

2.07 Water Appurtenance Design. All appurtenances shall be designed in accordance with the Standard Details.

1. Fire hydrants shall be located at street intersections, where possible.

2. Fire hydrants shall be spaced no more than 800 feet apart and at a closer spacing as necessary to limit hose line length to 500 feet to main entrance and 700 feet to most remote point of buildings to be protected.

3. Gate valves shall be installed at all distribution system intersections; at all fire hydrant branches; at water main terminal points; and at suitable locations necessary for system isolation – every 2,000 feet – if not otherwise valved. All such valves shall be located outside of the roadway pavement, wherever possible.

4. Valve stem extensions shall be designed for those locations where the depth of cover over the pipe exceeds 5 feet. Extension depth shall be such that a standard tee-handle valve key may be utilized to operate the valve.

5. Air release assemblies shall be located at high points in the distribution system. For pipe sizes less than 12 inches, fire hydrants may be utilized as air releases.

6. Flushing hydrant assemblies shall be located at low points or at termini on the water main system. Flushing hydrants shall be positioned to drain the immediate system of water mains. Access to flushing locations is critical to proper operation and should be considered in the design.

7. Concrete vaults containing meters, control devices, special valves, or other similar appurtenances shall be designed to withstand the applied loads determined from the location of the vault. Such vaults may be formed and cast-in-place, precast concrete, or bolt together precast concrete. Other vault materials may be considered on a case-by-case basis. Such vaults shall be drained to the surface where practical or to absorption pits with sump pits provided inside the structure. Vaults shall not be connected directly to sewers.

8. Water mains, which temporarily terminate in valves or plugs, shall be designed for ease of continuation in the future without placing the existing facilities out of service. Such termini shall be installed with a concrete bulkhead or other restraint as shown on the Standard Details.

9. Tapping sleeves and valves shall be utilized where new developments occur.

10. Sampling stations shall be included and located where directed by the Authority.

2.08 Structural Design.

1. Special structures shall be designed by the Engineer.

2. Pipe bedding shall be considered in the design with proper strength pipe utilized.

3. Thrust restraint shall be provided in accordance with the Standard Details. Mechanical joint or similar restraints shall be used where properly designed. Concrete thrust blocks bearing against undisturbed earth will be allowed where mechanical joint restraints will not provide adequate thrust restraint.

SECTION E-3

WASTEWATER FACILITIES

3.01 General Requirement. Sewerage shall be designed by a Professional Engineer registered in the Commonwealth of Virginia and approved by the Authority. Designs shall be performed in accordance with the State Water Control Board's Sewage Collection and Treatment Regulations and the following criteria.

3.02 Design Population. Sewerage shall be designed for complete development of the watershed with a design analysis including all assumptions submitted in a written report to the Authority. Unit sewage flows shall be those utilized by the State Water Control Board's Sewage Collection and Treatment Regulations. Actual flows from similar establishments may be utilized as long as supporting data is furnished and appropriate peaking factors are applied.

3.03 Sanitary Sewer Design. Sanitary sewers shall be designed in accordance with the following concepts:

1. Virginia Sewage Collection and Treatment Regulations.

2. Uniform slope and straight alignment.

3. Free flowing when full to provide a velocity of 2 feet per second.

4. Roughness value, N=0.013, as utilized in the Kutter formula.

5. Maximum velocity, 10 FPS.

6. Minimum size, 8-inch diameter.

7. Minimum slope, shall be:

Size:	8"	10"	12"	15"	18"	24"
Slope %:	0.40	0.28	0.22	0.15	0.12	0.08

Eight inch sewers with fewer than three service connections shall have minimum slope of 1%.

8. Sewer constructed on 20 percent slope or greater shall be anchored securely with concrete anchors or other approved means. Suggested minimum anchorage is as follows but should be determined by the Engineer.

   A. Not over 36 feet center to center on grades 20 percent up to 35 percent.
   B. Not over 24 feet center to center on grades 35 percent up to 50 percent.
   C. Not over 16 feet center to center on grades 50 percent and over.

9. Minimum depth of cover, 4 feet. Special details such as concrete cap and/or ductile iron pipe shall be used for locations where less cover exists over the pipe.

10. Maximum depth of cover, 15 feet. When depth of cover exceeds 15 feet, special details such as ductile iron pipe (special thickness design), concrete encasement, or other techniques shall be used to protect the pipe.

11. Where property beyond the subdivision or project under design may be served, the proposed system shall be designed to accommodate such development through proper size and depth of sewer to provide such future extension.

12. For gravity sewers pipe material shall remain consistent from manhole to manhole. Pipe materials used for sanitary sewer force mains may vary to accommodate pressure variances, provided the appropriate transition fittings are used; however, material consistency is encouraged.

3.04 Sanitary Sewer Location. In proposed subdivisions, sewers shall generally be placed along the road shoulder on the side opposite the water main. Should sewers be located on private property, a permanent utility easement (generally 30 feet in width) shall be provided with an additional temporary easement (generally 20 feet in width) furnished for construction purposes. All easements shall be recorded with the Campbell County Clerk of Circuit Court.

3.05 Water Course Crossing Design. Where no other alternative exists, exposed sanitary sewer crossings may be permitted. Such crossings shall be adequately supported, strapped in place, insulated to protect the sewer against damage from freezing, accessible for repair or replacement, and installed above the level of a 100-year flood plus any floating debris such flood may carry. Should crossings under water be designed, sanitary sewer shall be encased in steel casing pipe or direct buried with flexible (ball and socket) watertight joints. Unless ball and socket pipe is used, all crossing pipe shall be ductile iron with restrained joints. Valves and sample taps shall be provided on each side of the crossing, shall be easily accessible, and shall be located in a position adjacent to the crossing but not subject to flooding.

3.06 Railroad Track Crossing Design. Crossings of railroad tracks shall be designed in accordance with AREMA Specifications and the requirements of the affected railway company. The crossings shall be designed as auger-bored installations in steel casing with length of casing, depth of cover from top of rail to top of pipe, valves furnished and other details all as required by the AREMA and the railway company. Carrier pipe shall be ductile iron with restrained joints and be fitted with spider type guides inside the casing pipe.

3.07 Highway Crossing Design.

1. Crossings of federal, state, primary, or major secondary roads shall be designed as auger-bored crossings in steel casing and in accordance with VDOT requirements.

2. Crossings of minor secondary and subdivision roads shall be auger-bored or open-cut crossings in steel casing pipe with pavement repair where applicable, as shown in the details, and as allowed by VDOT.

3. Sanitary sewer pipe for all crossings shall be ductile iron with restrained joints and be fitted with spider type guides inside the casing pipe.

3.08 Protection of Water Supplies.

1. General Requirements. The Engineer shall exercise all reasonable care in the design of the work to avoid interference with any water utility services whether indicated on the Drawings or not, and to protect the same against pollution or contamination which may occur as a result of the construction of any sanitary sewerage.

2. Water Supply Interconnections. There shall be no physical connection between a public or private potable water supply system and a sewer or appurtenance thereto which would permit the passage of any sewage or polluted water into the potable water supply. No water supply or distribution pipe shall pass through or come in contact with any part of a sewer manhole.

3. Relation to Water Works Structures. Sewers shall be designed in accordance with Virginia Department of Health regulations concerning the clear distance from the sewer to any individual water supply well or other water supply sources and structures.

4. Relation to Water Mains.

   A. Parallel Installation. Water mains shall be designed at least 10 feet horizontally, barrel-to-barrel, from a sewer or sewer manhole. Where local conditions prevent a horizontal separation of 10 feet, the water main may be designed such that the bottom of the water main is a least 18 inches above the top of the sewer. Where this vertical separation cannot be obtained, the sewer shall be designed of ductile iron pipe and shall be pressure tested in place to 30 PSI without leakage prior to backfilling.

   B. Crossings. Water mains crossing sewers shall be designed with a separation of at least 18 inches between the bottom of the water main and the top of the sewer. Where local conditions prevent a vertical separation, sewers passing over or under water mains shall be designed of ductile iron and shall be pressure tested in place to 30 PSI without leakage prior to backfilling. Water mains passing under sewers shall, in addition, be protected by providing a vertical separation of at least 18 inches between the bottom of the sewer and the top of the water main. Adequate structural support for the sewers shall be provided to prevent excessive deflection of the joints and settling on or breaking the water main. Further, the length of the water main shall be centered at the point of the crossing so that joints shall be equidistant and as far as possible from the sewer.

3.09 Manhole Locations. Sanitary sewer manholes shall be provided as follows:

1. At a maximum distance of 400 feet for pipe 15 inches or less in diameter and at a maximum distance of 500 feet for pipe greater than 15 inches in diameter.

2. At all junctions with other sewers.

3. At all changes in pipe materials.

4. At the terminus of a sewer.

3.10 Manhole Details.

1. Manholes shall be a minimum 4 foot inside diameter. Where pipe larger than 15 inches is used, the manhole diameter shall be a minimum of 5 feet.

2. Maximum difference between influent and effluent invert shall be 2 feet. A smooth transition between inverts shall be made with cast-in-place concrete. Influent and effluent invert shall be 0.1 feet for 0 degrees to 30 degrees, 0.2 feet for 30 degrees to 60 degrees, and 0.3 feet for 60 degrees to 90 degrees.

3. Manhole rims shall be designed at 2-feet above the 100-year flood elevation. If not practical to do so, watertight frames and covers shall be included in the design. Where watertight sections of sewer are designed, manhole vents shall be included to provide the necessary ventilation. Unvented sections of sewer shall not exceed 1,000 feet in length. Manhole frames shall be anchored to the precast concrete.

4. Where the difference in invert is greater than 2 feet inside, drop connections shall be provided. Inside drops require a 5 foot diameter manhole.

5. Where allowed by the Authority, service laterals shall connect into manholes at an elevation equal to the crown of the main line entering the manhole.

6. Deflection angles between incoming and outgoing lines shall not exceed 90 degrees.

3.11 Building Connections. Service laterals designed from a building to the sewer shall be at least 4 inches in diameter. A clean out shall be provided on all building connections at right-of-way property or easement lines.

SECTION E-4

SPECIAL DESIGN CONSIDERATIONS

4.01 Permits.

1. The Engineer shall obtain environmental permits for the Authority from the Virginia Department of Health, Virginia Marine Resources Commission, Army Corps of Engineers, and Department of Environmental Quality as required for construction. A copy of these permits shall be provided with the Bidding Documents.

2. The Contractor or Developer responsible for conducting land disturbing activity shall obtain an Erosion and Sediment Control Permit and file a Stormwater Management Plan with Campbell County and Stormwater VPDES Permits from the Department of Environmental Quality, as required, prior to initiating construction site activities. The Developer shall be responsible for costs of all permits required. A copy of all permits and plans shall be given to the Engineer and the Authority.

4.02 Utilities Located in VDOT Right-of-Way.

1. The Engineer shall fully understand the requirements of the Virginia Department of Transportation concerning location of utility facilities in VDOT rights-of-way.

2. The permit requirements of VDOT shall be included within specifications of the documents furnished to the Authority. All VDOT special details, road-crossing requirements, paving, and shoulder replacement details shall be shown on the Drawings or in the Bidding Documents and included as pay items as necessary to describe the work required by the Contractor. Sufficient Drawings and details shall be furnished for use by the Authority in procuring the land use permit.

3. Maintenance of Traffic plans shall be designed and conducted in accord with the requirements of VDOT.

4. All requirements such as the use of certified Erosion and Sediment Control persons and certified traffic signal persons shall be included in the construction documents.

SECTION E-5

DOCUMENT PREPARATION PROCEDURES AND CHECKLIST

Date_____ Project Name _____

Owner_____ Engineer _____

The Engineer shall include the following items on the Drawings, as required. Should the utilities design be part of an overall subdivision or other development plan, the water and sewage utilities design portion shall be included on separate sheets. The Engineer shall assure coordination of all details of construction including storm drainage design, pavement design, and design of other utilities with that for water and sewerage design.

All Drawings sheets shall be D-sized (24 inch by 36 inch).

All data shall be provided in an electronic format for paperless distribution. Data shall be furnished in AutoCAD format and shall be DXF (Data Exchange File) or DWG (AutoCAD Compatible Drawing File) with sufficient layers furnished to show existing topographical features, utilities, roads, point elevations, property data, and the proposed design features. Data shall be shown at a 1:1 configuration so that various scale plots utilizing certain layers can be produced for Construction Drawings (1:600) and/or utility system details (1:2400).

Once all work is finalized, the electronic files can be copied to compact disks for distribution in PDF format.

5.01 Title Page.

A._____ Project name and number (as provided by the Authority)
B._____ Engineer's seal, signature, and date
C._____ Location map
D._____ Water and sewerage notes with Miss Utility notation and reference made to Authority standard specifications and details.
E._____ Legend of existing and proposed features—utilities, poles, roads, drives, property pins, etc.
F._____ Signature block for Authority approval
G._____ List of Drawings

5.02 Index Page. (If Necessary)

A._____ Subdivision plat with utility sheet plan numbers
B._____ Overall plan of the utilities layout, including any phasing of the development
C._____ Tax identification numbers of parcels (unless all work is in VDOT right-of-way)
D._____ Area map with sewage service analysis

5.03 Plan and Profile Pages (General).

A._____ Existing water and sewerage facilities on each sheet. A larger scale may be required to adequately detail plan features.

B._____ Existing water and/or sewerage mains shall be labeled with sizes and drawn to scale.

C._____ Benchmark and control points on each sheet.

D._____ Existing easements

E._____ Proposed utility easements.

F._____ Existing and proposed storm sewers, gas mains, telecommunications, power, and other utility cables, which cross or run parallel to the utility shall be shown with exact horizontal and vertical separations given, where applicable.

G._____ Road names, state route numbers, and right-of-way widths.

H._____ Plan and profile drawn in the same direction. Stations shall ascend from left to right.

I._____ Property lines, property markers, and tax parcel identification numbers.

J._____ Location of existing houses, buildings, fences, wells, drainfields, and other structures.

K._____ Erosion control and sedimentation details as required by the Virginia Erosion and Sediment Control Handbook.

L._____ Locations of special features such as concrete encasement, riprap stabilization, clay dams, etc.

M._____ Detail Drawing of all stream crossings, jurisdictional wetlands, and storm sewer outlets, with elevations of the streambed and high (100-year flood elevation) and normal water elevations.

N._____ Pavement replacement location.

O._____ Proposed, existing, and original ground elevations.

P._____ North arrow.

Q._____ Where horizontal boring is required, bore location, length of bore, pit location, and pit size shown in relation to all existing and/or proposed utilities on plan and profile.

R._____ Location of utility in existing VDOT right-of-ways and coordination with VDOT requirements.

S._____ Horizontal scale for all utility plans shall be at least l in = 50 ft with vertical scale 1 in = 10 ft.

T. _____ A graphical scale shall be shown on each Drawing.

5.04 Plan and Profile (Sewerage).

A._____ All sanitary sewers with size, grade, length, direction of flow, and type and class of pipe.

B._____ Manholes with top and invert elevations; and locations, size, and inverts of drop stacks when a vertical drop exceeds 2 feet.

C._____ Virginia State Plane Coordinates for all manholes.

D._____ All finished floor elevations and/or basement elevations of structures to be served.

E._____ Manholes designed with rims above the 100-year flood plain elevation as set forth in the design standards.

F._____ Manhole locations shown in easements.

G._____ Depth of cover over sewer pipe meets minimum criteria.

H._____ A minimum of 10 feet horizontal separation is maintained between sewers, sewer laterals, and water meters or water blowoff devices (flushing hydrants).

I._____ All pipe between manholes shall be the same material and class.

J._____ Whenever connecting a sewer lateral to an existing sewer, Engineer shall note that the Contractor shall use a mechanical hole cutter when tapping the existing sewer and that an approved saddle shall be used.

K._____ Where existing manholes must be accessed for proposed sewers, the manholes shall be core drilled and fitted with an insert adapter or boot.

L._____ Sampling manholes are required for new facilities currently regulated by local or federal industrial waste pretreatment laws. Appropriate measures have been included in the design to allow for sampling of industrial waste. A sampling manhole shall be provided at the property line to facilitate random 24-hour composite sampling. Provisions include ingress/egress to the private manhole, ability to sample, and adequate space to set a 24-hour composite sampler.

M._____ Design details for solids interceptors, grease separators, and grit removal systems where required by facility use.

5.05 Plan and Profile (Water).

A._____ All fittings, fire hydrants, valves, air releases, and blowoffs including sizes properly labeled.

B._____ All conflicts with storm sewers and other utilities shown with appropriate design changes shown.

C._____ A minimum of 18 inches of vertical clearance has been designed and obtained at all crossing of other utilities, or as specified by other utility agencies, or otherwise approved by the Authority.

D._____ Water mains with size, type, and class of pipe and a minimum of 36 inches of cover for 8-inch and smaller mains and 48 inches of cover for mains 10-inch and larger.

E._____ Fire hydrant, blow-off, and air relief locations are shown in the profile.

F._____ Hydrants or blowoff assemblies are designed at major low points in the main and air release assemblies are designed at high points.

G._____ Blowoff devices (flushing hydrants) or hydrants at the main dead ends.

H._____ Water services shown.

I._____ Connections to existing mains shown.

J._____ Ditch lines shown on the plan and depth of ditches shown on the profile at the fire hydrant locations and services, where necessary, with a depth of cover under the ditch of at least 30 inches.

K._____ Water main stubs for future extensions included.

L._____ Location of water meter boxes shown outside non-vehicular traveled areas.

M._____ Sampling stations shown as required.

SECTION E-6

REVIEW PROCEDURE FOR WATER AND/OR SEWER PLANS (DEVELOPER PROJECTS)

Prior to construction of public water and/or sewer facilities and issuance of any building permits, water and/or sewer plans must be submitted to and approved by the Authority.

A. It is required for water and sewer projects, that the Engineer arrange a meeting with the Campbell County Utilities and Service Authority, 20644 Timberlake Road, Lynchburg, Virginia 24502, (434) 239-8654, to discuss the approach to be taken to supply water and sewer service. All water and sewer systems must be sized properly, and the location designed to provide sewer and water to the entire service area. An overall water and sewer plan of the development shall be submitted for review and approval.

B. The water and sewer plans must be designed by a Professional Engineer or Professional Surveyor with a Class B license who is registered by the Commonwealth of Virginia. The plans must conform to the County's latest overall water and sewer master plan and the document preparation procedures and checklist for water and sewer plans. (See Section E-6 of this document).

C. The Engineer shall coordinate the location of all proposed water and/or sewer lines within all existing and proposed road rights-of-way with regard to existing and proposed roads and drainage structures. In addition, coordination shall be made with other appropriate utility companies and agencies, i.e., electric utility companies, telecommunication companies, gas companies, railroad rights-of-way, VDOT, etc., with regard to their existing easements, rights-of-way, and facilities.

D. The Engineer shall submit a copy of the document preparation procedures and checklist with a certification that the plans reflect all applicable items on the checklist. The plans will be reviewed and a review letter will be sent to the Engineer with a copy to the Developer. When making the revisions, the Engineer shall resubmit the plans for final review. A letter of approval will be sent when all the Authority criteria are met. Four sets of additional plans shall be sent once all the approvals are granted for construction purposes.

E. Prior to the beginning of construction, all water and/or sewer easements outside the boundaries of the new subdivision and/or within a complex not recorded by a subdivision plat shall be dedicated to the Authority. The Developer shall provide a check payable to the clerk of the circuit court in the amount of the recordation costs for all easements. When a VDOT permit is required to install the water and/or sewer line, the Engineer needs to follow the "review process for water and sewer lines in VDOT's right-of-way" letter from VDOT, accepting the location of the water and sewer lines in the right-of-way. Design of the pavement replacement by VDOT is required prior to approval of the water and sewer plans. The Developer shall have a copy of the highway permit sent to the Authority prior to the start of construction within the VDOT right-of-way.

F. Upon meeting all the above criteria, Drawings will be turned over to the Authority for the issuance of Notice to Proceed. The Contractor must give the Authority at least 48 hours' notice before construction is to begin. At such time, a Pre-Construction meeting is required and shall be arranged by the Contractor with the Authority.

SECTION E-7

GENERAL RESPONSIBILITIES OF A DESIGN ENGINEER HIRED AND PAID BY THE DEVELOPER

The Developer shall employ an Engineer to evaluate, design, and perform construction administration services for the water and/or sewer system required for the project. The Engineer shall be registered as a Professional Engineer in the Commonwealth of Virginia and possess the necessary experience and qualifications to design potable water and sanitary sewer systems.

The Developer must assure that the following duties are included in any agreement with the Engineer:

A. The Engineer must evaluate the water and sewer needs of the proposed system. The evaluation must include an analysis of the existing systems to determine if capacity is available to provide the required service. A hydraulic analysis of both water and/or sewer needs must be performed to determine main size. The hydraulic analysis of the water system must address domestic and fire flow needs, hydrant spacing, and "looping." The analysis must also address other factors as required to meet Authority and State regulations.

B. Engineer must prepare detailed drawings (plans, profiles, and details), and written specifications suitable for competitive bidding (if required). If written specifications are not required, notes shall be added to the plan sheets as required by the Authority. The detailed documents shall coordinate the water and sewer construction with other construction associated with the project, such as, street and storm drainage construction. Plans shall be printed on 24-inch by 36-inch plan and profile paper.

C. Engineer must be available to respond to questions and/or review his design and project documents with the Authority and State review agencies.

D. Engineer shall prepare 8-1/2-inch by 14-inch easement plats as required for the project. The Engineer shall also prepare other drawings that may be required to obtain State and/or County permits.

E. Engineer must be available to respond to Contractor inquiries during the bid period, and issue addenda, if required.

F. Engineer must review bids, prepare bid tabulation, and recommend contract award.

G. Engineer must establish and set control/reference points for Contractor to use for construction layout. Engineer must also have the authority to have property pins or stakes set for the accurate field location of meter settings.

H. Engineer shall review and approve shop drawings and respond to technical questions that may arise during construction (either office or field review may be required).

I. Based on field measurements provide by Authority inspector and/or Contractor, Engineer shall prepare, certify, and furnish record drawings to the Authority (two paper sets of record drawings and CD containing record drawings in AutoCAD (*.dwg and *.pdf file format).

J. Plan review

SECTION E-8

CCUSA Water/Wastewater Record Drawing Checklist
(November 15, 2016)

General:

1. Street addresses for each lot where a water or sewer service has been set.

2. Field survey to accurately locate storm drainage pipes that cross water or sewer lines. Determine and accurately show storm pipe crossing elevations in the water and sewer profiles and note the pipe inverts in the storm sewer structures.

3. Plans shall be tied to the Virginia State Plane Coordinate System.

4. If the road centerline profile has been used for the water or sewer profiles then stationing of the water and sewer lines shall be in relation to the road centerline.

5. Provide one paper copy of the record drawings and a USB flash drive or CD/DVD containing electronic files of the record drawings. The electronic files shall be contained in two folders. One folder shall contain drawing files in .dwg format compatible with AutoCAD Civil 3D 2016. The other folder shall contain drawing files in .pdf format.

Water:

1. Field survey to accurately locate meter boxes, valve boxes, hydrants, and other above grade water line appurtenances. Revise the plan view accordingly if the scale permits.

2. Add large scale schematic details of main connections, branches, or appurtenances as shown on the record drawing mark-ups.

3. Number fire hydrants, air release valves, flushing hydrants, etc. as marked on the record drawing mark-ups.

4. Revise material notes in the plan view to reflect the actual stationing and materials used.

5. Revise water profiles to note the correct stationing of valves and fittings.

6. Redraw water profiles as shown on the record drawing mark-ups or if the stationing of valves or fittings has changed by 5 feet or more.

7. Redraw storm sewer crossings in the water profiles and note their inverts at crossings.

Wastewater:

1. Field survey to accurately locate cleanouts, manholes, manhole invert elevations, and manhole top elevations. Revise the plan view accordingly if the scale permits.
2. Revise profiles to note the correct manhole stationing, manhole top elevation, manhole invert elevation, distance between manholes (to the nearest 0.1 feet), and line slope between manholes.

3. Redraw sewer profiles if inverts have changed by 0.3 feet or more or if manhole locations have changed by 5 feet or more. The correct distances and slopes between manholes must be noted even if redrawing the manholes and/or pipe is not required.

4. Redraw storm sewer crossings in the sewer profiles and note their inverts at crossings.