

Water and Wastewater Rules, Regulations, Operational Procedures, Design Standards and Details for Culpeper County Water and Sewer Authority

October 6, 2005

These Volumes represent a portion of the water and sewer system standards, rules, rates, and procedures as approved by the Culpeper County Water and Sewer Authority (Authority) on October 6, 2005 and effective October 6, 2005. As such, these Volumes must be used for all service areas under the jurisdiction of the Authority. Comments and inquiries are to be directed to the Authority.

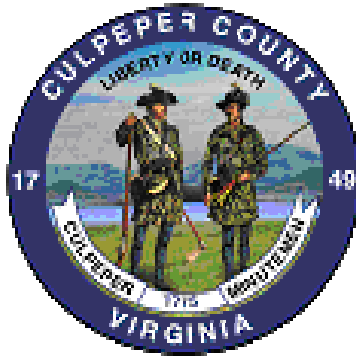
CULPEPER COUNTY WATER AND SEWER AUTHORITY

**Water and Wastewater
Rules, Regulations, Operational Procedures, Design Standards
Design Details and Agreements for Service
for
CULPEPER COUNTY WATER AND SEWER AUTHORITY**

October 6, 2005

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Volume A

CULPEPER COUNTY WATER AND SEWER AUTHORITY

RULES AND REGULATIONS

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CULPEPER COUNTY WATER AND SEWER AUTHORITY

**VOLUME A
 RULES AND REGULATIONS
 PART 1
 GENERAL OPERATING RULES AND POLICIES
 CULPEPER COUNTY WATER AND SEWER AUTHORITY**

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VOLUME A - RULES AND REGULATIONS

PART 1 - GENERAL OPERATING RULES AND POLICIES

100 **GENERAL CONDITIONS**

100.01 Introduction

The purpose of this Section is to establish rules and regulations for the Culpeper County Water and Sewer Authority (the "Authority" and/or "CCWSA's") this section sets forth the requirements in accordance with Sections 15.2-5100 through 15.2-5158, the Virginia Water and Waste Authorities Act, of the Code of Virginia of 1950, as amended, and which are applicable to the public water and sanitary sewerage facilities now existing or which may, in the future, be under the jurisdiction of the Authority and procedures for securing the provision of the Authority's water and/or sewer services consistent with the Authority's *Operating Code*.

Inquiry for information or clarification of any item herein, pertinent to other matters concerning the Authority's provision of services shall be directed to the General Manager, Culpeper County Water and Sewer Authority, Culpeper, Virginia 22701.

100.02 Validity

If any section, subsection, sentence or clause or phrase of this Section is for any reason held to be invalid, such decision shall not affect the validity of any other portion of this Section, which can be given effect without such invalid portions of this Section.

No statement or obligation in this part shall be construed to interfere with any additional requirements that may be construed to interfere with any additional requirements, which may be imposed by County Ordinances, Commonwealth of Virginia, Virginia Department of Health ("VDH") or Virginia Department of Environmental Quality ("DEQ").

100.03 Definitions

Unless the context specifically indicates otherwise the meaning of terms used herein shall be as follows:

- a. Advance Availability - shall mean any Availability purchased for any parcel of land within a Service District, in advance of the Authority's extension of services into the Service District, as defined by the approved and current Culpeper County Comprehensive Plan or such other rules and regulations as may be adopted by the Authority.

- b. Applicant - shall mean any person or entity requesting water and/or sewer service from the Authority.

- c. Authority - shall mean the Culpeper County Water and Sewer Authority or its authorized and/or delegated representative.
- d. Availability - The right of a subscriber to connect to the water and/or sewer system of the Authority upon payment of all applicable rates, fees and charges. See Volume A, Part 5, 100.02 for definition of Availability Fees.
- e. Board - shall mean the Board of County Supervisors, the governing body of Culpeper County, Virginia.
- f. Commercial User - shall mean all non-residential users.
- g. Connection Fees - All fees appropriate to the class of service being purchased, that shall be paid before full service is initiated, including, but not limited to Availability Fees, Permit Fees, Meter Fees, Review Fees, etc.
- h. County - shall mean the County of Culpeper, Virginia.
- i. Domestic Wastes - shall mean the water-carried liquid or solid wastes which are derived principally from residential dwellings and commercial buildings.
- j. ERC: Equivalent Residential Connection.
- k. Facilities of the Authority - shall mean any and all component and pertinent parts of the entire utility system of the water and sanitary sewerage facilities under the jurisdiction of the Authority, including but not limited to the County, or any public agency of Culpeper County, such as water mains and their appurtenances, water storage tanks, filtration or treatment facilities and pumping station, sewers and their appurtenances, sewage pumping stations and treatment plants, including these items and others now constructed, installed, leased, operated or maintained by the Authority, or any which may be leased, operated or maintained by the Authority, or any which may be approved and accepted in the future as additions or extensions of the systems.
- l. Industrial Wastes - shall mean the water-carried liquid or solid wastes from institutional establishments and industrial plant processes as distinct from Domestic Wastes.
- m. May is permissive, or conditional.
- n. Non-Potable or Raw Water - shall mean water classified as unsuitable for human consumption.
- o. Operating Code (of the Authority) – shall mean Volumes A through G of the Water and Wastewater Rules, Regulations, Operational Procedures, Design

Standards and Details, for Culpeper County Water and Sewer Authority.

- p. Owner, Developer, or Subdivider - shall mean any person, firm, partnership, corporation, association, society or group owning or having an interest, whether legal or equitable, sole or partial, in any premise or tract, lot or parcel of land which is or may be in the future developed or subdivided.
- q. Person - shall mean any individual, firm, partnership, corporation, association, society, group, and unit of local, state or federal government.
- r. Potable or Finished Water - shall mean water classified as suitable for human consumption.
- s. Premise - shall mean any building or group of buildings, or any tract, lot or parcel of land upon which buildings are to be constructed and which is or may be served by the Facilities of the Authority.
- t. Rules and Regulations - shall mean Volume A, Part 1 (General Operating Rules and Policies), Part 2 (Cross Connection Control Plan), Part 3 (Pretreatment Regulations), Part 4 (Developer Services Procedures), and Part 5 (Rates, Fees, Charges, and Customer Service Policies).
- u. Sanitary Sewerage Facilities - shall mean all facilities for the collection, pumping, transmission, treatment, and disposal of sewage or wastewater.
- v. Service Area - shall mean the territory included within the boundaries of each or all of the areas of Culpeper County designated by the Board of Supervisors in which the Authority has been authorized to provide and regulate existing and future water and/or sanitary sewerage facilities.
- w. Sewer Main or Sewer Line - shall mean a pipe or conduit for the collection and transmission of sewage or wastewater.
- x. Shall is mandatory.
- y. Subscriber - shall mean any person or entity connected to the water and/or sewer system of the Authority.
- z. Utility Standards – shall mean Volume B, Water Distribution and Wastewater Collection Systems Design and Construction Standards; Volume C, Water Distribution and Wastewater Collection Systems Standard Construction Details; Volume D, Water Treatment Facilities Design Standards; Volume E, Wastewater Treatment Facilities Design Standards; Volume F, Steel and Concrete Water Storage Tank Design Standards.

- aa. Wastewater or Sewage - shall mean any combination of Domestic and Industrial Wastes together with any groundwater, surface water or storm water that may be present.
- bb. Wastewater Treatment Plant or Sewage Treatment Plant - shall mean any arrangement of devices and structures used for the treatment of sewage or wastewater.
- cc. Water Filtration Plant or Water Treatment Plant - shall mean any arrangement of devices and structures used for the treatment and/or purification of non-potable or raw water.
- dd. Water Main or Water Line - shall mean a pipe or conduit for transmission or distribution of potable or finished water.
- ee. Waterworks or Water Facilities Improvements - shall mean all facilities for the treatment and/or purification of non-potable or raw water and the transmission, pumping, and distribution of potable or finished water.

200 **WATER AND SEWER SERVICES**

200.01 General Policy

- a. Easement Costs - Applicants shall pay expenses, including but not limited to surveying, plat preparation, legal, recordation and purchase costs incurred by the Authority in obtaining easements which may be required from adjacent land owners to effect a physical connection of the Applicant's property to the facilities of the Authority, and the Applicant shall assist Authority in obtaining such easements.
- b. Lack of Capacity - No commitment of future service will be made by the Authority to an Applicant in an area where adequate flow and pressure or wastewater treatment capacity is not available in the system.
- c. Prohibition on Free Service - The Authority will not provide free service to any user of the water and/or sewer systems, nor waive any fees normally charged to such users for service.
- d. System Expansion - Nothing contained in these Rules and Regulations shall be construed to limit or prevent the Authority from extending or supplementing its facilities whenever it is determined that circumstances so warrant.

200.02Mandatory Sewer Connections

The owner of any building or structure for which sewage disposal is required, and for which building permits for such building or structure are issued, shall be required to connect such building or structure to the public sewer, provided that said building or structure is within three hundred (300) feet of approved public or private sewer. In addition, if any privy system or individual sewage disposal or individual treatment system is found by the County health department to have become unsanitary or malfunctioning, it shall be unlawful for any person to replace, repair or clean any such system or any part thereof in any manner to improve its operating conditions if sewer service is within three hundred (300) feet of any building or structure which such privy or individual sewage disposal or individual treatment system served; provided, that it shall not be unlawful to make emergency repairs to clean out so as to permit use of the facilities pending connection to the public or private sewer, provided such connection is made in the most expedient manner and provided the health department is notified of such connection or temporary repairs; and provided further that individual sewer disposal systems that serve property adjacent to a force main sewer line can be replaced, repaired or cleaned, notwithstanding that provisions hereof, subject to County health department approval. It is further provided that the owner of any building or structure for which sewage disposal is required and which is connected to public sewer shall not disconnect the building or structure from such public or private sewer.

200.03 Mandatory Water Connections

The owner of any building or structure for which water is required, and for which building permits for such building or structure are issued, shall be required to connect such building or structure to the public water supply system, provided that said building or structure is within three hundred (300) feet of approved public water supply system. In addition, if any water system is found by the County Health Department to be polluted or not potable, it shall be unlawful for any person to replace or repair any water system or any part thereof in any manner to improve its operating conditions, if the public water supply system is within three hundred (300) feet of any building or structure which such water system served; provided, that it not be unlawful to make emergency repairs so as to permit use of the facility pending connection to the public water supply system, provided such connection is made in the most expedient manner and provided the health department is notified of such connection or temporary repairs. It is further provided that the owner of any building or structure for which water is required and which is connected to an approved public water supply system shall not disconnect the building or structure from such public water supply system.

200.04 Connections When Utility Capacity is Available and Infrastructure Constructed

The Owners of all residential dwellings, commercial buildings, industrial plants, institutional establishments, structures and properties used for human occupancy, business, employment, recreation or other purposes or those who have been directed by the Board of Supervisors of Culpeper County to obtain or provide central water or sewer service for their project or development, shall be required to:

- a. Request water and/or sewer service by application to the Authority on a prescribed form,
- b. Install suitable toilet, drain and other disposable liquid wastes facilities therein;
- c. Connect such facilities directly with the public sewer or water facility.

200.05 Connections When Utility Capacity is Available but Infrastructure Not Yet Constructed

The Developer of any new residence, subdivision, or commercial or industrial site located where Authority owned and/or operated public water facilities and/or sanitary sewerage facilities are available, shall be required to:

- a. Obtain one copy of these Rules and Regulations, Volume A, Parts 1 through 5 and Utility Standards of the Authority Operating Code, Volumes B, C, D, E, and F.

- b. Request both public water and sewer service by application to the Authority. The Authority will notify the Developer, within 30 calendar days of receipt of the application, as to whether or not the services requested can be provided;
- c. Construct, at the expense of the Applicant, water main or sewers as deemed by the Authority to be either necessary, feasible or advisable to connect the applicable systems of the subdivision or development to the suitable facilities of the Authority. Regardless of whether the Authority decides to participate in the development, the plans and specifications of any proposed central water and sewer system shall be in conformance with these Rules and Regulations and the Utility Standards of the Authority's Operating Code and subject to approval and subsequent construction inspection of the Authority;
- d. Complete a Developer's Agreement between the Applicant and the Authority, if deemed necessary by the Authority, detailing the financial responsibilities, location and details of necessary construction, deed transfers and easement considerations;
- e. Complete, subsequent to the construction of such facilities, transfer of ownership of the new facilities to become the property of the Authority.

200.06 Connections When Capacity and/or Source are Not Available

The Authority reserves the absolute right to impose specific and temporary limits on new connections to its water and/or wastewater systems when, from time to time and in its sole opinion, treatment capacity or source is limited. To correct this deficiency, the Authority may elect to enter into an appropriate Developer's Agreement for the construction of such additional capacity as needed, may elect to develop such capacity itself or may determine that such expansion of capacity is not in the best public interest.

200.07 Construction Planning and Funding Responsibilities

Where a developer, builder, contractor, or property owner requires and builds a water/sewer line extension or expansion of existing facilities to serve either residential or non-residential developments, the following shall apply:

- a. Said Applicant shall, at the time of filing, file therewith a preliminary detail statement of plans, specifications, potential number of customers, fixture counts, route, long term expansion plans and any other matters deemed to be helpful to the Authority, together with proof of financial responsibility and such other information as may be requested by the Authority, in order to secure estimates for the overall project cost.
- b. Applicants shall pay for the entire construction cost of all water/sewer line extensions for whatever size lines the Authority determines are necessary to serve the proposed development, but in no case less in size than four inches in diameter for water and eight inches in diameter for sewer.
- c. The method and time for payment is determined by the type of agreement set forth between the Developer and the Authority.

200.08 Application for Service

- a. Application Submittal - Application for services will be available at the Authority's Office, during business hours. Specific examples of forms and detailed processing procedures can be found in Volume A, Part 4 - Developer Services Procedures of the Authority's Operating Code.

The Authority shall accept, review and render decisions on all applications for public water and/or sanitary sewer service to the Premises described in the applications from any persons who are owners, contract owners, legal representatives of the owners, or tenants of land within Culpeper County.

- b. Application Information - Applications for water and/or sewer services shall be made on a form prescribed and furnished by the Authority for the purpose of such application. Each form shall be accompanied by any measurements, maps, drawings or other such data that will clearly establish and indicate the

physical location of the Premise for which the application is submitted. If the proposed or physical location of the available service is known, it shall be indicated on the same map, drawing or data submittal. Drawings shall have a minimum scale of one inch equals 100 feet.

Applications for industrial establishments shall also submit with their application written information regarding plant location, type of industry, raw and finished products, approximate magnitude of utility requirements, types of Industrial Wastes to be discharged, proposed facilities for pre-treatment of Industrial Wastes, and any other data pertinent to the industry's utility requirements.

- c. Applications Requiring Construction - Where construction of water and/or sanitary sewerage facilities is required, the submittal requirements outlined in Volumes B, C, D, E and F - Utility Standards of the Authority's Operating Code shall be followed.
- d. Right to Refuse Service - The Authority reserves the right to approve, revise and request additional data, design or other information, or to disapprove any service application or plans pertinent thereof, as the opinion or best interest of the Authority may determine.

200.09 Disposition of Applications

- a. On receiving the application for service, the Authority will approve, with or without revisions, or disapprove the application, to indicate the decision of the Authority and return one copy of each of the submitted items to the Applicant. The applicant is required to submit 4 copies of all items submitted to facilitate the review and approval process.
- b. The Applicant receiving a returned application marked with revisions, shall conform strictly with the notations indicated thereon by the Authority.
- c. The procedures outlined in Volume A, Part 4 - Developer Services Procedures and Volumes B, C, D, E, and F - Utility Standards of the Authority's Operating Code, will be followed for processing applications.

300 **ACQUISITION OF FACILITIES**

300.01 New Systems

- a. Operating Guarantees - If the potential exists that the initial connections to the water and sewerage system are insufficient to support the operation and maintenance cost incurred by the Authority, the developer or owner shall provide such guarantees in the form of sureties or other negotiable

instruments as agreed by both parties, to insure support of the operation and maintenance cost until sufficient connections are supporting the system.

- b. Construction Standards - The builder, developer, or contractor shall install, at the sole expense of the Applicant, the water/sewerage facilities system, including meters, all to requirements of Volumes B, C, D, E, and F - Utility Standards, and Volume G, Water and Wastewater Service Agreements, of the Authority's Operating Code and subject to approval of the Authority.
- c. Construction Progress Inspections - During progress of the work, the Authority and/or its authorized representative, inspectors, or others who are directly concerned with the work shall have access to the locations of construction for the purpose of establishing to their satisfaction that the projects are being constructed to the Authority's requirements and in accordance with approved plans and specifications.
- d. Final Inspections - At the completion of any construction project of water or sanitary sewerage facilities, the Developer or Owner responsible for construction shall notify the Authority in writing that the project has been completed.
 - (1) Certificate of Completion - A Professional Engineer registered in the Commonwealth of Virginia shall seal and sign a letter certification stating that the facilities have been constructed in accordance with the approved plans and specifications and with these Rules and Regulations and Volumes B, C, D, E, and F - Utility Standards of the Authority's Operating Code. The Developer's or Owner's letter of notifications shall be accompanied by the Engineer's letter of certification, all as-built plans, final specifications and other such data and addenda relative thereto as may be required by the Authority.
 - (2) Field Inspection - On receipt of such notification of completion and as-built plans, and on written request of the Developer or Owner responsible for the construction, the Authority shall make a final comprehensive inspection of the completed facilities, including detailed examination of conformance of the work with the approved plans and/or specifications, alignment of sewers, infiltration, leakage, workmanship, operation of equipment, and other related items to the satisfaction and best interest of the Authority. The Developer or Owner or responsible representative shall accompany the authorized agent of the Authority and shall furnish whatever labor as may be necessary to conduct the final inspection.
 - (3) Defects - Deficiencies which are found to exist during the inspection shall be pointed out to the Developer or Owner's representative. Subsequent to the inspection, the Developer or Owner will be

furnished, in writing, a summary of the deficiencies found and corrections which are required. On notification that all such deficiencies have been corrected, the Authority will reinspect all corrected work prior to approval of the facilities.

- e. Approval of New Construction - The Authority will approve newly constructed water and sanitary sewer service facilities on satisfaction of the following conditions:
 - (1) That all requirements of the foregoing Sections 300.01 (a) through (d) have been fulfilled.
 - (2) That, in the case of water mains, physical disconnection, by actual removal of any connecting mains, has been made from any and all other private systems.
 - (3) That all matters relative to specific contracts between the Developer or Owner and the Authority are in order.
 - (4) That payment has been made by the Developer or Owner of all fees relative to applications and inspections.
- f. Waiver of Liens - The developer shall submit to the Authority a fully executed waiver of mechanics lien form signed by all contractors, subcontractors and suppliers who performed work or supplied material for the facilities.
- g. Title Conveyance - The developer shall in good and sufficient form, free of encumbrances and at no cost to the Authority, convey fee simple title to the Facilities to the Authority with all requisite easements for the operation and maintenance of the facilities, by deed with General Warranty and English Covenants of Title, in accordance with the Culpeper County Subdivision Ordinance and the procedures and requirements detailed and found in Volume A, Part 4 - Developer Services Procedures of the Authority's Operating Code.
- h. Construction Warranty - The developer shall be responsible for and obligated to correct any deficiencies in the construction of the facilities for a period of one year from date of conveyance of the Facilities to the Authority by deed as above required. These requirements shall also be applied to facilities to be constructed in conjunction with site plan approval of the Culpeper County Zoning Ordinance.
- i. Authority Ownership - Upon compliance with the above, the Authority shall thereafter supply, maintain, service, and operate said system and collect all fees from said system, and user chargers, according to its effective Volume

A, Part 5 - Rates, Fees, Charges, and Customer Service Policies of the Authority's Operating Code.

300.02 Acquisition of Existing Systems

a. Policy

- (1) General - From time to time, the Authority is asked to purchase existing water and/or wastewater systems within Culpeper County. In accordance with its charter, it is the policy of the Authority to acquire only those existing water and wastewater systems which will enhance the Authority's overall operation. As the construction and operation of existing systems may not be within Authority standards, the subsequent acquisition of these systems demand a more detailed evaluation and consideration than those systems built for and immediately assumed by the Authority. For favorable consideration, systems proposed for acquisition by the Authority will usually have the following characteristics:
 - (a) They will be adjacent to or reasonably close to an existing Authority system to permit connection with only limited infrastructure construction;
 - (b) They will not be an added financial burden to existing Authority customers;
 - (c) Acquisition by the Authority will have the support of a majority of the current users of the system to be acquired;
 - (d) The new customers can and will pay the monthly operating and maintenance rates in effect for all of the Authority systems.
- (2) Specific - The following considerations will be used when evaluating system acquisitions:
 - (a) Existing Infrastructure - The Authority will generally not pay for existing distribution or collection systems as these costs have already been recovered by the developer in the sale to individual property owners.
 - (b) Water Source - On a case by case basis and at its sole determination, the Authority will pay an amount determined by the Authority for capacity at an existing water source that exceeds the capacity required for the existing and potential customers served or to be served by such source.

- (c) Treatment Capacity - On a case by case basis and at its sole determination, the Authority will pay an amount determined by the Authority for existing treatment capacity that exceeds the capacity required to serve the existing and potential customers of the system to be acquired.
- (d) Availability Fees - In those cases where water source and/or treatment capacity of the system to be acquired is inadequate, the owner of the system may be required to pay or arrange for a payment that is adequate, in the opinion of the Authority, to reimburse it for capacity in the Authority's systems.
- (e) Transaction Costs - Transaction costs (if any), including, but not limited to the Authority's consulting, legal, engineering and conveyance costs, will be borne solely by users and/or owner of the system to be acquired.

b. Approach

- (1) Acquisition Steps - While every acquisition is a unique process whose merits shall be individually evaluated, a number of steps are normally undertaken before an existing system will be accepted for ownership and operation by the Authority.
 - (a) Identification - The initial phase of the acquisition strategy includes the evaluation of the existing system by the staff and/or outside consultants. This phase seeks to create an accurate picture of the layout, sizing, condition, performance and operating costs of the existing system. In addition, existing and required easements are identified. Finally, the cost to bring the system up to Authority standards is quantified.
 - (b) Negotiations - Agreement is reached between the system owner and the Authority for its acquisition during this phase. Also during this phase, the cost to be borne by system owner, a Capital Deficiency Assessment (CDA) is identified.
 - (c) Closure and Administration - Final closure of the sale will require the exchange of fees, titles and deeds to land and equipment and the initiation of service to the area by the Authority.
- (2) Right of Refusal - The Authority maintains an absolute right to refuse acquisition of any and all existing systems that, in its sole judgment, it determines are not suitable for connection to the Authority's systems

or which would place a financial burden on the existing customers of the Authority's system.

c. Capital Deficiency Assessment

- (1) Definition - A Capital Deficiency Assessment is a one time charge to the current owner of a water and/or wastewater system being acquired by the Authority.
- (2) Purpose - The purpose of the CDA is to pay for those capital investments which the Authority will be required to make to connect the system and to bring it up to Authority construction and operating standards.
- (3) Payment Period - Capital Deficiency Assessments shall be paid in full at the time of system acquisition.

d. Investigation Costs

- (1) Definition - Initial investigation costs shall include all anticipated costs required to obtain a reasonably accurate estimate and evaluation of the existing system. These costs may include, but are not limited to, staff evaluation time, flow testing, surveying, title search, legal opinion, professional engineering analysis, etc. During the identification phase of the acquisition process, the Authority and system owner will collectively identify the degree and method of investigation needed to obtain a true picture of the system. In addition, a cost cap will be agreed for these investigative services.
- (2) Responsibility - The owner of the system being proposed for acquisition pays all investigation costs. The Authority will make an attempt to accurately estimate such costs but the system owner bears full responsibility for paying the actual costs and will agree to payment of these charges before an analysis will be undertaken by the Authority.
- (3) Refunds - Costs for the evaluation of an existing system are not refundable should the Authority elect not to, or is unable to, acquire the system. The cost of investigation may, however, be added to the Capital Deficiency Assessment should the Authority decide to proceed with the acquisition.

300.03 Freestanding and/or Alternate Wastewater Treatment Systems

- a. The Authority will not consider the operation and/or ownership of alternate technology wastewater treatment facilities. The Authority will only consider the operation and/or ownership of freestanding ("Community Systems") if they comply with all the appropriate requirements in Volumes A through G.
- b. Sewage collection systems connected to freestanding wastewater treatment facilities will be considered for connection to the Authority's public wastewater system in accordance with § 300.02 above, with the costs of connection to the system and the costs of demolition of the treatment facilities to be included in the calculation of the Capital Deficiency Assessment.
- c. The determination of whether a wastewater treatment facility is considered to be either freestanding and/or to employ alternate wastewater treatment technology shall be at the sole discretion of the Authority Board.

400 **SYSTEM SURCHARGES**

400.01 Availability Surcharges

Where the Authority constructs facilities for public utility service and normal Availability Fees, as set forth and as revised from time to time, for capacity, treatment plant construction cost or water source costs are insufficient to pay for such extensions, the Authority may assess a surcharge to the cost of Availability for users of such extensions. Such surcharge shall be as fixed by the Authority's Volume A, Part 5 - Rates, Fees, Charges, and Customer Service Policies of the Authority's Operating Code and shall be sized to off-set the additional expense of system construction within this designated area.

- a. Applicability - The additional availability charge shall be applicable to all users of the extended system and shall continue in effect until such extension is paid for and/or the Authority deems the revenues from the users of such extension to be sufficient to pay the installation costs of such extension.
- b. System Limits - The Authority shall designate the infrastructure to which this provision shall apply prior to such line being placed in service.
- c. Surcharge Determination - At such time the Authority shall determine the additional fee to be charged in such cases; and all Applicants of these facilities shall be charged the same amount per ERC so long as the additional Availability Fee herein set forth remains in effect. The additional Availability Fee shall be determined by considering the potential number of connections resulting from such new plant, the costs of the additional

treatment capacity or water source required, and other matters as the Authority may deem pertinent.

400.02 Usage Surcharges

Where the cost of operating and maintaining a water and/or wastewater system are significantly more costly than the norm, due to regulatory requirements, labor, material or power costs or other impacting requirements, the Authority shall designate that portion of the system impacted by such extraordinary costs and shall apply an additional surcharge to the customers served by this portion of the system. Such surcharge shall be as fixed by the effective Volume A, Part 5 - Rates, Fees, Charges, and Customer Service Policies of the Authority's Operating Code and shall be sized to off-set the additional expense of system operations within this designated area.

- a. Applicability - The additional usage charge shall be applicable to all users of the extended system and shall continue in effect until such extension is paid for and/or the Authority deems the revenues from the users of such extension to be sufficient to pay the installation costs of such extension.
- b. System Limits - The Authority shall designate the infrastructure to which this provision shall apply at the time the surcharge is imposed.
- c. Surcharge Determination - At such time the Authority shall determine the additional fee to be charged in such cases; and all Applicants of those facilities within the designated area shall be charged the same amount per ERC so long as the additional usage charge herein set forth remains in effect. The usage surcharge shall be determined by considering the additional cost of operating and maintaining the utility service in the designated system.

500 **USE OF WATER FACILITIES**

500.01 Withdrawal Prohibited Without Permit

Except as permitted in the Rules and Regulations of the Authority, or under conditions specifically approved in writing by the Authority, no persons shall withdraw any water from the water system of the Authority. All users shall first obtain a valid permit from the Authority allowing for said withdrawal of water from the systems.

500.02 Cross Connection and Backflow Prevention

The provisions of Volume A, Part 2 - Cross-Connection Control Plan, of the Authority's Operating Code shall apply.

500.03 Violations-Penalties

Any person violating the provisions of Section 500.01 and 500.02 herein shall be guilty of a misdemeanor punishable by fine not exceeding \$1,000 or by imprisonment not exceeding twelve months or by both such fine and imprisonment. Each day such violation continues shall constitute a separate offense. The Authority, in addition to other remedies may institute an appropriate action or proceeding, at law or in equity, to prevent violation or attempted violation, to restrain, correct and abate such violation or to prevent any act which would constitute such a violation of the provisions of Sections 500.01 and 500.02 herein.

500.04 Pressure and Continuity of Supply

The Authority will strive to provide, but cannot guarantee, a sufficient or uniform pressure, or an uninterrupted supply of potable water.

- a. Storage - Customers are cautioned to maintain a sufficient water storage where an absolutely uninterrupted supply shall be assured, such as for steam boilers, domestic hot water systems, gas engines, etc.
- b. Low Water Pressure - Where the system water pressure is lower than desired, the customer may install at his own expense a tank and/or booster pump with the appropriate backflow prevention as approved by the Authority.
- c. High Water Pressure - Where the water pressure exceeds 80 psi the customer should install at his own expense, a proper pressure regulating device to reduce the water pressure as required by the applicable Council of American Building Officials-1&2 (CABO) Family Dwelling or Building Officials Code Administrators (BOCA) codes.
- d. Water Hammer - The Authority reserves the right to require the Owner or customer to adjust, modify or remove from the Premise any quick opening or closing valve or other device, the operation of which results in any unreasonable fluctuation in the pressure of the system.
- e. Service Interruptions - It is the intention of the Authority to provide advance notice of interruption of the water supply. Such notice however, is only a courtesy and not a requirement. The Authority may shut off the water mains for the purpose of making connections, alterations, repairs, changes or for other reasons at any time. Subscriber's buildings shall have internal facilities and/or plumbing fixtures which will not be damaged if water mains are shut off without notice.
- f. Water Rationing - The Authority may restrict the use of its potable water to reserve a sufficient supply as the public health and/or public welfare may, from time to time, require. The Authority shall have sole discretion in determining when such restrictions are required.

500.05 Public Fire Hydrants

- a. Indemnification - The Authority does not guarantee fire flow in its systems nor those of private systems and sprinkler systems and shall not be responsible for, nor considered in any manner to be an insurer of persons or property against injury, loss or damage by fire, water, failure to supply water or pressure, or any other cause whatsoever.
- b. Restrictions - Water from any public or private fire hydrant shall not be used for construction purposes, sprinkling streets, flushing sewers or gutters, or for any purpose other than the fighting of fires by County authorized units, unless specifically permitted by the Authority for a particular circumstance. Upon written request, the Authority may install supplemental public fire hydrants at the sole expense of any interested person.

600 **USE OF SANITARY SEWERAGE FACILITIES**

600.01 Discharge Prohibited Without Permit

Except as permitted in the Rules and Regulations and/or Volume A, Part 3, Pretreatment Regulations, of the Authority, or under conditions specifically approved in writing by the Authority, no persons shall discharge any wastewater or sewage into the sanitary sewerage systems of the Authority, or its tributaries. All users shall first obtain a valid permit from the Authority allowing for said discharge of wastewater or sewage.

600.02 Grease, Oil, and Sand Traps

The provisions of the Authority's Operating Code shall apply.

600.03 Pre-Treatment

The provisions of Volume A, Part 3 - Pretreatment Regulations of the Authority's Operating Code shall apply.

600.04 Violations-Penalties

Any person violating the provisions of Section 600.01 through 600.03 herein shall be guilty of a misdemeanor punishable by fine not exceeding \$1,000 or by imprisonment not exceeding twelve months or by both such fine and imprisonment. Each day such violation continues shall constitute a separate offense. The Authority, in addition to other remedies may institute an appropriate action or proceeding, at law or in equity, to prevent violation or attempted violation, to restrain, correct and abate such violation or to prevent any act which would constitute such a violation of the provisions of Section 600.01 herein.

700 **OVERSIZING POLICY**

700.01 Definition

Applicants may be required to build infrastructure or facilities sized in excess ("oversizing") of the immediate needs of their specific subdivisions or projects, but in accordance with the requirements of Master Planning or other considerations determined by the Authority.

700.02 Authority Actions

The Authority shall:

- a. Reimbursement Authority - Reimburse the Applicant for the excess costs resultant from required "oversizing";
- b. Developer's Agreement - Execute a Developer's Agreement with the applicant, specifying the terms and conditions of the oversizing agreement;
- c. Incremental Costs - Reimburse the Applicant only for the incremental costs of the additional capacity created as verified by invoices and supporting documentation, in accordance with the Developer's Agreement.
- d. Proportional Reimbursement - Reimburse a proportional share of Availability Fee revenues based on the ratio of number of connections that will use the oversized facilities to the total number of connections in the designated area to be served.
- e. Ten Year Limitation - Continue reimbursement for a period of no longer than ten years after the infrastructure has been deeded to the Authority or until full repayment of the oversizing has been obtained.

**VOLUME A
 RULES AND REGULATIONS
 PART 2
 CROSS-CONNECTION CONTROL PLAN
 CULPEPER COUNTY WATER AND SEWER AUTHORITY**

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VOLUME A - RULES AND REGULATIONS

PART 2 - CROSS-CONNECTION CONTROL PLAN

100 INTRODUCTION

A cross-connection is defined as "Any physical arrangement whereby a public water supply is connected, directly or indirectly with any other water supply system; sewer; drain; conduit; pool; storage reservoir; plumbing fixture, or other device which contains or may be capable of imparting contamination to the public water supply as the result of changeable devices and other temporary or permanent devices through which or because of which backflow could occur are considered to be cross connections." Consequently, either cross-connections or the chance of backflow must be eliminated to prevent degrading the high quality of water that water purveyors strive to maintain.

The following is the Culpeper County Water and Sewer Authority, CCWSA, (hereinafter the "Authority") policy regarding Cross-Connection and Backflow Prevention.

200 OVERVIEW

200.01 Purpose

The purpose of this Policy is to protect the public potable water supply of the Authority from the possibility of contamination. To promote the elimination or control of existing cross-connections, actual or potential, between its customers in-plant plumbing fixtures and industrial piping and the public water supply; and to provide for the maintenance of a continuing program of cross-connection control and backflow prevention which will systematically and effectively prevent the contamination of the potable water distribution system. More exactly, the Policy is intended to prevent delivered water, (water that has passed beyond the public water system and into the private distribution systems of consumers), from re-entering the public distribution system and being subsequently delivered to consumers, and to allow persons, active in piping design and installation, to incorporate and install appropriate backflow prevention devices correctly.

200.02 Causes of Backflow

The causes of backflow cannot usually be eliminated completely, since backflow is often initiated by accidents or unexpected circumstances. However, some causes of backflow can be partially controlled by good design and informed maintenance. Listed below are the major causes of backflow as outlined under the two types of backflow - backsiphonage and backpressure.

a. Backsiphonage

Backsiphonage is caused by reduced or negative pressure being created in the supply piping. The principal causes of backsiphonage are:

- (1) Line repair or break which is lower than a service point. This will allow negative pressures to be created by water trying to flow to a lower point in the system.
- (2) Undersized piping; if water is withdrawn from a pipe at a very high velocity, the pressure in the pipe is reduced and the pressure differential created can cause water to flow into the pipe from a contaminated source.
- (3) Lowered pressure in water main due to high water withdrawal rate such as fire fighting; water main flushing; or water main breaks.
- (4) Reduced supply main pressure on the suction side of a booster pump.

b. Backpressure

Backpressure may cause backflow to occur where a potable water system is connected to a non-potable system of piping, and the pressure in the non-potable system exceeds that in the potable system. The principal causes of backpressure are:

- (1) Booster pump systems designed without backflow prevention devices.
- (2) Potable water connections to boilers and other pressure systems without backflow prevention devices.
- (3) Connections with another system which may, at times, have a higher pressure.
- (4) Water stored in tanks or plumbing systems which by virtue of their elevation would create head, sufficient to cause backflow if pressure were lowered in the public system.

300 **RESPONSIBILITY**

300.01 Cross-Connection Control Program

The responsibilities of the Authority's Cross-Connection Control program in accord with the Commonwealth of Virginia/State Board of Health "Waterworks Regulations" are as follows:

- a. It is the responsibility of the purveyor to establish or cause to be established and operate a Cross-Connection Control and Backflow Prevention Program consistent with the extent of the system and the type of consumer served.

This program shall include at least one designated individual who shall be responsible for the inspection of the waterworks for cross-connection and backflow prevention control. One of the Authority's Field Service Personnel shall be the individual charged with these duties. This program shall be carried out in accordance with the Uniform Statewide Building Code and shall be a continuing program. The cost of the tests shall be borne by the Owner. As required by the Virginia "Waterworks Regulations", the questionnaires are completed and reviewed every three years.

- b. Certified plans for fire service connections and extensive lawn or irrigation systems served by waterworks and other facilities requiring approved backflow prevention devices, shall be submitted to the water purveyor prior to construction. The water purveyor shall review the plans and advise if the plans are approved or disapproved. If disapproved, the designer and the purveyor shall consult with the Virginia Department of Health for a determination of what will be approved. The revised design shall be resubmitted for additional reviews. Only after final approval by the water purveyor, will it be permissible to proceed with the final construction. All plans should be submitted to the purveyor with sufficient copies for the purveyor to forward an approved copy to the Virginia Department of Health.
- c. It shall be the duty of the purveyor to have thorough inspections and operational tests made annually of backflow prevention devices or low pressure cut-off devices which are required and installed. Where storage facilities are provided, it is suggested that at least one sample per month be tested to verify that the water remains of satisfactory bacteriological quality. Copies of results of these inspections and tests shall be kept on file and made available to the Virginia Department of Health. The devices shall be repaired, overhauled, or replaced when needed. Nothing in this section shall prevent the purveyor from installing and operating approved devices or making repairs.
- d. The water purveyor may deny or discontinue the water service to a consumer if the required backflow prevention device is not installed. If it is found that the device(s) has been removed or bypassed or if a cross-connection exists on the premises, or if the pressure in the waterworks is lowered below 10 psi gauge, the purveyor shall take positive action to insure that the waterworks is adequately protected at all times. Water service to such premises shall not be restored until the deficiencies have been corrected or eliminated in accordance with these Regulations and to the satisfaction of the purveyor.

300.02 Customers

The customer's responsibility starts at the point of delivery from the public potable water system and includes all of his water systems. The customer, at his own expense, shall install, operate, test, and maintain approved backflow prevention devices as directed by the Authority. The customer shall maintain accurate records of tests and repairs made to backflow prevention devices and provide the Authority with copies of such records. The records shall be on forms approved or provided by the Authority. In the event of accidental pollution or contamination of the public or consumer's potable water system due to backflow on or from the customer's premises, the owner shall promptly take steps to confine further spread of pollution or contamination within the customer's premises, and shall immediately notify the Authority.

300.03 Backflow Prevention Device Installers

The installer's responsibility is to make proper installation of backflow prevention devices in accordance with the manufacturer's installation instructions and any additional instructions approved by the Authority.

The installer is also responsible to make sure a device is working properly when it is installed, and is required to furnish the following information to the Authority immediately after a reduced pressure principle backflow preventer (RP), double check valve assembly (DCVA) or pressure vacuum breaker (PVB) is installed:

- a. Service address where device is located
- b. Owner
- c. Description of device's location and size
- d. Date of installation
- e. Type of device
- f. Manufacturer
- g. Model number
- h. Serial number

All RP, DCVA, and PVB are required to be tested following installation by a Certified Backflow Prevention Device Technician, as defined in Section 5.

400 **INSPECTIONS**

400.01 Frequency

Due to changes in models or components of equipment, methods of manufacturing and additions to plants, buildings, etc., water use requirements undergo continual change. As a result, new cross-connections may be installed and existing protection may be bypassed, removed, or otherwise ineffective; therefore, an annual detailed inspection of the customer's premises by the Authority may be required.

400.02 Proposed Constructions

All new construction plans and specifications shall be reviewed by the Authority to determine the degree of possible cross-connections hazard. At this time, backflow prevention requirements in accordance with this policy will be made.

400.03 New and Existing Facilities

In order to determine the degree of hazard to the public potable water system, a survey will be made of the consumer's presently installed system. This survey need not be confined to establishing the water uses on the premises, the existence of cross-connections, and the availability of auxiliary or used water supplies. On site inspections are made of new and existing facilities and should any devices or plumbing changes be required, a follow-up inspection will be made of the same facilities at a later date.

500 **DEFINITIONS**

- a. Air-Gap-Separation a physical separation between the free-flowing discharge end of a potable water supply and an open or non-pressure receiving vessel. An approved air-gap separation shall be a distance of at least two (2) times the diameter of the supply pipe measured vertically above the top rim of the vessel - with a minimum distance of one (1) inch.
- b. Approved accepted by the Authority as meeting an applicable specification of the Authority and accepted by the Virginia Department of Health in accordance with Title 32.1, Chapter 6, Article 2 of the Code of Virginia entitled "Public Water Supply".
- c. Auxiliary Water Supply any water supply on or available to the premises other than the purveyor's approved public potable water supply. These auxiliary waters may include water from a private non-potable water supply or any natural source(s) such as a well; spring; river; stream; harbor; etc., or "used waters" or "industrial fluids". These waters may be contaminated or they may be objectionable, and constitute an unacceptable water source over which the water purveyor does not have sanitary control.

- d. Backflow the flow of water or other liquids, mixtures, or substances under pressure into the distribution pipes of a potable water supply system from any source or sources other than its intended source.
- e. Backflow Prevention Device any effective device, method of construction used to prevent backflow into a potable water system. The type of device used should be based on the degree of hazard, either existing or potential.
- f. Backflow Prevention Device - Approved a device that has met the requirements of one or more of the following standards:
 - (1) AWWA-C-506 Reduced Pressure Principle and Double Check Valves - (RP) & (DCVA)
 - (2) ASSE-1001 Atmospheric Vacuum Breakers - (AVB)
 - (3) ASSE-1011 Hose Bibb Vacuum Breakers - (HBVB)
 - (4) ASSE-1013 Reduced Pressure Principle Device - (RP)
 - (5) ASSE-1015 Double Check Valve Assembly - (DCVA)
 - (6) ASSE-1020 Pressure Vacuum Breakers - (PVB)
 - (7) ASSE-1024 Dual Check Backflow Preventer (Residential Use Only) - (DCBP)
 - (8) USE-FCCC University of Southern California Foundation for Cross-Connection Control and Hydraulic Research
- g. Backpressure any elevation of pressure in the downstream piping system (by pump, elevation of piping, or steam and/or air pressure) above the supply pressure at the point of consideration which would cause or tend to cause, a reversal of the normal flow.
- h. Backsiphonage a form of backflow due to a reduction in system pressure which causes a negative or sub-atmospheric pressure to exist at a site in the water system.
- i. Certified Backflow Prevention Device Technician a person who has proven his competency to the satisfaction of the Authority. The technician who is certified to make competent tests or to repair, overhaul and make reports on backflow prevention devices, shall be conversant with applicable laws, rules and regulations. The technician shall have attended and successfully completed a certification program for Backflow Prevention acceptable to the

Authority. The technician will be required to provide the Authority with a copy of his/her certificate.

- j. Contamination an impairment of the quality of the potable water by any solid, liquid, or gaseous compounds or mixtures to a degree which would create an imminent danger to the public health, or would create an unacceptable taste, odor, or color to the potable water.
- k. Cross-Connection any physical connection or arrangement of piping or fixtures between two otherwise separate piping systems, one of which contains potable water and the other non-potable water or industrial fluids of questionable safety, through which, or because of which, backflow or backsiphonage may occur into the potable water system. A water service connection between a public potable water distribution system and a customer's water distribution system which is cross-connected to a contaminated fixture, industrial fluid system or with potentially one type of cross-connection. Other types of cross-connections include connectors such as swing connections; removable sections; four-way plug valves; spools; dummy sections of pipe; swivel or change-over devices; sliding multiport tube; solid connections; etc.
- l. Double Check Valve Assembly (DCVA) an assembly composed of two single, independently acting, check valves, including tightly closing shut-off valves located at each end of the assembly. A valve that is "drip-tight" in the normal direction of flow when the inlet pressure is one psi and the outlet pressure is zero. The check valve shall permit no leakage in a direction reverse to the normal flow. The closure element (e.g., clapper) shall be internally weighted or otherwise internally loaded to promote rapid and positive closure and suitable connections for testing the watertightness of each check valve.
- m. Hazard - Degree of a qualification of what potential and actual harm may result from cross-connections within a water-using facility. The word "severe" as used to qualify "Health Hazard" means a hazard to the health of the user that could reasonably be expected to result in significant morbidity or death. Establishing the degree of hazard is directly related to the type and toxicity of contaminants that could feasibly enter the public water supply system and is determined by the Authority.
- n. Hazard - Health any condition, device, or practice in a water system or its operation that creates or may create, a danger to the health and well-being of users.
- o. Hazard - Pollution a condition through which an aesthetically objectionable or degrading material not dangerous to health, may enter the public water system or a potable consumer's water system.

- p. Hazard - System a condition posing an actual or potential threat of damage to physical properties of the public water system or a potable consumer's water system.
- q. Industrial Piping System - Consumer's any system used by the consumer for transmission of or to store any fluid, solid or gaseous substance other than an approved water supply. Such a system would include all pipes; conduits; tanks; receptacles; fixtures; equipment and appurtenances to produce, convey or store substances which are or may be polluted or contaminated.
- r. Point of Delivery/Service Connection the point at which the Consumer's Potable System is connected to the Public Potable System.
- s. Point of Use the point(s) where water is being taken from the Consumer's Potable System.
- t. Reduced Pressure Principle Backflow Preventer (RP) a device containing within its structure a minimum of two independently acting approved check valves, together with an automatically operating pressure differential relief valve located between the two check valves. The first check valve reduces the supply pressure, a predetermined amount so that during normal flow and at cessation of normal flow the pressure between the check valves shall be less than the supply pressure. In case of leakage of either check valve, the differential relief valve, by discharging to atmosphere, shall operate to maintain the pressure between the check valves less than the supply pressure. The unit shall include tightly closing shut-off valves located at each end of the device. Each device shall be fitted with properly located test cocks. (RP, RPP and RPZ are all acceptable abbreviations for this device.)
- u. Vacuum Breaker - Atmospheric Type (AVB) an approved device consisting of a check valve and an air inlet to relieve a vacuum. It shall effectively shut off the reverse flow of water when a negative pressure exists on the supply side of the device.
- v. Vacuum Breaker - Pressure Type (PVB) a pressure vacuum breaker is similar to an atmospheric vacuum breaker except that the checking unit "poppet valve" is activated by a spring. This type of vacuum breaker does not require a negative pressure to react and can be used on a pressure side of a valve.
- w. Water Purveyor the owner or operator of the public potable water system supplying an approved water supply to the public. The utility shall be one that is operating under a valid permit from the Virginia Department of Health. As used herein, the terms water purveyor and the Authority may be used simultaneous.

- x. Water System - Consumer's Potable that portion of the privately owned potable water system lying between the point of delivery and point of use. This system will include all pipes; conduits; tanks; receptacles; fixtures; equipment and appurtenances used to produce, convey, store or use potable water.
- y. Water System - Public Potable any publicly or privately owned water system operated as a public utility under a valid health permit to supply water for domestic purposes. This system will include all sources, facilities and appurtenances between the source and the point of delivery such as valves, pumps, pipes, conduits, tanks, receptacles, fixtures, equipment and appurtenances used to produce, convey, treat or store a potable water for public consumption or use.
- z. Water- Used any water supplied by a water purveyor from a public potable water system to a customer's water system after it has passed through the point of delivery.

600 **CROSS-CONNECTION HAZARDS AND REQUIRED PROTECTION**

600.01 Facilities

- a. Type of Backflow Protection Required - An approved backflow prevention device of the type designated, shall be installed on each water service connection to the following types of facilities. This list is presented as a guideline and should not be construed as being complete.

Abbreviations used are as follows:

AG	Air Gap Separation
AVB	Atmospheric Vacuum Breaker
DCVA	Double Check Valve Assembly
PVB	Pressure Vacuum Breaker
RP	Reduced Pressure Principle Backflow Preventer

b.	<u>Type of Facility</u>	<u>Minimum Typical Protection</u>
(1)	Brewery, Distillery, Bottling Plant	DCVA
(2)	Buildings over three stories	RP
(3)	Car Wash with recycling system and/or adductor	RP
(4)	Chemical Plant	RP
(5)	Dairy	DCVA
(6)	Dentist Office	RP
(7)	Exterminating Companies (Pesticides)	PVB
(8)	Fertilizer Plant	RP

(9)	Film Laboratory	RP
(10)	Food or Beverage Plant	DCVA
(11)	Hospital, Clinics, Medical Building	RP
(12)	Irrigation System	PVB
(13)	Laboratory	RP
(14)	Laundry or Dry Cleaning Plant	RP
(15)	Machine Tool Plant (Health or System Hazard)	RP
(16)	Machine Tool Plant (Pollution Hazard)	DCVA
(17)	Metal Processing Plant (Health or System Hazard)	RP
(18)	Metal Processing Plant (Pollution Hazard)	DCVA
(19)	Metal Plating Plant	RP
(20)	Morgue or Mortuary	RP
(21)	Nursing Home	RP
(22)	Packing House	RP
(23)	Petroleum Storage Yard (Health or System Hazard)	RP
(24)	Petroleum Storage Yard (Pollution Hazard)	DCVA
(25)	Pharmaceutical or Cosmetic Plant	RP
(26)	Power Plant	RP
(27)	Restaurants (Health or System Hazard)	RP
(28)	Restaurants (Pollution Hazard)	DCVA
(29)	Sand and Gravel Plant	DCVA
(30)	School (Health or System Hazard)	RP
(31)	School (Pollution Hazard)	DCVA
(32)	Sewage Pumping Station	PVB
(33)	Sewage Treatment Plant	RP
(34)	Swimming Pools with Piped Fill Line	AG
(35)	Veterinary Establishment	RP

Vacuum breakers (Vacuum Relief Valves) designed to prevent collapse or implosion of a steam-heated pressure vessel when being cooled, are not acceptable devices for protection against backflow in potable water lines.

Single check valves will not be accepted as a means to protect the potability of drinking water and therefore may only be used to prevent backflow which would effect the functioning of a plumbing system, such as to prevent recirculation of potable hot water. Where single check valves are improperly used, they will be required to be replaced by an appropriate approved backflow prevention device.

- c. In addition to and including those types of facilities listed above, an approved backflow prevention device of the type designated shall be installed on each domestic water service connection to any premises containing the following real or potential hazards:

Situation

Minimum Typical Protection

- (1) Premises having an auxiliary water system not connected to public water system.....RP
- (2) Premises having a water storage tank, reservoir, pond, or similar appurtenance.....RP
- (3) Premises having a steam boiler, cooling system, or hot water heating system where chemical water conditioners are used.....RP
- (4) Premises having submerged inlets to equipment.....RP
- (5) Premises having self-draining yard hydrants, fountains, hose boxes or similar devices presenting a health or system hazard. (i.e. chemical storage plants, tank farms, bulk storage yards).....RP
- (6) Premises having self-draining yard hydrants, fountains, hose boxes or similar devices presenting a pollution hazard. (i.e., parks, play fields, cemeteries)..... DCVA
- (7) Others specified by the Public Utilities Department

Any device, equipment or situation not covered by this Cross-Connection Policy where water is connected or used, which may constitute a potential health hazard, will be handled at the discretion of the water purveyor or his authorized agent.

600.02 Parallel Installation

All backflow prevention devices with test cocks, are required to be tested with a minimum frequency of once per year. Testing requires a water shutdown usually lasting five (5) to twenty (20) minutes. For facilities that require an uninterrupted supply of water, and when it is not possible to provide water service from two separate meters, provisions shall be made for a "parallel installation" of backflow prevention devices.

Multi-story buildings which have a number of flushometer toilets, should be equipped with parallel devices. Experience has shown, if the water is to be shut off to this type of building, flushometers may have to be manually reset.

During testing, one device is left on while the other is being tested. Usually the two devices are sized one device size smaller than the service line, e.g. one 2 inch device or two 1 1/2 inch devices, one 8 inch device or two 6 inch devices.

The Authority will not accept an unprotected by-pass around a backflow preventer when

the device is in need of testing, repair or replacement.

600.03 Exterminating Companies

All tanks, tank trucks, and spraying apparatus used to convey pesticides in an exterminating process are required to use only designated-protected potable water fill locations. Filling with potable water at unspecified locations or private residences is prohibited. All filling locations will consist of over-head piping arrangements with correctly installed pressure vacuum breakers. If for any reason an over-head piping arrangement cannot be used, a reduced pressure zone backflow preventer must be installed on the fill line. All filling locations must be approved by the Authority.

600.04 Fire Systems

Type of Backflow Protection Required - An approved backflow prevention device of the type designated, shall be installed on each fire protection service to any premises where the fire protection system contains any of the following components, unless the Culpeper County Water & Sewer Authority determines that no regular or potential health, pollution, or system hazard to the public water system exists. Systems containing antifreeze protecting unheated areas shall be equipped with at least a double check valve. Fire systems may be divided into six (6) general classes. The following are typical:

<u>Class</u>	<u>Minimum Typical Protection</u>
a. <u>Class 1</u> - A closed automatic fire system without pumper connection; A system having 20 heads or less.....	DCVA
b. <u>Class 2</u> - A closed automatic fire system with pumper connection.....	DCVA
c. <u>Class 3</u> - A closed automatic fire system with pumper connection and an auxiliary water supply on or available to the premises; or an auxiliary water supply which will be located within 1,700 feet of the pumper connection.....	RP
d. <u>Class 4</u> - A closed automatic fire system with a closed pressure tank supply (this class may have a jockey pump interconnected with the public water supply and/or an air compressor connection)	RP
e. <u>Class 5</u> - A closed automatic sprinkler system inter-connected with an auxiliary water supply	RP
f. <u>Class 6</u> - A fire system used for the combined purposes of supplying the automatic sprinklers, hose lines, fire hydrants and standpipes and of being used for industrial purposes.	

- (1) Self-Draining Fire Hydrants on premises presenting a Health or System Hazard (i.e., Chemical Plant, Petroleum Storage Plant, Bulk Storage Yard, Stock Yard, Sewage Plant, or similar facilities where ground seepage of toxic materials may occurRP
- (2) Self-Draining Fire Hydrants on premises presenting a Pollution Hazard (i.e., Apartment House, Office Complex, Fabricating Plant, or similar facility where ground seepage of polluttional but not toxic materials may occur..... DCVA

600.05 Other Cross-Connection Hazards

- a. Fixture Inlets or Valved Outlets - Fixture inlets or valved outlets with hose attachments, which may constitute a cross-connection, shall be protected by the proper approved vacuum breaker (AVB, HBVB, etc.) installed at least six (6) inches above the highest point of usage and located on the discharge side of the last valve. Fixtures with integral vacuum breakers manufactured as a unit may be installed in accordance with their approved requirements.
- b. Air Condition Cooling Tower - Potable water inlet shall have an air gap separation of twice the inside diameter of the inlet line or a minimum of two inches above the flood level rim. In a case where the cooling unit is completely enclosed, then an RP device must be installed.
- c. Aspirators and Ejectors - Aspirators and ejectors shall have an AVB or PVB, depending upon the degree of hazard, on the faucet from which these devices are attached or operated.
- d. Booster Pumps - All booster pumps shall be provided with a low pressure cut-off unless other acceptable provisions are made to prevent the creation of low or negative pressures in the piping system.
- e. Private Wells - Shall not be interconnected to any Authority public water supply system.
- f. Portable Spray and Cleaning Equipment - Any portable pressure spray or cleaning units that have the capability of connection to any potable water supply and do not contain a built-in approved air gap, should be fitted with a reduced pressure backflow device or double check valve assembly depending on the degree of hazard.
- g. Uses of Water From Fire Hydrants or Meter Setters -The unmetered use of water from any fire hydrant or meter setter by other than authorized personnel is prohibited. The department may permit the use of water from a fire hydrant for construction, provided the applicant applies for and adheres

to backflow requirements on hydrant permits.

Note: Any device, equipment, or situation not covered by this cross-connection policy, which may constitute a potential health hazard, will be examined for appropriate treatment by the Authority.

600.06 Typical Backflow Prevention Devices (Illustrated)

Illustrations of typical backflow devices are to be furnished.

600.07 Typical Backflow Prevention Device Installations (Illustrated)

Illustrations of typical backflow device installations are to be furnished.

600.08 Testing of Backflow Preventers

See Volume A, Part 5, Section 200.07 for details.

700 **PENALTIES FOR NON-COMPLIANCE**

700.01 Termination of Service

A written notification detailing all cross-connections found during the inspection will be sent to the owner or authorized agent of the owner of the building or premises, stating that corrections must be made and setting a reasonable time for compliance. Upon failure of the owner or authorized agent of the owner of the building or premises to have the defect(s) corrected by the specified time the water purveyor shall cause the water service to the building or premises to be terminated. The water purveyor shall cause discontinuance of water service if a required backflow prevention device has been bypassed or failed to be tested or properly maintained as required by this policy statement. The water purveyor shall also discontinue water service if an air gap separation system is compromised.

700.02 Monetary Penalties

Violations of any provisions concerning cross-connections within the Authority Cross-Connection and Backflow Prevention Policy shall be punished as a Culpeper County Class 3 Misdemeanor. Under this Policy each day any violation shall continue shall constitute a separate offense.

REFERENCES

The following references provide additional details regarding backflow regulatory requirements and compliance measures.

- a. "United States Safe Drinking Water Act", Public Law 93-523, December 16, 1974, and the National Primary and Secondary Drinking-Water Regulations..
- b. "Cross-Connection Control Manual", U.S. Environmental Protection Agency, Washington, D.C., 1973.
- c. "Waterworks Regulations", Commonwealth of Virginia/State Board of Health, February 1, 1982.
- d. "Section P-1505.0 Protection of Potable Water Supply", The BOCA Basic/National Plumbing Code, 1984.

**VOLUME A
RULES AND REGULATIONS
PART 3
PRETREATMENT REGULATIONS
CULPEPER COUNTY WATER AND SEWER AUTHORITY**

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VOLUME A - RULES AND REGULATIONS

PART 3 - PRETREATMENT REGULATIONS

100 GENERAL PROVISIONS

100.01 Purpose and Policy

This Article sets forth uniform requirements for direct and indirect users of the wastewater collection and treatment systems of the Publicly Owned Treatment Works (POTW) within the County, or serving the County, and enable the Authority to comply with all applicable state and federal laws, including the Clean Water Act (33 United States Code § 1251 et seq.) and the General Pretreatment Regulations (40 CFR, Part 403). The objectives of this Article is:

- a. To prevent the introduction of pollutants into the Publicly Owned Treatment Works which will interfere with its operation or contaminate the resulting sludge;
- b. To prevent the introduction of pollutants into the Publicly Owned Treatment Works which will pass through the Publicly Owned Treatment Works, inadequately treated, into receiving waters or the atmosphere or otherwise be incompatible with the Publicly Owned Treatment Works;
- c. To protect both Publicly Owned Treatment Works personnel who may be affected by wastewater and sludge in the course of their employment and the general public;
- d. To promote reuse and recycling of industrial wastewater and sludge from the Publicly Owned Treatment Works;
- e. To provide for fees for the equitable distribution of the cost of operation, maintenance, and improvement of the Publicly Owned Treatment Works; and
- f. To enable the Authority to comply with its National Pollutant Discharge Elimination System permit conditions, sludge use and disposal requirements, and any other federal and state laws to which the Publicly Owned Treatment Works is subject.

This Article shall apply to all users of the Publicly Owned Treatment Works. This Article authorizes the issuance of wastewater discharge permits; provides for monitoring compliance and enforcement activities; establishes administrative review procedures; requires user reporting; and provides for the setting of fees for the equitable distribution of costs resulting from the program established herein.

100.02 Administration

Except as otherwise provided herein, the General Manager shall administer, implement and enforce the provisions of this Article. Any powers granted to or duties imposed upon the General Manager may be delegated by the General Manager to other Authority personnel.

100.03 Abbreviations

The following abbreviations, when used in these regulations, shall have the designated meanings:

BOD	-	Biochemical Oxygen Demand
CFR	-	Code of Federal Regulations
COD	-	Chemical Oxygen Demand
EPA	-	Environmental Protection Agency
gpd	-	Gallons per day
l	-	Liter
mg	-	Milligrams
mg/l	-	Milligrams per liter
NPDES	-	National Pollutant Discharge Elimination System
POTW-		Publicly Owned Treatment Works
RCRA	-	Resource Conservation and Recovery Act
SIC	-	Standard Industrial Classification
TSS	-	Total Suspended Solids
U.S.C.	-	United States Code

100.04 Definitions

Unless a provision explicitly states otherwise, the following terms and phrases, as used in this Article, shall have the meanings hereinafter designated:

- a. Act or "the Act" - The Federal Water Pollution Control Act, also known as the Clean Water Act, as amended, 33 U.S.C. § 1251 et seq.
- b. Approval Authority - The Director of the Virginia State Water Control Board.
- c. Authority - The Culpeper County Water and Sewer Authority.
- d. Authorized Representative of the User
 - (1) If the user is a corporation:
 - (a) The president, secretary, treasurer, or a vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or
 - (b) The manager of one or more manufacturing, production, or operation facilities employing more than two hundred fifty (250) persons or having gross annual sales or expenditures exceeding twenty-five (25) million dollars (in second quarter 2005 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
 - (2) If the user is a partnership or sole proprietorship: a general partner or proprietor, respectively.
 - (3) If the user is a federal, state or local government facility: a director or highest official appointed or designated to oversee the operation and performance of the activities of the government facility, or their designee.
 - (4) The individuals described in Section 100.04.d (1) through (3), above, may designate another authorized representative if the authorization is in writing, the authorization specifies the individual or position responsible for the overall operation of the facility from which the discharge originates or having overall responsibility for environmental matters for the company, and the written authorization is submitted to and approved by the Authority.

- e. Biochemical Oxygen Demand or BOD - The quantity of oxygen utilized in the biochemical oxidation of organic matter under standard laboratory procedures for five (5) days at twenty degrees (20') centigrade, usually expressed as a concentration (e.g., mg/l).
- f. Categorical Pretreatment Standard or Categorical Standard - Any regulation containing pollutant discharge limits promulgated by EPA in accordance with Sections 307(b) and (c) of the Act (33 U.S.C. § 1317) which applies to a specific category of users and which appears in 40 CFR Chapter I, Subchapter N, Parts 405-471.
- g. County - The County of Culpeper, Virginia.
- h. Direct Discharge - The discharge of treated or untreated wastewater directly to the waters of the Commonwealth of Virginia.
- i. Environmental Protection Agency or EPA - The U.S. Environmental Protection Agency or, where appropriate, the Regional Water Management Division Director, or other duly authorized official of such agency.
- j. Existing Source - Any source of discharge, the construction or operation of which commenced prior to the publication by EPA of proposed categorical pretreatment standards under Section 307(c), which shall be applicable to such source.
- k. General Manager - The General Manager of the Culpeper County Water and Sewer Authority who is designated by the Authority to supervise the operation of the POTW, and who is charged with certain duties and responsibilities by this Article, or a duly authorized representative.
- l. Grab Sample - A sample which is taken from a wastestream without regard to the flow in the wastestream and over a period of time not to exceed fifteen (15) minutes.
- m. Indirect Discharge or Discharge - The introduction of pollutants into the POTW from any nondomestic source regulated under Section 307(b), (c), or (d) of the Act.
- n. Instantaneous Maximum Allowable Discharge Limit - The maximum concentration of a pollutant allowed to be discharged at any time, determined from the analysis of any discrete or composite sample collected, independent of the industrial flow rate and the duration of the sampling event.
- o. Interference - A discharge, which alone or in conjunction with a discharge or discharges from other sources, inhibits or disrupts the POTW, its treatment processes or operations or its sludge processes, use or disposal; and

therefore, is a cause of a violation of the Authority's NPDES permit or of the prevention of sewage sludge use or disposal in compliance with any of the following statutory/regulatory provisions or permits issued thereunder, or any more stringent state or local regulations: Section 405 of the Act; the Solid Waste Disposal Act, including Title II commonly referred to as the Resource Conservation and Recovery Act (RCRA); any state regulations contained in any state sludge management plan prepared pursuant to Subtitle D of the Solid Waste Disposal Act; the Clean Air Act; the Toxic Substances Control Act; and the Marine Protection, Research, and Sanctuaries Act.

- p. Medical Waste - Isolation wastes, infectious agents, human blood and blood products, pathological wastes, sharps, body parts, contaminated bedding, surgical wastes, potentially contaminated laboratory wastes, and dialysis wastes.

- q. New Source
 - (1) Any building, structure, facility, or installation from which there is, or may be a discharge of pollutants, the construction of which commenced after the publication of proposed pretreatment standards under Section 307(c) of the Act which will be applicable to such source, provided that:
 - (a) The building, structure, facility, or installation is constructed at a site at which no other source is located; or
 - (b) The building, structure, facility, or installation totally replaces the process or production equipment that causes the discharge of pollutants at an existing source; or
 - (c) The production or wastewater generating processes of the building, structure, facility, or installation are substantially independent of an existing source at the same site. In determining whether these are substantially independent, factors such as the extent to which the new facility is integrated with the existing plants, and the extent to which the new facility is engaged in the same general type of activity as the existing source, should be considered.

 - (2) Construction on a site at which an existing source is located results in a modification rather than a new source if the construction does not create a new building, structure, facility, or installation meeting the criteria of Section 100.04.q above but otherwise alters, replaces, or adds to existing process or production equipment.

- (3) Construction of a new source as defined under this paragraph has commenced if the owner or operator has:
- (a) Begun, or caused to begin, as part of a continuous on-site construction program
 - (i) any placement, assembly, or installation of facilities or equipment; or
 - (ii) significant site preparation work including clearing, excavation, or removal of existing buildings, structures, or facilities which is necessary for the placement, assembly, or installation of new source facilities or equipment; or
 - (b) Entered into a binding contractual obligation for the purchase of facilities or equipment which are intended to be used in its operation within a reasonable time. Options to purchase or contracts which can be terminated or modified without substantial loss, and contracts for feasibility, engineering, and design studies do not constitute a contractual obligation under this paragraph.
- r. Noncontact Cooling Water - Water used for cooling which does not come into direct contact with any raw material, intermediate product, waste product or finished product.
- s. Pass Through - A discharge which exits the POTW into waters of the United States in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the Authority's NPDES permit, including an increase in the magnitude or duration of a violation.
- t. Person - Any individual, partnership, co-partnership, firm, company, corporation, association, joint stock company, trust, estate, governmental entity, or any other legal entity; or their legal representatives, agents, or assigns. This definition includes all federal, state, and local government entities.
- u. pH - A measure of the acidity of a solution, expressed in standard units on a logarithmic scale from 0 to 14.
- v. Pollutant - Dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, medical wastes, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, municipal, agricultural and

industrial wastes, and certain characteristics of wastewater (e.g., pH, temperature, TSS, turbidity, color, BOD, COD, toxicity, or odor).

- w. Pretreatment - The reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to, or in lieu of, introducing such pollutants into the POTW. This reduction or alteration can be obtained by physical, chemical, or biological processes, by process changes, or by other means, except by diluting the concentration of the pollutants unless allowed by an applicable pretreatment standard.
- x. Pretreatment Requirements - Any substantive or procedural requirement related to pretreatment imposed on a user, other than a pretreatment standard.
- y. Pretreatment Standards or Standards - Pretreatment standards shall mean prohibited discharge standards, categorical pretreatment standards, and local limits.
- z. Prohibited Discharge Standards or Prohibited Discharges - Absolute prohibitions against the discharge of certain substances; these prohibitions appear in Section 2.1.
- aa. Publicly Owned Treatment Works or POTW - A "treatment works," as defined by Section 212 of the Act (33 U.S.C. § 1292) which is owned by the Authority. This definition includes any devices or systems used in the collection, storage, treatment, recycling, and reclamation of sewage or industrial wastes of a liquid nature and any conveyances which convey wastewater to a treatment plant. This definition specifically excludes treatment works owned and operated by an incorporated town in the County.
- bb. Septic Tank Waste - Any sewage from a holding tank such as vessels, chemical toilets, campers, trailers, and septic tanks.
- cc. Sewage - Human excrement and gray water (household showers, dishwashing operations, etc.).
- dd. Shall is mandatory; may is permissive.
- ee. Significant Industrial User
 - (1) A user subject to categorical pretreatment standards; or
 - (2) A user that:

- (a) Discharges an average of twenty-five thousand (25,000) gpd or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blowdown wastewater);
 - (b) Contributes a process wastestream which makes up five (5) percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or
 - (c) Is designated as such by the Authority on the basis that it has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement.
- (3) Upon a finding that a user meeting the criteria Section 1.4.EE.(2).(b) has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Authority may at any time, on its own initiative or on response to a petition received from a user, and in accordance with procedures in 40 CFR 403.8(f)(6), determine that such user should not be considered a significant industrial user.
- ff. Slug Load or Slug - Any discharge at a flow rate or concentration which would cause a violation of the prohibited discharge standards in Section 17-21(a) of this Article.
- gg. Standard Industrial Classification (SIC) Code - A classification pursuant to the Standard Industrial Classification Manual issued by the United States Office of Management and Budget.
- hh. State - Commonwealth of Virginia.
- ii. Storm Water - Any flow occurring during or following any form of natural precipitation, and resulting from such precipitation, including snowmelt.
- jj. Suspended Solids - The total suspended matter that floats on the surface of, or is suspended in, water, wastewater, or other liquid, and which is removable by laboratory filtering.
- kk. User or Industrial User - A source of indirect discharge.
- ll. Wastewater - Liquid and water-carried industrial wastes and sewage from residential dwellings, commercial buildings, industrial and manufacturing facilities and institutions, whether treated or untreated, which are contributed to the POTW.

- mm. Wastewater Treatment Plant or Treatment Plant - That portion of the POTW which is designed to provide treatment of municipal sewage and industrial waste.

200 GENERAL SEWER USE REQUIREMENTS

200.01 Prohibited Discharge Standards

a. General Prohibitions

No user shall introduce or cause to be introduced, directly or indirectly, into the POTW any pollutant or wastewater which causes pass through or interference. These general prohibitions apply to all users of the POTW whether or not they are subject to categorical pretreatment standards or any other federal, state, or local pretreatment standards or requirements.

b. Specific Prohibitions

No user shall introduce or cause to be introduced into the POTW the following pollutants, substances, or wastewater:

- (1) Pollutants which, by reason of their nature or quantity are or may be sufficient, either alone or by interaction with other substances, to create a fire or explosive hazard in the POTW, including, but not limited to, wastestreams with a closed-cup flashpoint of less than 140°F (60°C) using the test methods specified in 40 CFR 261.21;
- (2) Wastewater having a pH less than 5.0 or more than 9.0, or otherwise causing corrosive structural damage to the POTW or equipment;
- (3) Solid or viscous substances in amounts which will cause obstruction of the flow in the POTW resulting in interference, such as, but not limited to: grease, garbage with particles greater than one-half (1/2) inch in any dimension, animal guts or tissues, paunch manure, bones, hair, hides or fleshings, entrails, whole blood, feathers, ashes, cinders, sand, spent lime, stone or marble dust, metal, glass, straw, shavings, grass clippings, rags, spent grains, spent hops, waste paper, wood, plastics, tar, asphalt residues, residues from refining or processing of fuel or lubricating oil, mud, or glass grinding or polishing wastes;
- (4) Pollutants, including oxygen-demanding pollutants (BOD, etc.), released in a discharge at a flow rate and/or pollutant concentration which, either singly or by interaction with other pollutants, will cause interference with the POTW;

- (5) Wastewater having a temperature greater than 80°F (27°C), or which will inhibit biological activity in the treatment plant resulting in interference, but in no case wastewater which causes the temperature at the introduction into the treatment plant to exceed 104°F (40°C);
- (6) Petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin, in amounts that will cause interference or pass through;
- (7) Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems;
- (8) Trucked or hauled pollutants, except at discharge points designated by the General Manager in accordance with Section 300.04 of this Article.
- (9) Noxious or malodorous liquids, gases, solids, or other wastewater which, either singly or by interaction with other wastes, are sufficient to create a public nuisance or a hazard to life, or to prevent entry into the sewers for maintenance or repair;
- (10) Wastewater which imparts color which cannot be removed by the treatment process, such as, but not limited to, dye wastes and vegetable tanning solutions, which consequently imparts color to the treatment plant's effluent, thereby violating the Authority's NPDES permit;
- (11) Wastewater containing any radioactive wastes or isotopes except in compliance with applicable state or federal regulations;
- (12) Storm water, surface water, ground water, artesian well water, roof runoff, subsurface drainage, swimming pool drainage, condensate, deionized water, noncontact cooling water, and unpolluted wastewater, unless specifically authorized by the General Manager;
- (13) Sludges, screenings, or other residues from the pretreatment of industrial wastes;
- (14) Medical wastes, except as specifically authorized by the General Manager in a wastewater discharge permit;
- (15) Wastewater causing, alone or in conjunction with other sources, the treatment plant's effluent to fail a toxicity test;
- (16) Detergents, surface-active agents, or other substances which may cause excessive foaming in the POTW;

- (17) Fats, oils, or greases of animal or vegetable origin in concentrations greater than ten (10mg/l); or
- (18) Wastewater causing two successive readings on an explosion hazard meter at the point of discharge into the POTW, or at any point in the POTW, of more than fifty percent (50%) or any single reading over sixty percent (60%) of the Lower Explosive Limit of the meter.

Pollutants, substances, or wastewater prohibited by this section shall not be processed or stored in such a manner that they could be discharged to the POTW.

200.02 National Categorical Pretreatment Standards

The National Categorical Pretreatment Standards as promulgated by the EPA and codified in 40 CFR, Chapter I, Subchapter N, Parts 405-471, as amended, are incorporated herein by this reference.

- a. Where a categorical pretreatment standard is expressed only in terms of either the mass or the concentration of a pollutant in wastewater, the General Manager may impose equivalent concentration or mass limits in accordance with 40 CFR 403.6(c).
- b. When wastewater subject to a categorical pretreatment standard is mixed with wastewater not regulated by the same standard, the General Manager shall impose an alternate limit using the combined wastestream formula in 40 CFR 403.6(e).
- c. A user may obtain a variance from a categorical pretreatment standard if the user can prove, pursuant to the procedural and substantive provisions in 40 CFR 403.13, that factors relating to its discharge are fundamentally different from the factors considered by EPA when developing the categorical pretreatment standard.
- d. A user may obtain a net gross adjustment to a categorical standard in accordance with 40 CFR 403.15.

200.03 Modification of National Categorical Pretreatment Standards

Where the POTW achieves consistent removal of pollutants limited by federal pretreatment standards, the POTW may apply to the approval authority for modification of specific limits in the federal pretreatment standards. For purposes of this Section, "consistent removal" shall mean reduction in the amount of a pollutant or alteration of the nature of the pollutant by the wastewater treatment system to a less toxic or harmless state in the effluent which is achieved by the system in ninety-five (95) percent of the samples taken when measured according to the procedures set forth in section 403.7(c)(2) of (40 CFR, Part 403), "General Pretreatment Regulations for Existing and New Sources of Pollution," promulgated pursuant to the Act. The POTW may then modify pollutant discharge limits in the federal pretreatment standards if the requirements contained in 40 CFR part 403, section 403.7 are fulfilled and prior approval from the approval authority is obtained.

200.04 State Pretreatment Standards

State requirements and limitations on discharges shall apply in any case where they are more stringent than federal requirements and limitations or those in these regulations.

200.05 Local Limits

The Authority shall have the right to establish local pollutant limits to protect against pass through and interference. No person shall discharge wastewater containing in excess of the instantaneous maximum allowable discharge limits so established.

200.06 Special Agreements With Industrial Concerns For Treatment of Certain Industrial Waste

Nothing contained in this Article shall be construed as preventing any special agreement between the Authority and an industrial concern whereby an industrial waste of unusual strength or character may be accepted by the Authority for treatment, provided that such can be accomplished without contravention of the objectives presented in Section 1.1 of this Article, applicable federal and state laws, regulations, and performance standards. Such waste shall be subject to payments and conditions stipulated to in the agreement.

200.07 Authority's Right of Revision

The Authority shall have the right to establish, by regulation or in wastewater discharge permits, more stringent standards or requirements on discharges to the POTW if deemed necessary to achieve the objectives presented in Section 100.01 of this Article, and nothing herein or anything done or permitted hereunder shall create any vested rights of any nature in any person or user.

200.08 Dilution

No user shall ever increase the use of process water, or in any way attempt to dilute a discharge, as a partial or complete substitute for adequate treatment to achieve compliance with a discharge limitation unless expressly authorized by an applicable pretreatment standard or requirement. The General Manager may impose mass limitations on users who are using dilution to meet applicable pretreatment standards or requirements or in other cases when the imposition of mass limitations is appropriate.

300 PRETREATMENT OF WASTEWATER

300.01 Pretreatment Facilities

Users shall provide wastewater treatment as necessary to comply with this Article and shall achieve compliance with all categorical pretreatment standards, local limits, and the prohibitions set out in Section 200.01 of this Article within the time limitations specified by EPA, the state, or the General Manager, whichever is more stringent. Any facilities necessary for compliance shall be provided, operated, and maintained at the user's expense. Detailed plans describing such facilities and operating procedures shall be submitted to the General Manager for review, and shall be deemed acceptable by the General Manager before such facilities are constructed. The review of such plans and operating procedures shall in no way relieve the user from the responsibility of modifying such facilities as necessary to produce a discharge acceptable to the Authority under the provisions of this Article.

300.02 Additional Pretreatment Measures

- a. Whenever deemed necessary, the General Manager may require users to restrict their discharge during peak flow periods, designate that certain wastewater be discharged only into specific sewers, relocate and/or consolidate points of discharge, separate sewage wastestreams from industrial wastestreams, and such other conditions as may be necessary to protect the POTW and determine the user's compliance with the requirements of this Article.
- b. The General Manager may require any person discharging into the POTW to install and maintain, on their property and at their expense, a suitable storage and flow-control facility to ensure equalization of flow. A wastewater discharge permit may be issued solely for flow equalization.
- c. Grease, oil and sand interceptors shall be provided when, in the opinion of the General Manager, they are necessary for the proper handling of wastewater containing excessive amounts of grease and oil, or sand; except that such interceptors shall not be required for residential users. All interception units shall be of type and capacity approved by the General Manager and shall be so located to be easily accessible for cleaning and

inspection. Such interceptors shall be inspected, cleaned, and repaired regularly, as needed, by the user at their expense.

- d. Users with the potential to discharge flammable substances may be required to install and maintain an approved combustible gas detection meter.

300.03 Accidental Discharge/Slug Control Plans

At least once every two (2) years, the General Manager shall evaluate whether each significant industrial user needs an accidental discharge/slug control plan. The General Manager may require any user to develop, submit for approval, and implement such a plan. Alternatively, the General Manager may develop such a plan for any user. An accidental discharge/slug control plan shall address, at a minimum, the following:

- a. Description of discharge practices, including nonroutine batch discharges;
- b. Description of stored chemicals;
- c. Procedures for immediately notifying the General Manager of any accidental or slug discharge, as required by Section 600.06 of this Article; and
- d. Procedures to prevent adverse impact from any accidental or slug discharge. Such procedures include, but are not limited to, inspection and maintenance of storage areas, handling and transfer of materials, loading and unloading operations, control of plant site runoff, worker training, building of containment structures or equipment, measures for containing toxic organic pollutants, including solvents, and/or measures and equipment for emergency response.

300.04 Hauled Wastewater

- a. Septic tank waste may be introduced into the POTW only at locations designated by the General Manager, and at such times as are established by the General Manager. Such waste shall not violate Section 200 of this Article or any other requirements established by the Authority. The General Manager may require septic tank waste haulers to obtain wastewater discharge permits.
- b. The General Manager shall require haulers of industrial waste to obtain wastewater discharge permits. The General Manager may require generators of hauled industrial waste to obtain wastewater discharge permits. The General Manager also may prohibit the disposal of hauled industrial waste. The discharge of hauled industrial waste is subject to all other requirements of this Article.

- c. Industrial waste haulers may discharge loads only at locations designated by the General Manager. No load may be discharged without prior consent of the General Manager. The General Manager may collect samples of each hauled load to ensure compliance with applicable standards. The General Manager may require the industrial waste hauler to provide a waste analysis of any load prior to discharge.
- d. Industrial waste haulers must provide a waste-tracking form for every load. This form shall include, at a minimum, the name and address of the industrial waste hauler, permit number, truck identification, names and addresses of sources of waste, and volume and characteristics of waste. The form shall identify the type of industry, known or suspected waste constituents, and whether any wastes are RCRA hazardous wastes.

400 **WASTEWATER DISCHARGE PERMIT APPLICATION**

400.01 Wastewater Analysis

When requested by the General Manager, a user must submit information on the nature and characteristics of its wastewater within thirty (30) days of the request. The General Manager is authorized to prepare a form for this purpose and may periodically require users to update this information.

400.02 Wastewater Discharge Permit Requirement

- a. No significant industrial user shall discharge wastewater into the POTW without first obtaining a wastewater discharge permit from the General Manager, except that a significant industrial user that has filed a timely application pursuant to Section 400.03 of this Article may continue to discharge for the time period specified therein.
- b. The General Manager may require other users to obtain wastewater discharge permits as necessary to carry out the purposes of this Article.
- c. Any violation of the terms and conditions of a wastewater discharge permit shall be deemed a violation of this article and shall subject the wastewater discharge permittee to the sanctions set out in Sections 1000 through 1200 of this Article. Obtaining a wastewater discharge permit does not relieve a permittee of its obligation to comply with all federal and state pretreatment standards or requirements or with any other requirements of federal, state, and local law.

400.03 Wastewater Discharge Permitting: Existing Connections

Any user required to obtain a wastewater discharge permit who was discharging wastewater into the POTW prior to the effective date of these regulations and who wishes to continue such discharges in the future, shall, within ninety (90) days after such date, apply to the General Manager for a wastewater discharge permit in accordance with Section 400.05 of this Article, and shall not cause or allow discharges to the POTW to continue after one hundred twenty (120) days of the effective date of this Article except in accordance with a wastewater discharge permit issued by the General Manager.

400.04 Wastewater Discharge Permitting: New Connections

Any user required to obtain a wastewater discharge permit who proposes to begin or recommence discharging into the POTW must obtain such permit prior to the beginning or recommencing of such discharge. An application for a wastewater discharge permit, in accordance with Section 400.05 of this Article, must be filed at least ninety (90) days prior to the date upon which any discharge will begin or recommence.

400.05 Wastewater Discharge Permit Application Contents

All users required to obtain a wastewater discharge permit must submit a permit application to the Authority. The General Manager may require all users to submit as part of an application the following information:

- a. All information required by Section 600.01 of this Article;
- b. Description of activities, facilities, and plant processes on the premises, including a list of all raw materials and chemicals used or stored at the facility which are, or could accidentally or intentionally be, discharged to the POTW;
- c. Number and type of employees, hours of operation, and proposed or actual hours of operation;
- d. Each product produced by type, amount, process or processes, and rate of production;
- e. Type and amount of raw materials processed (average and maximum per day);
- f. Site plans, floor plans, mechanical and plumbing plans, and details to show all sewers, floor drains, and appurtenances by size, location, and elevation, and all points of discharge;
- g. Time and duration of discharges; and

- h. Any other information as may be deemed necessary by the General Manager to evaluate the wastewater discharge permit application.

Incomplete or inaccurate applications will not be processed and will be returned to the user for revision.

400.06 Application Signatories and Certification

All wastewater discharge permit applications and user reports must be signed by an authorized representative of the user and contain the following certification statement:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for permitting false information, including the possibility of fine and imprisonment, for knowing violations."

400.07 Wastewater Discharge Permit Decisions

The General Manager will evaluate the data furnished by the user and may require additional information. Within thirty (30) days of receipt of a complete wastewater discharge permit application, the General Manager will determine whether or not to issue a wastewater discharge permit. The General Manager may deny any application for a wastewater discharge permit.

500 **WASTEWATER DISCHARGE PERMIT ISSUANCE PROCESS**

500.01 Wastewater Discharge Permit Duration

A wastewater discharge permit shall be issued for a specified time period, not to exceed five (5) years from the effective date of the permit. A wastewater discharge permit may be issued for a period less than five (5) years, at the discretion of the General Manager. Each wastewater discharge permit will indicate a specific date upon which it will expire.

500.02 Wastewater Discharge Permit Contents

A wastewater discharge permit shall include such conditions as are deemed reasonably necessary by the General Manager to prevent pass through or interference, protect the quality of the water body receiving the treatment plant's effluent, protect worker health and safety, facilitate sludge management and disposal, and protect against damage to the POTW.

- a. Wastewater discharge permits shall contain:

- (1) A statement that indicates wastewater discharge permit duration, which in no event shall exceed five (5) years;
- (2) A statement that the wastewater discharge permit is nontransferable without prior notification to the Authority in accordance with Section 500.05 of this Article, and provisions for furnishing the new owner or operator with a copy of the existing wastewater discharge permit;
- (3) Effluent limits based on applicable pretreatment standards;
- (4) Self monitoring, sampling, reporting, notification, and record-keeping requirements. These requirements shall include an identification of pollutants to be monitored, sampling location, sampling frequency, and sample type based on federal, state, and local law; and
- (5) A statement of applicable civil and criminal penalties for violation of pretreatment standards and requirements, and any applicable compliance schedule. Such schedule may not extend the time for compliance beyond that required by applicable federal, state, or local law.

B. Wastewater discharge permits may contain, but need not be limited to, the following additional conditions:

- (1) Limits on the average and/or maximum rate of discharge, time of discharge, and/or requirements for flow regulation and equalization;
- (2) Requirements for the installation of pretreatment technology, pollution control, or construction of appropriate containment devices, designed to reduce, eliminate, or prevent the introduction of pollutants into the treatment works;
- (3) Requirements for the development and implementation of spill control plans or other special conditions including management practices necessary to adequately prevent unanticipated, or nonroutine discharges;
- (4) Development and implementation of waste minimization plans to reduce the amount of pollutants discharged to the POTW;
- (5) The unit charge or schedule of user charges and fees for the management of the wastewater discharged to the POTW;
- (6) Requirements for installation and maintenance of inspection and sampling facilities and equipment;

- (7) A statement that compliance with the wastewater discharge permit does not relieve the permittee of responsibility for compliance with all applicable federal and state pretreatment standards, including those which become effective during the term of the wastewater discharge permit; and
- (8) Other conditions as deemed appropriate by the General Manager to ensure compliance with these regulations, and state and federal laws, rules, and regulations.

500.03 Wastewater Discharge Permit Appeals

The General Manager shall provide public notice of the issuance of a wastewater discharge permit. Any person, including the user, may petition the General Manager to reconsider the terms of a wastewater discharge permit within thirty (30) days of notice of its issuance.

- a. Failure to submit a timely petition for review shall be deemed to be a waiver of the administrative appeal.
- b. In its petition, the appealing party must indicate the wastewater discharge permit provisions objected to, the reasons for this objection, and the alternative condition, if any, it seeks to place in the wastewater discharge permit.
- c. The effectiveness of the wastewater discharge permit shall not be stayed pending the appeal.
- d. If the General Manager fails to act within thirty (30) days, a request for reconsideration shall be deemed to be denied.
- e. Any user, permit applicant or permit holder aggrieved by any decision not to reconsider a wastewater discharge permit, not to issue a wastewater discharge permit, or not to modify a wastewater discharge permit made by the General Manager may, within ten (10) days after notification of the such decision, file a written appeal with the Authority. The written appeal will be heard by the Authority within forty-five (45) days from the date of filing. The Authority will make a final ruling on the appeal within fifteen (15) days of the close of the meeting at which the appeal is considered. The decision of the General Manager shall remain in effect during the pendency of the appeal. Final rulings by the Authority shall be considered final administrative actions for purposes of judicial review.

500.04 Wastewater Discharge Permit Modification

The General Manager may modify a wastewater discharge permit for good cause, including, but not limited to, the following reasons:

- a. To incorporate any new or revised federal, state, or local pretreatment standard or requirements;
- b. To address significant alterations or additions to the user's operation, processes, wastewater volume or character since the time of wastewater discharge permit issuance;
- c. A change in the POTW that requires either a temporary or permanent reduction or elimination of the authorized discharge;
- d. Information indicating that the permitted discharge poses a threat to the Authority's POTW, Authority personnel, or the receiving waters;
- e. Violation of any terms or conditions of the wastewater discharge permit;
- f. Misrepresentations or failure to fully disclose all relevant facts in the wastewater discharge permit application or in any required reporting;
- g. Revision of or a grant of variance from categorical pretreatment standards pursuant to 40 CFR 403.13;
- h. To correct typographical or other errors in the wastewater discharge permit;
or
- i. To reflect a transfer of the facility ownership or operation to a new owner or operator.

500.05 Wastewater Discharge Permit Transfer

Wastewater discharge permits may be transferred to a new owner or operator only if the permittee gives at least thirty (30) days advance notice to the General Manager and the General Manager approves the wastewater discharge permit transfer. The notice to the General Manager must include a written certification by the new owner or operator which:

- a. States that the new owner and/or operator has no immediate intent to change the facility's operations and processes;
- b. Identifies the specific date on which the transfer is to occur; and
- c. Acknowledges full responsibility for complying with the existing wastewater discharge permit.

Failure to provide advance notice of a transfer renders the wastewater discharge permit void as of the date of facility transfer.

500.06 Wastewater Discharge Permit Revocation

The General Manager may revoke a wastewater discharge permit for good cause, including, but not limited to, the following reasons:

- a. Failure to notify the General Manager of significant changes to the wastewater prior to the changed discharge;
- b. Failure to provide prior notification to the General Manager of changed conditions pursuant to Section 600.03 of this Article;
- c. Misrepresentation or failure to fully disclose all relevant facts in the wastewater discharge permit application;
- d. Falsifying self-monitoring reports;
- e. Tampering with monitoring equipment;
- f. Refusing to allow the General Manager timely access to the facility premises and records;
- g. Failure to meet effluent limitations;
- h. Failure to pay fines;
- i. Failure to pay sewer charges;
- j. Failure to meet compliance schedules;
- k. Failure to complete a wastewater survey or the wastewater discharge permit application;
- l. Failure to provide advance notice of the transfer of business ownership of a permitted facility; or
- m. Violation of any pretreatment standard or requirement, or any terms of the wastewater discharge permit or this Article.

Wastewater discharge permits shall be voidable upon cessation of operations or transfer of business ownership. All wastewater discharge permits issued to a particular user are void upon the issuance of a new wastewater discharge permit to that user.

500.07 Wastewater Discharge Permit Reissuance

A user with an expiring wastewater discharge permit shall apply for wastewater discharge permit reissuance by submitting a complete permit application, in accordance with Section 400.05 of this Article, a minimum of one hundred twenty (120) days prior to the expiration of the user's existing wastewater discharge permit.

500.08 Regulation of Waste Received from Other Jurisdictions

- a. If another jurisdiction, or user located within another jurisdiction, contributes wastewater to the POTW, the General Manager shall enter into an interjurisdictional agreement with the contributing jurisdiction.
- b. Prior to entering into an agreement required by paragraph 1 above, the General Manager shall request the following information from the contributing jurisdiction:
 - (1) A description of the quality and volume of wastewater discharged to the POTW by the contributing jurisdiction;
 - (2) An inventory of all users located within the contributing jurisdiction that are discharging to the POTW; and
 - (3) Such other information as the General Manager may deem necessary.
- c. An interjurisdictional agreement, as required by paragraph A, above, shall contain the following conditions:
 - (1) A requirement for the contributing jurisdiction to adopt a sewer use ordinance which is at least as stringent as these regulations and local limits which are at least as stringent as those set out in Section 200.04 of this Article. The requirement shall specify that such ordinance and limits must be revised as necessary to reflect changes made to the Authority's regulations or local limits;
 - (2) A requirement for the contributing jurisdiction to submit a revised user inventory on at least an annual basis.
 - (3) A provision specifying which pretreatment implementation activities, including wastewater discharge permit issuance, inspection and sampling, and enforcement, will be conducted by the contributing jurisdiction; which of these activities will be conducted by the General Manager; and which of these activities will be conducted jointly by the contributing jurisdiction and the General Manager;

- (4) A requirement for the contributing jurisdiction to provide the General Manager with access to all information that the contributing jurisdiction obtains as part of its pretreatment activities;
- (5) Limits on the nature, quality, and volume of the contributing jurisdiction's wastewater at the point where it discharges to the POTW;
- (6) Requirements for monitoring the contributing jurisdiction's discharge;
- (7) A provision ensuring the General Manager access to the facilities of users located within the contributing jurisdiction's boundaries for the purpose of inspection, sampling, and any other duties deemed necessary by the General Manager; and
- (8) A provision specifying remedies available for breach of the terms of the interjurisdictional agreement.

600 REPORTING REQUIREMENTS

600.01 Baseline Monitoring Reports

- a. Within either one hundred eighty (180) days after the effective date of a categorical pretreatment standard, or the final administrative decision on a category determination under 40 CFR 403.6(a)(4), whichever is later, existing categorical users currently discharging to or scheduled to discharge to the POTW shall submit to the General Manager a report which contains the information listed in paragraph b, below. At least ninety (90) days prior to commencement of their discharge, new sources, and sources that become categorical users subsequent to the promulgation of an applicable categorical standard, shall submit to the General Manager a report which contains the information listed in paragraph b. below. A new source shall report the method of pretreatment it intends to use to meet applicable categorical standards. A new source also shall give estimates if its anticipated flow and quality of pollutants to be discharged.
- b. Users described above shall submit the information set forth below.
 - (1) Identifying Information - The name and address of the facility, including the name of the operator and owner.
 - (2) Environmental Permits - A list of any environmental control permits held by or for the facility.
 - (3) Description of Operations - A brief description of the nature, average rate of production, and standard industrial classifications of the

operation(s) carried out by such user. This description should include a schematic process diagram which indicates points of discharge to the POTW from the regulated processes.

- (4) Flow Measurement - Information showing the measured average daily and maximum daily flow, in gallons per day, to the POTW from regulated process streams and other streams, as necessary, to allow use of the combined wastestream formula set out in 40 CFR 403.6(e).
- (5) Measurement of Pollutants
 - (a) The categorical pretreatment standards applicable to each regulated process.
 - (b) The results of sampling and analysis identifying the nature and concentration, and/or mass, where required by the standard or by the General Manager, of regulated pollutants in the discharge from each regulated process. Instantaneous, daily maximum, and long-term average concentrations, or mass, where required, shall be reported. The sample shall be representative of daily operations and shall be analyzed in accordance with procedures set out in Section 6.10 of this Article.
 - (c) Sampling must be performed in accordance with procedures set out in Section 600.11 of this Article.
- (6) Certification - A statement, reviewed by the user's authorized representative and certified by a qualified professional, indicating whether pretreatment standards are being met on a consistent basis, and, if not, whether additional operation and maintenance (O&M) and/or additional pretreatment is required to meet the pretreatment standards and requirements.
- (7) Compliance Schedule - If additional pretreatment and/or O&M will be required to meet the pretreatment standards, the shortest schedule by which the user will provide such additional pretreatment and/or O&M. The completion date in this schedule shall not be later than the compliance date established for the applicable pretreatment standard. A compliance schedule pursuant to this section must meet the requirements set out in Section 600.02 of this Article.
- (8) Signature and Certification - All baseline monitoring reports must be signed and certified in accordance with Section 600.06 of this Article.

600.02 Compliance Schedule Progress Reports

The following conditions shall apply to the compliance schedule required by Section 600.01.b.(7) of this Article.

- A. The schedule shall contain progress increments in the form of dates for the commencement and completion of major events leading to the construction and operation of additional pretreatment required for the user to meet the applicable pretreatment standards (such events include, but are not limited to, hiring an engineer, completing preliminary and final plans, executing contracts for major components, commencing and completing construction, and beginning and conducting routine operation);
- B. No increment referred to above shall exceed nine (9) months;
- C. The user shall submit a progress report to the General Manager no later than fourteen (14) days following each date in the schedule and the final date of compliance including, as a minimum, whether or not it complied with the increment of progress, the reason for any delay, and, if appropriate, the steps being taken by the user to return to the established schedule; and
- D. In no event shall more than nine (9) months elapse between such progress reports to the General Manager.

600.03 Reports on Compliance with Categorical Pretreatment Standard Deadline

Within ninety (90) days following the date for final compliance with applicable categorical pretreatment standards, or in the case of a new source following commencement of the introduction of wastewater into the POTW, any user subject to such pretreatment standards and requirements shall submit to the General Manager a report containing the information described in Section 600.01.b.(4-6) of this Article. For users subject to equivalent mass or concentration limits established in accordance with the procedures in 40 CFR 403.6(c), this report shall contain a reasonable measure of the user's long-term production rate. For all other users subject to categorical pretreatment standards expressed in terms of allowable pollutant discharge per unit of production (or other measure of operation), this report shall include the user's actual production during the appropriate sampling period. All compliance reports must be signed and certified in accordance with Section 400.06 of this Article.

600.04. Periodic Compliance Reports

- (1) All significant industrial users shall, at a frequency determined by the General Manager but in no case less than twice per year (in June and December), submit a report indicating the nature and concentration of pollutants in the discharge which are limited by pretreatment standards and the measured or estimated average and maximum daily flows for the reporting period. All periodic compliance reports must be signed and certified.

- (2) All wastewater samples must be representative of the user's discharge. Wastewater monitoring and flow measurement facilities shall be properly operated, kept clean, and maintained in good working order at all times. The failure of a user to keep its monitoring facility in good working order shall not be grounds for the user to claim the sample results are unrepresentative of its discharge.
- (3) If a user subject to the reporting requirement in this section monitors any pollutant more frequently than required by the General Manager, the results of this monitoring shall be included in the report.

600.05 Reports of Changed Conditions

Each user must notify the General Manager of any planned significant changes to the user's operations or system which might alter the nature, quality, or volume of its wastewater at least ninety (90) days before the change.

- a. The General Manager may require the user to submit such information as may be deemed necessary to evaluate the changed condition, including the submission of a wastewater discharge permit application under Section 4.5 of this Article.
- b. The General Manager may issue a wastewater discharge permit under Section 400.07 of this Article or modify an existing wastewater discharge permit under Section 500.04 of this Article in response to changed conditions or anticipated changed conditions.
- c. For purposes of this requirement, significant changes include, but are not limited to, flow increases of ten percent (10%) or greater, and the discharge of any previously unreported pollutants.

600.06 Reports of Potential Problems

- a. In the case of any discharge, including, but not limited to, accidental discharges, discharges of a non-routine, episodic nature, a non-customary batch discharge, or a slug load, that may cause potential problems for the POTW, the user shall immediately telephone and notify the General Manager of the incident. This notification shall include the location of the discharge, type of waste, concentration and volume, if known, and corrective actions taken by the user.
- b. Within five (5) days following such discharge, the user shall, unless waived by the General Manager, submit a detailed written report describing the cause(s) of the discharge and the measures to be taken by the user to prevent similar future occurrences. Such notification shall not relieve the

user of any expense, loss, damage, or other liability which may be incurred as a result of damage to the POTW, natural resources, or any other damage to person or property; nor shall such notification relieve the user of any fines, penalties, or other liability which may be imposed pursuant to this Article.

- c. A notice shall be permanently posted on the user's bulletin board or other prominent place advising employees who to call in the event of a discharge described in paragraph A above. Employers shall ensure that all employees, who may cause such a discharge to occur, are advised of the emergency notification procedure.

600.07 Reports from Unpermitted Users

All users not required to obtain a wastewater discharge permit shall provide appropriate reports to the General Manager as the General Manager may require.

600.08 Notice of Violation/Repeat Sampling and Reporting

If sampling performed by a user indicates a violation, the user must notify the General Manager within twenty-four (24) hours of becoming aware of the violation. The user shall also repeat the sampling and analysis and submit the results of the repeat analysis to the General Manager within thirty (30) days after becoming aware of the violation. The user is not required to resample if the General Manager monitors at the user's facility at least once a month, or if the General Manager samples between the user's initial sampling and when the user receives the results of this sampling.

600.09 Notification of the Discharge of Hazardous Waste

The discharge of hazardous waste is strictly prohibited.

600.10 Analytical Requirements

All pollutant analyses, including sampling techniques, to be submitted as part of a wastewater discharge permit application or report shall be performed in accordance with the techniques prescribed in 40 CFR Part 136, unless otherwise specified in an applicable categorical pretreatment standard. If 40 CFR Part 136 does not contain sampling or analytical techniques for the pollutant in question, sampling and analyses must be performed in accordance with procedures approved by EPA.

600.11 Sample Collection

- a. Except as indicated in Section b, below, the user must collect wastewater samples using flow proportional composite collection techniques. In the event flow proportional sampling is infeasible, the General Manager may authorize the use of time proportional sampling or a minimum of four (4) grab samples where the user demonstrates that this will provide a representative

sample of the effluent being discharged. In addition, grab samples may be required to show compliance with instantaneous discharge limits.

- b. Samples for oil and grease, temperature, pH, cyanide, phenols, sulfides, and volatile organic compounds must be obtained using grab collection techniques.

600.12 Timing

Written reports will be deemed to have been submitted on the date postmarked. For reports which are not mailed, postage prepaid, into a mail facility serviced by the United States Postal Service, the date of receipt of the report shall govern.

600.13 Record Keeping

Users subject to the reporting requirements of these regulations shall retain, and make available for inspection and copying, all records of information obtained pursuant to any monitoring activities required by these regulations and any additional records of information obtained pursuant to monitoring activities undertaken by the user independent of such requirements. Records shall include the date, exact place, method, and time of sampling, and the name of the person(s) taking the samples; the dates analyses were performed; who performed the analyses; the analytical techniques or methods used; and the results of such analyses. These records shall remain available for a period of at least three (3) years. This period shall be automatically extended for the duration of any litigation concerning the user or the Authority, or where the user has been specifically notified of a longer retention period by the General Manager.

700 **COMPLIANCE MONITORING**

700.01 Right of Entry: Inspection and Sampling

The General Manager shall have the right to enter the premises of any user to determine whether the user is complying with all requirements of this Article and any wastewater discharge permit or order issued hereunder. Users shall allow the General Manager ready access to all parts of the premises for the purposes of inspection, sampling, records examination and copying, and the performance of any additional duties.

- a. Where a user has security measures in force which require proper identification and clearance before entry into its premises, the user shall make necessary arrangements with its security guards so that, upon presentation of suitable identification, the General Manager will be permitted to enter without delay for the purpose of performing specific responsibilities.
- b. The General Manager shall have the right to set up on the user's property, or require installation of, such devices as are necessary to conduct sampling and/or metering of the user's operations.

- c. The General Manager may require the user to install monitoring equipment as necessary. The facility's sampling and monitoring equipment shall be maintained at all times in a safe and proper operating condition by the user at its own expense. All devices used to measure wastewater flow and quality shall be calibrated quarterly to ensure their accuracy.
- d. Any temporary or permanent obstruction to safe and easy access to the facility to be inspected and/or sampled shall be promptly removed by the user at the written or verbal request of the General Manager and shall not be replaced. The costs of clearing such access shall be born by the user.
- e. Unreasonable delays in allowing the General Manager access to the user's premises shall be a violation of this Article.

800 CONFIDENTIAL INFORMATION

Information and data on a user obtained from report, surveys, wastewater discharge permit applications, wastewater discharge permits, and monitoring programs, and from the General Manager's inspection and sampling activities, shall be available to the public without restriction, unless the user specifically requests, and is able to demonstrate to the satisfaction of the General Manager, that the release of such information would divulge information, processes, or methods of production entitled to protection as trade secrets under applicable state law. Any such request must be asserted at the time of submission of the information or data. When requested and demonstrated by the user furnishing a report that such information should be held confidential, the portions of a report which might disclose trade secrets or secret processes shall not be made available for inspection by the public, but shall be made available immediately upon request to governmental agencies for uses related to the NPDES program or pretreatment program, and in enforcement proceedings involving the person furnishing the report. Wastewater constituents and characteristics and other "effluent data" as defined by 40 CFR 2.302 will not be recognized as confidential information and will be available to the public without restriction.

900 PUBLICATION OF USERS IN SIGNIFICANT NONCOMPLIANCE

The General Manager shall publish annually, in the newspaper with the largest circulation within the County, a list of the users which, during the previous twelve (12) months, were in significant noncompliance with applicable pretreatment standards and requirements. The term significant noncompliance shall mean:

- a. Chronic violations of wastewater discharge limits, defined here as those in which sixty-six percent (66%) or more of wastewater measurements taken during a six- (6-) month period exceed the daily maximum limit or average limit for the same pollutant parameter by any amount;

- b. Technical Review Criteria (TRC) violations, defined here as those in which thirty-three percent (33%) or more of wastewater measurements taken for each pollutant parameter during a six- (6-) month period equals or exceeds the product of the daily maximum limit or the average limit multiplied by the applicable criteria (1.4 for BOD, TSS, fats, oils and grease, and 1.2 for all other pollutants except pH);
- c. Any other discharge violation that the General Manager believes has caused, alone or in combination with other discharges, interference or pass through, including endangering the health of POTW personnel or the general public;
- d. Any discharge of pollutants that has caused imminent endangerment to the public or to the environment, or has resulted in the General Manager's exercise of its emergency authority to halt or prevent such a discharge;
- e. Failure to meet, within ninety (90) days of the scheduled date, a compliance schedule deadline contained in a wastewater discharge permit or enforcement order for starting construction, completing construction, or attaining final compliance;
- f. Failure to provide within thirty (30) days after the due date, any required reports, including baseline monitoring reports, reports on compliance with categorical pretreatment standard deadlines, periodic self-monitoring reports, and reports on compliance with compliance schedules;
- g. Failure to accurately report noncompliance; or
- h. Any other violation(s) which the General Manager determines will adversely affect the operation or implementation of the local pretreatment program.

1000 **ENFORCEMENT REMEDIES**

1000.01 Notification of Violation

When the General Manager finds that a user has violated, or continues to violate, any provision of this Article, a wastewater discharge permit or agreement entered into hereunder, or any other pretreatment standard or requirement, the General Manager may serve upon that user a written notice stating the nature of the violation and calling for immediate compliance. Within fifteen (15) days of the receipt of this notice, an explanation of the violation and a plan for the satisfactory correction and prevention thereof, to include specific required actions, shall be submitted by the user to the General Manager. Submission of this plan in no way relieves the user of liability for any violations occurring before or after receipt of this notice. Nothing in this section shall limit the authority of the General Manager to take any action, including emergency actions or any other enforcement action, without first issuing notice of a violation.

1000.02 Emergency Suspensions of Wastewater Treatment Service

The General Manager may immediately suspend wastewater treatment service and/or a wastewater discharge permit, after providing notice to the user verbally, either in-person or by telephone, whenever, in the opinion of the General Manager, such suspension is necessary to stop an actual or threatened discharge which reasonably appears to present or cause an imminent or substantial endangerment to the health or welfare of persons. The General Manager may also immediately suspend the wastewater treatment service and/or a wastewater discharge permit, after notice and opportunity to respond, whenever the user's discharge threatens to interfere with the operation of the POTW, or presents, or may present, an endangerment to the environment.

- a. Any user notified of a suspension of its wastewater treatment service and/or wastewater discharge permit shall immediately stop or eliminate its contribution. In the event of a user's failure to immediately comply voluntarily with the suspension order, the General Manager may take such steps as deemed necessary, including immediate cessation of the water supplied to the premises and severance of the sewer connection, to prevent or minimize damage to the POTW, its receiving stream, or endangerment to any individuals. The General Manager may allow the user to recommence its discharge when the user has demonstrated to the satisfaction of the General Manager that the period of endangerment has passed, unless termination proceedings pursuant to Section 1000.04 of this Article have been initiated against the user.
- b. A user that is responsible, in whole or in part, for any discharge presenting imminent endangerment shall submit a detailed written statement, describing the causes of the harmful contribution and the measures taken to prevent any future occurrence, to the General Manager within fifteen (15) days of the date of occurrence.

Nothing in this section shall be interpreted as requiring a hearing prior to any emergency suspension under this section.

1000.03 Termination of Wastewater Treatment Service

Any user who violates the following conditions is subject to termination of wastewater treatment service and/or revocation of a wastewater discharge permit:

- a. Violation of wastewater discharge permit conditions;
- b. Failure to accurately report the wastewater constituents and characteristics of its discharge;
- c. Failure to report significant changes in operations or wastewater volume, constituents, and characteristics prior to discharge;
- d. Refusal of reasonable access to the user's premises for the purpose of inspection, monitoring, or sampling; or
- e. Violation of the pretreatment standards in Section 200 of this Article.

Such user will be notified of the proposed termination of wastewater treatment service and/or the proposed revocation of its wastewater discharge permit and be offered an opportunity to show cause why the proposed action should not be taken as provided in Section 1000.04 of this Article. Exercise of this option by the General Manager shall not be a bar to, or a prerequisite for, taking any other action against the user.

1000.04 Termination Proceedings

- a. Notice - The General Manager may direct any user who causes or allows an unauthorized discharge to enter the POTW to show cause why the proposed enforcement action should not be taken. A notice shall be served on the user specifying the time and place of a hearing to be held by the Authority regarding the violation, the reasons why the action is to be taken, the proposed enforcement action, and directing the user to show cause before the Authority why the proposed enforcement action should not be taken. The notice of the hearing shall be served personally or by registered or certified mail (return receipt requested) at least ten (10) days before the hearing. Service may be made on any agent or officer of a corporation.
- b. Hearing - The Authority may itself conduct the hearing and take the evidence, or may designate any of its members or any of its officers or employees to:
 - (1) Issue, in the name of the Authority, notices of the hearing requesting the attendance and testimony of witnesses and the production of evidence relevant to any matter involved in such hearings;
 - (2) Take the evidence; or

- (3) Transmit a report of the evidence and hearing, including transcripts and other evidence, together with recommendations to the Authority for action thereon.
- c. Record - At any hearing held pursuant to this Section, testimony taken shall be under oath and recorded. The transcript, so recorded, will be made available to any member of the public or any party to the hearing upon payment of a reasonable charge therefor.
- d. Action - After the Authority has concluded the hearing or reviewed the report and recommendations referred to in b.(3) above, it may direct the user responsible for the discharge that unless the user installs, within a specified period of time, adequate treatment facilities, devices or other related appurtenances on existing treatment facilities and ensures that such additional facilities, devices or other related appurtenances are properly operated, wastewater treatment service will be discontinued. The Authority may issue further directives as are necessary and appropriate.

1000.05 Injunctive Relief

When the General Manager finds that a user has violated, or continues to violate, any provision of these regulations, a wastewater discharge permit, or order issued hereunder, or any other pretreatment standard or requirement, the Authority may commence an action in any circuit court of this commonwealth for the issuance of a temporary or permanent injunction, as appropriate, which restrains or compels the specific performance of the wastewater discharge permit, order, or other requirement imposed by this Article on the activities of the user. The Authority may also seek such other action as is appropriate for legal and/or equitable relief, including a requirement for the user to conduct environmental remediation. A petition for injunctive relief shall not be a bar against, or a prerequisite for, taking any other action against a user.

1000.06 Criminal Prosecution

- a. A user who willfully or negligently violates any provision of this Article, a wastewater discharge permit, or order issued hereunder, or any other pretreatment standard or requirement shall, upon conviction, be guilty of a misdemeanor, punishable by a fine of not more than one thousand dollars (\$1,000) per violation, per day, or imprisonment for not more than thirty (30) days, or both for each offense. Each day on which a violation shall occur or continue shall be deemed a separate and distinct offense.
- b. A user who knowingly makes any false statements, representations, or certifications in any application, record, report, plan, or other documentation filed, or required to be maintained, pursuant to this Article, wastewater discharge permit, or order issued hereunder, or who falsifies, tampers with,

or knowingly renders inaccurate any monitoring device or method required under these regulations shall, upon conviction, be punished by a fine of not more than one thousand dollars (\$1,000) per violation, per day, or imprisonment for not more than thirty (30) days, or both for each offense.

1000.07 Attorneys Fees, Court Costs, and Related Expenses

In addition to the penalties provided herein, the Authority may recover reasonable attorneys' fees, court costs, court reporters' fees and other expenses of litigation by appropriate suit at law or equity against the person found to have violated this article or the permits issued hereunder.

1000.08 Remedies Nonexclusive

The remedies provided for in this Article are not exclusive. The General Manager may take any, all, or any combination of these actions on behalf of the Authority against a noncompliant user. Enforcement of pretreatment violations will generally be in accordance with the Authority's enforcement response plan. However, the General Manager may take other action against any user when the circumstances warrant. Further, the General Manager is empowered to take more than one enforcement action against any noncompliant user.

1100 **SUPPLEMENTAL ENFORCEMENT ACTION**

1100.01 Performance Bonds

The General Manager may decline to issue or reissue a wastewater discharge permit to any user who has failed to comply with any provision of this Article, a previous wastewater discharge permit, or other issued hereunder, or any other pretreatment standard or requirement, unless such user first files a satisfactory bond, payable to the Authority, in a sum not to exceed a value determined by the General Manager to be necessary to achieve consistent compliance.

1100.02 Liability Insurance

The General Manager may decline to issue or reissue a wastewater discharge permit to any user who has failed to comply with any provision of this Article, a previous wastewater discharge permit, or order issued hereunder, or any other pretreatment standard or requirement, unless the user first submits proof that it has obtained financial assurances sufficient to restore or repair damage to the POTW caused by its discharge.

1100.03 Water Supply Severance

Whenever a user has violated or continues to violate any provision of this Article, a wastewater discharge permit, or order issued hereunder, or any other pretreatment standard or requirement, water service to the user may be severed. Service will only

recommence, at the user's expense, after it has satisfactorily demonstrated its ability to comply.

1200 **AFFIRMATIVE DEFENSES TO DISCHARGE VIOLATIONS**

1200.01 Upset

- a. For the purposes of this section, "upset" means an exceptional incident in which there is unintentional and temporary noncompliance with categorical pretreatment standards because of factors beyond the reasonable control of the user. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.
- b. An upset shall constitute an affirmative defense to an action brought for noncompliance with categorical pretreatment standards if the requirements of paragraph C. below are met.
- c. A user who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:
 - (1) An upset occurred and the user can identify the cause(s) of the upset;
 - (2) The facility was at the time being operated in a prudent and workman-like manner and in compliance with applicable operation and maintenance procedures; and
 - (3) The user has submitted the following information to the General Manager within twenty-four (24) hours of becoming aware of the upset (if this information is provided orally, a written submission must be provided within five (5) days):
 - (a) A description of the indirect discharge and cause of noncompliance;
 - (b) The period of noncompliance, including exact dates and times or, if not corrected, the anticipated time the noncompliance is expected to continue; and
 - (c) Steps being taken and/or planned to reduce, eliminate, and prevent recurrence of the noncompliance.
- d. In any enforcement proceeding, the user seeking to establish the occurrence of an upset shall have the burden of proof.

- e. Users will have the opportunity for a judicial determination on any claim of upset only in an enforcement action brought for noncompliance with categorical pretreatment standards.
- f. Users shall control production of all discharges to the extent necessary to maintain compliance with categorical pretreatment standards upon reduction, loss, or failure of its treatment facility until the facility is restored or an alternative method of treatment is provided. This requirement applies in the situation where, among other things, the primary source of power of the treatment facility is reduced, lost, or fails.

1200.02 Prohibited Discharge Standards

A user shall have an affirmative defense to an enforcement action brought against it for noncompliance with the general prohibitions in Section 200.01.a of this Article or the specific prohibitions in Sections 200.01.b.(3) through (7) and 200.01.b. (9) through (18) of this Article if it can prove that it did not know, or have reason to know, that its discharge, along or in conjunction with discharges from other sources, would cause pass through or interference and that either:

- a. A local limit exists for each pollutant discharge and the user was in compliance with each limit directly prior to, and during, the pass through or interference; or
- b. No local limit exists, but the discharge did not change substantially in nature or constituents from the user's prior discharge when the Authority was regularly in compliance with its NPDES permit, and in the case of interference, was in compliance with applicable sludge use or disposal requirements.

1200.03 Bypass

- a. For the purposes of this section,
 - (1) "Bypass" means the intentional diversion of wastestreams from any portion of a user's treatment facility.
 - (2) "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

- b. A user may allow any bypass to occur which does not cause pretreatment standards or requirements to be violated, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provision of paragraph c. and d. of this section.
- c.
 - (1) If a user knows in advance of the need for a bypass, it shall submit prior notice to the General Manager, at least ten (10) days before the date of the bypass, if possible.
 - (2) A user shall submit oral notice to the General Manager of an unanticipated bypass that exceeds applicable pretreatment standards within twenty-four (24) hours from the time it becomes aware of the bypass. A written submission shall also be provided within five (5) days of the time the user becomes aware of the bypass. The written submission shall contain a description of the bypass and its cause; the duration of the bypass, including exact dates and times, and, if the bypass has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the bypass. The General Manager may waive the written report on a case-by-case basis if the oral report has been received within twenty-four (24) hours.
- d.
 - (1) Bypass is prohibited, and the General Manager may take an enforcement action against a user for a bypass, unless
 - (a) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
 - (b) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and
 - (c) The user submitted notices as required under paragraph 600.08 of this volume.
 - (2) The General Manager may approve an anticipated bypass, after considering its adverse effects, if the General Manager determines that it will meet the three conditions listed in paragraph d.(1) of this section.

1300 **MISCELLANEOUS PROVISIONS**

1300.01 Pretreatment Charges and Fees

The Authority may adopt reasonable fees for reimbursement of costs of setting up and operating the Authority's Pretreatment Program which may include:

- a. Fees for wastewater discharge permit applications including the cost of processing such applications;
- b. Fees for monitoring, inspection, and surveillance procedures including the cost of collection and analyzing a user's discharge, and reviewing monitoring reports submitted by users;
- c. Fees for reviewing and responding to accidental discharge procedures and construction;
- d. Fees for filing appeals; and
- e. Other fees as the Authority may deem necessary to carry out the requirements contained herein. These fees relate solely to the matters covered by these regulations and are separate from all other fees, fines, and penalties chargeable by the Authority.

1300.02 Severability

If any provision of this Article is invalidated by any court of competent jurisdiction, the remaining provisions shall not be affected and shall continue in full force and effect.

1400 **EFFECTIVE DATE**

This Article shall be in full force and effect upon passage.

**VOLUME A
 RULES AND REGULATIONS
 PART 4
 DEVELOPER SERVICES PROCEDURES
 CULPEPER COUNTY WATER AND SEWER AUTHORITY**

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VOLUME A - RULES AND REGULATIONS

PART 4 - DEVELOPER SERVICES PROCEDURES

100 GENERAL CONDITIONS

100.01 Developer's Agreements:

In circumstances where the owner/developer ("Applicant") is constructing water and or wastewater treatment facilities, wells, sewage pumping stations and/or other Master Plan infrastructure and facilities intended for dedication to the Authority, a separate Developer's Agreement will be required between the Applicant and the Authority. The Developer's Agreement is intended to detail the terms and conditions of the parties' respective responsibilities that are beyond the scope of these procedures.

200 BUILDING PERMIT RELEASE REQUIREMENTS

As outlined in the Developer's Checklist (Exhibit "A"), the following steps and tasks must be completed in their entirety, before the Authority will issue a Building Permit Release. Blank copies of Exhibits "A through F" are included at the rear of this section.

200.01 Pre-Design Conference:

- a. The Applicant shall schedule and attend a pre-design conference with the Authority's Engineer/General Manager ("Engr./GM"). The conference is intended to provide a general briefing to the Applicant regarding the Authority's basic procedures and requirements, outlined in the Developer's Checklist regarding the Authority's provision of its services. The Applicant shall sign the Developer's Checklist at the end of the pre-design conference.
- b. If the Developer Services Representative ("DSR") cannot readily determine the availability of the Authority's services to the property, the DSR will request the Authority's Inspector to evaluate the site regarding its proposed use of the Authority's services. The Inspector performs a field visit to confirm the property's location and its service feasibility (i.e. location of the nearest manhole/water main etc.). The Authority Engineer/General Manager ("Engr./GM") verifies the requisite amount or size of services needed.
- c. In the event of any conflict between this Volume A, Part 4 of the Authority's Rules and Regulations, and Volume B, Water Distribution and Wastewater Collection Systems Design and Construction Standards Manual (DCS Manual) of the Authority's Operating Code and applicable rules, regulations, and specifications of the VDH, or the DEQ, it shall be understood that the most stringent standard shall prevail.

200.02 Construction Plans:

a. General:

Preliminary Site Plans, Final Site Plans, Preliminary Subdivision Plats, and Final Subdivision Plats are typically reviewed for approval by the Culpeper County Planning and Zoning Department in accordance with the requirements of the County's Subdivision and Zoning Ordinances. While the Authority will participate in the County review process to the extent practicable, it has separate and distinct project submission and approval requirements. The Authority's requirements are detailed, but not limited to, the Authority's Volume B, DCS Manual, and other pertinent portions of its Operating Code (Volumes A through G). Securing County approval for any or all components of a site or subdivision plan does not constitute Authority approval or exempt an Applicant from meeting all the requirements of the pertinent portions of its Operating Code (Volumes A through G).

b. Format:

Construction Plans shall conform to the requirements of the Authority's Volume A, Rules and Regulations; Volume B, DCS Manual; and Volume C, Standard Details; and other pertinent portions of its Operating Code

c. Preliminary Submittals:

Three sets of Construction Plans shall be submitted to the Authority for review. Upon approval by the Authority, the plans shall then be submitted to the VDH for review and comment.

200.03 Subdivision Plats and Easement Plats:

a. General:

Water and sewer utilities which will become the property of the Authority, and which do not lie wholly within a public right-of-way, shall require Utility Easements dedicated to the Authority. Subdivision Plats and/or Easement Plats shall include sufficient detail of the project's Utility Easements, well lots, pumping station lots and related Ingress/Egress Easements, when applicable, for recordation in the land records of Culpeper County, Virginia (the "Land Records") consistent with the requirements of the Authority's Volumes B, C, D, E and F Utility Standards. Such detail may be provided as either an integral component of a larger plat such as a Subdivision Plat, or as a separate Utility Easement Plat and shall be submitted in preliminary form with the initial submission of the Construction Plans. Subdivision Plats and/or Easement Plats intended for recordation in the Land Records shall

conform to the Construction Plans as approved by the Authority. Should the Construction Plans be subsequently changed, as approved by the Authority, the Subdivision Plat and/or Easement Plat shall be amended accordingly to reflect such changes and subsequently recorded in the Land Records.

b. Easement and/or Lot Costs:

The Applicant shall convey to the Authority all Utility Easements, Ingress/Egress Easements and real property that may be required to effect a physical connection to the Authority's facilities at no cost to the Authority. Further, the Applicant shall pay all expenses, including but not limited to, surveying, plat preparation, legal expenses, title insurance, recordation fees and acquisition costs. The Applicant's conveyance to the Authority of fee simple title to real property and attendant facilities shall be in good and sufficient form, free of encumbrances and by Deed with General Warranty and English Covenants of Title.

c. Format:

Subdivision Plats and/or Easement Plats are required to have the following labels and be approved by the Authority prior to their recordation in the Land Records:

- (1) The parcel of property being conveyed or the parcel of property that surrounds the Utility Easement or lot being conveyed should note the parcel owner's name; the parcel's Property Identification Number and the owner's Deed of acquisition.
- (2) Each Utility Easement and/or Fee Lot shall be labeled "HEREBY CONVEYED TO THE CCWSA" and shall enumerate the area being conveyed in acreage and square feet.
- (3) For Fee Lots Only – OWNER(S) CONSENT STATEMENT FOR THE CULPEPER COUNTY WATER AND SEWER AUTHORITY (the CCWSA): The conveyance to the CCWSA of (1) the easements and areas specifically identified on this Plat as "HEREBY CONVEYED TO THE CCWSA", and (2) all water and/or sewer lines, valves or appurtenant facilities which are constructed and installed or are hereafter constructed and installed within those areas in accordance with the Rules and Regulations (Volume A) and Utility Standards (Volumes B, C, D, E, and F) of the CCWSA as they now exist or may be hereafter amended, is with the free consent and in accordance with the desires of the undersigned Owner(s), Proprietor(s) and Trustee(s), if any.

- (4) For Subdivision Plats and/or fee simple conveyances, an Approval Block is required.

The Authority requires the Applicant to provide copies of any recorded instruments conveying real property or Utility Easements to the Authority. In addition to copies of any recorded instruments, the Applicant shall provide a minimum of two signed and sealed original Subdivision Plats and/or Easement Plats sealed by a land surveyor registered to practice in the Commonwealth of Virginia.

d. Deeds and Other Legal Instruments:

The requisite legal instruments (Deeds and/or Deed of Easement, Utility Easements and Conveyances, Subordination Agreements etc.) shall be formatted in accordance with Authority guidelines and recorded concurrently with the Subdivision Plats and/or Easement Plats. Upon request, the Authority staff shall assist the Applicant or the Applicant's counsel in the preparation of the requisite legal instruments. Requisite legal instruments are subject to review, approval and acceptance by the Authority. The Authority must sign all such instruments prior to their recordation in the Land Records. The following terms and conditions shall be incorporated into all of the Authority's Deeds of Easement instruments:

All Utility Easements are subject to the following terms and conditions:

- (1) All streets, service drives, trails, sidewalks and driveways and all other appurtenant facilities installed by the Landowner in the Easement, with the prior written approval of the Authority, shall be and remain the property of the Landowner, its successors and assigns, who shall maintain the Property and such facilities.
- (2) The Authority and its agents shall have full and free use of the Easement for the purposes named, and shall have all rights and privileges reasonably necessary to the enjoyment and exercise of the Easement, including the right of access to and from the Easement and the right to use adjoining land of the Landowner to the extent necessary to facilitate installation, construction, replacement, alteration, maintenance, inspection, operation and any necessary repairs; provided, however, that this right to use adjoining land shall be exercised only during periods of actual surveying, installation, construction, reconstruction, replacement, alteration, maintenance, inspection, operation or repair, and then only to the minimum extent necessary for such work; and further, this right to use adjoining land shall not be construed to allow the Authority to erect any building or structure of a permanent nature on such adjoining land.

- (3) The Authority shall have the right to trim, cut and remove trees, shrubbery, fences, structures, or other obstructions in or near the Easement being conveyed, deemed by the Authority to interfere with the proper and efficient construction, grading, operation and maintenance of the water and sewage lines and appurtenant facilities, provided, however, that the Authority at its own expense shall restore the premises as nearly as possible to their original condition, such restoration to include the backfilling of trenches, the replacement of fences, and the reseeding or resodding of lawns or pasture areas, but not the replacement of structures, trees, shrubbery, or other obstructions.
- (4) The Landowner reserves the right to make any use of the Easement herein granted which may not be inconsistent with the rights herein conveyed, or interfere with the use of the Easement by the Authority for the purposes named, provided, however, that the Landowner shall not erect any building or other structure, including a fence, on the Easement, without obtaining the prior written approval
- (5) The consideration mentioned above is paid by the Authority and accepted by the Landowner as full and total payment for all damages to shrubbery or other obstructions within the Easement, for all trees outside the Easement trimmed or felled during the initial construction stage of the Authority's facilities, for all other rights and privileges set forth herein, and for any damages to the residue of the Property.
- (6) The Authority shall have the right to install, construct, operate, maintain, inspect, add to or alter, repair and replace electric and telephone lines and any appurtenant facilities for the transmission or distribution of electric power and communication service within the Easement which serve only the Authority's facilities. The Authority may assign these rights in whole or in part to one or more Virginia public service corporations.
- (7) The Landowner covenants that it is seized of and has the right to convey the Easement and to grant the rights and privileges appurtenant thereto, that the Authority shall have quiet and peaceable possession, use and enjoyment of the Easement and that the Landowner shall execute such further assurances thereof as may be required.
- (8) The parties agree that this Deed/Deed of Easement and Conveyance describes the entire agreement and understanding between the parties and that no written or verbal statements or representations have been made, which modify, add to or change this Deed of Easement agreement.

e. Title Insurance:

The Applicant, at his/her sole expense, shall provide a title report, title insurance and/or a certificate of title for the conveyance of any real property to the Authority. The Authority, in its sole discretion, shall determine the necessity for title insurance, a certificate of title or the appropriate level of title insurance.

200.04Plan Review Fees:

The Applicant shall pay all appropriate review fees, consistent with Volume A, Part 5, Rates, Fees, Charges, and Customer Service Policies of the Authority's Operating Code.

200.05Final Submittals and Construction Plans Approval:

The applicant shall incorporate all Authority comments and resubmit three sets of the corrected submittals to the Authority. The Authority shall then submit three sets of the final Construction Plans and subdivision plats and/or Easements Plats to the VDH for review, comment, and approval. The applicant acting on behalf of the Authority shall then respond to all VDH comments until all VDH comments are satisfied and they approve the submittal. Upon VDH approval, the Authority will issue a Construction Plans Approval letter.

200.06Fixture Count Worksheet:

If the property is being proposed for commercial use, or larger than normal residential use, a copy of a Fixture Count Worksheet (Exhibit "B") is also provided to the Applicant for completion. Upon submission of the completed Fixture Count Worksheet to the Authority, the requisite service size will be determined in accordance with the Authority's Volume A, Parts 1 through 5, Rules and Regulations.

200.07Completion Bond:

In situations where the Applicant is constructing water/sewer infrastructure and/or facilities, intended for dedication to the Authority, the Applicant is required to post a Completion Bond. The Authority in its sole discretion will determine the amount of the Completion Bond. The Completion Bond will be posted as a component of the County's Subdivision Bond, or separately with the Authority in either a form acceptable to the Authority, as an irrevocable letter of credit or as deposited funds in escrow.

200.08 Authority Application for Service and Availability Fees:

- a. The Request for Service and Building Permit Release (Exhibit "C") is the Authority's initial application for new service. It consists of two sections. The first section of the application is completed by the Applicant at the time service is requested. The Applicant shall return the completed form to the Authority with an attached copy of the property's Deed and related County Tax Map. It is recommended an Applicant purchase a copy of the Authority's Volume A, Rules and Regulations, and Volumes B, C, D, E, and F, Utility Standards. However, a copy of Volumes A through G is also available on the Authority's web site.
- b. The first line of the second section of the application is completed by the DSR, upon receipt of the Inspector's and/or Engr./GM's comments. This details the size and capacity of service required for assignment to the property.
- c. Payment of the Availability Fees for all proposed connections within the development must be made to the Authority at the time the subdivision plat is recorded.

200.09 Building Permit Releases:

Building Permit Releases (Exhibit "D") will only be approved for properties whose Applicants have complied with all of the requirements of Section 2 herein.

**300 OCCUPANCY PERMIT RELEASE AND PARTIAL COMPLETION BOND
RELEASE REQUIREMENTS**

As outlined in the Developer's Checklist, the following steps and tasks must be completed in their entirety, before the Authority will issue an Occupancy Permit Release or Partial Completion Bond Release.

300.01 Pre-Construction Conference:

The Applicant shall schedule and attend a pre-construction conference with the Authority's Engineer/General Manager ("Engr./GM") and Inspector. The conference is intended to provide a general briefing to the Applicant regarding the Authority's basic procedures and requirements, outlined in the Developer's Checklist regarding the Authority's inspection and acceptance of infrastructure and facilities constructed on behalf of the Authority.

300.02 Inspection Fees:

The Applicant shall pay all appropriate inspection fees, consistent with Volume 1, Part 5 Rates, Fees, Charges, and Customer Service Policies of the Authority's Operating Code.

300.03 Water/Sewer Line Testing:

All testing of water/sewer lines shall conform to the requirements of the Authority's Volume B, and applicable VDH regulations and shall be conducted only in the presence of the Authority or its authorized representatives.

300.04 Bacterial Testing:

All disinfection and testing of water lines shall conform to the requirements of the Authority's Utility Standards and applicable VDH regulations. All sampling shall be conducted only in the presence of the Authority or its authorized representatives.

300.05 Engineer's Completion Statement:

The Applicant shall submit an Engineer's Completion Statement prepared, signed and sealed by a professional engineer registered to practice in the Commonwealth of Virginia that conforms to the requirements of the VDH.

300.06 As-Built Plans Submittal:

The Applicant shall submit an electronic file of the "As-built" plans and specifications on a Microsoft Windows compatible CD-ROM in AUTOCAD 2005 file format or current latest version of AUTOCAD and two paper sets of As-Built Plans (collectively the "Record Plans") that conform to the requirements of the Authority's Utility Standards.

300.07 Request and Receipt of Final Inspection:

Upon completion of the requirements of Sections 300.01 through 300.06 herein, the Applicant may request a Final Inspection. The Final Inspection will be conducted by the Authority's Inspector or other Authority representative as designated by the Authority's GM.

300.08 Final Inspection Letter and/or Deficiency List:

Upon a successful completion of the Final Inspection and a review of the As-Built Plans, the Authority will issue the Applicant a Certificate of Final Completion. Alternatively, should the Applicant fail to successfully complete the Final Inspection and/or the As-Built Plan review, the Authority will issue a Deficiency List ("Punch List") to the Applicant.

300.09 Deficiency List Completion:

The Applicant shall complete all of the Deficiency List items and incorporate all of the As-Built comments into the As-Built Plans before a Certificate of Completion Letter will be issued.

300.10 Final Inspection:

Upon satisfactory completion of the Deficiency List items (if any), as confirmation by the Authority's Inspector or other Authority representative as designated by the Authority's GM, the Authority will forward a Final Inspection Approval Letter to the Applicant.

300.11 As-Built Plan Approval:

Required corrections and changes shall be incorporated into the As-Built Plans and the revised plans submitted to the Authority for approval.

300.12 Recordation of Deeds, Plats, and Other Legal Instruments:

- a. All Deeds and/or Deeds of Easement, Subdivision Plats and/or Easement Plats and other legal instruments shall be reviewed, approved and executed by the Authority, prior to their recordation in the Land Records
- b. In addition to copies of any recorded instruments, the Applicant shall provide a minimum of two signed and sealed original Subdivision Plats and/or Easement Plats sealed by a land surveyor registered to practice in the Commonwealth of Virginia.

300.13 Construction Warranty:

As required by the Authority's Volume A, Rules and Regulations, the Applicant will provide a One Year Construction Warranty to correct any deficiencies in construction or materials for any related water/sewer infrastructure and/or facilities, occurring during a period of one year from the date of successfully passing a Final Inspection (the "Warranty Period"), as indicated by written correspondence from the Authority. The Construction Warranty Form (Exhibit "D") is provided to the Applicant. The Warranty Form must be completed and submitted before Building Permit Releases will be issued. Any and all damage to the Authority infrastructure and/or facilities, resulting from continuing construction activities beyond the Warranty Period, must be repaired immediately.

300.14 Waiver of Mechanic's Liens/Completion Bond Reduction/Releases:

As required by the Authority's Rules and Regulations, the Applicant is required to provide a Waiver of Mechanic's Liens.

- a. The Waiver of Mechanic's Liens, (Exhibit "E"), must be completed and submitted by the Applicant before an Occupancy Permit Release will be issued.
- b. Upon completion of the construction, passing a final inspection, the submission of a Construction Warranty and a Waiver of Mechanic's Liens, the Authority will consider a reduction of the Completion Bond. As insurance during the Warranty Period, the Authority typically retains 15% of the Completion Bond in cases where utilities have been constructed but have not yet received their final pavement and retains 5% of the Completion Bond in cases where utilities have been constructed and have received their final pavement. The Authority will request the release of the appropriate balance of the Completion Bond from the County or release any appropriate balance of the Completion Bond if held separately by the Authority, upon the expiration of the Warranty Period and a successful completion of the Warranty Check.

300.15 Meter Installations/Use and Occupancy Releases:

- a. When the property is ready for occupancy and where the Authority will be providing water service, the Applicant shall complete and submit a Request For Meter Installation Form (Exhibit "G"). The fee for meter installations is paid for at the time of submission of Exhibit G. The Authority will provide and install the meter after the developer has previously installed the meter box, concrete block, piping, meter yoke, and any other components necessary for installation of the meter.
- b. The Request for Occupancy Permit Release (Exhibit "H") shall be completed at the same time as the Request For Meter Installation Form, unless the Applicant's service will be a sewer only account. The Request for Occupancy Release is also processed through the DSR, Inspector and Engineer. The DSR re-verifies Availability Fee Payment and that the requirements for a Use and Occupancy Permit Release have been met. Once the Occupancy Permit Release Request has been submitted and approved, the DSR completes and the GM executes the Occupancy Permit Release (Form "I") for submission to the County by the Applicant.

400 **FINAL COMPLETION BOND RELEASE REQUIREMENTS**

400.01 Warranty Check:

Before the expiration of the Warranty Period (typically in its eleventh month), the Authority will conduct an inspection to identify any deficiencies in construction or materials for any related water/sewer infrastructure and/or facilities that the Applicant has constructed for dedication to the Authority, as detailed by the project's approved Construction Plans. The Warranty Check will be conducted by the Authority's Inspector or other Authority

representative as designated by the Authority's GM. The Applicant must repair all Warranty Repair List items or the Authority will discontinue the issuance of Use and Occupancy Permit Releases.

400.02Warranty Repair List:

Upon a successful completion of the Warranty Check, the Authority will approve the release of the remainder of the Applicant's Completion Bond. Alternatively, should the Applicant fail to successfully complete the Warranty Check, the Authority will issue a Warranty Repair List to the Applicant.

400.03Warranty Repairs Completed:

The Applicant shall complete all of the Warranty Repair List items before a second Warranty Check will be conducted.

400.04Reimbursable Warranty Repairs Paid:

In the event that the Applicant fails to complete all of the Warranty Repair List items, the Authority shall complete them on his behalf. In that event, payment for the Reimbursable Warranty Repairs will be effected by separate invoice, either billed directly to the Applicant or taken as a deduction from the remainder of the Applicant's Completion Bond. The Authority in its sole discretion shall determine the cost of the Reimbursable Warranty Repairs.

400.05Completion Bond Release:

Upon the expiration of the Warranty Period, the payment (if any) of the Reimbursable Warranty Repairs and a successful completion of the Warranty Check, the Authority will request the release of the appropriate balance of the Completion Bond from the County, or release any appropriate balance of the Completion Bond it held separately by the Authority.

500 MISCELLANEOUS ITEMS

500.01Rules and Regulations, Utility Standards, and Rates, Fees, Charges, and Customer Service Policies:

The Authority's entire Operating Code (Volumes A through G), is accessible on the Authority's web site.

500.02Verification Letters:

Occasionally, prospective property owners, banks etc. request confirmation that water/sewer service(s) are available to particular properties or that various fees have been paid. The Verification Letter (Exhibit "J") is used to verify the availability of service(s) to property and the payment of respective fees.

600 **EXHIBITS “A” through “J”**

See following pages.

DEVELOPER'S CHECKLIST

PROJECT NAME: _____

DEVELOPER: _____

A. BUILDING PERMIT RELEASE REQUIREMENTS

Schedule and attend a pre-design conference.

- ___ 1. Construction Plans submitted to CCWSA and Virginia Department of Health.
- ___ 2. Draft Plats/Deeds/Easements, etc. submitted to CCWSA. (Note: Such plats must be submitted with the construction plans).
- ___ 3. Plan Review Fees paid (if applicable).
- ___ 4. Incorporate comments into and submit final plans.
- ___ 5. Plans approval letter issued.
- ___ 6. Complete and submit Fixture Count Worksheet.
- ___ 7. Water/Sewer infrastructure Bond posted.
- ___ 8. Availability Fees paid.
- ___ 9. Complete and submit Request for Building Permit Release.

B. OCCUPANCY PERMIT RELEASE AND PARTIAL BOND RELEASE REQUIREMENTS

- ___ 1. Schedule and attend a pre-construction conference.
- ___ 2. Inspection Fees paid (if applicable).
- ___ 3. Water/Sewer Line testing passed.
- ___ 4. Bacteriological tests of water lines passed.
- ___ 5. Engineer's Completion Statement received.
- ___ 6. As-Built Plans submitted.
- ___ 7. Request and Receive Final Inspection.
- ___ 8. Final Inspection/As-Built Deficiency List given to Developer.
- ___ 9. Deficiency List completed.
- ___ 10. Final Inspection passed.
- ___ 11. As-Built Plans approved.
- ___ 12. Record Deeds, Plats and Easements, etc. and submit a record copy to CCWSA with a minimum of two signed and sealed original plats. (Note: Such instruments must be reviewed, approved and signed by the CCWSA prior to recordation.)
- ___ 13. Complete and submit Warranty.
- ___ 14. Complete and submit Waiver of Mechanics Lien.
- ___ 15. Complete and submit Request for Occupancy Permit Release and Request for Meter Installation. Meter Installation Fees Paid.

C. FINAL BOND RELEASE REQUIREMENTS

- 1. 11 Month Warranty Check on Subdivision completed.
- 2. Warranty Repair Check List given to Developer.
- 3. Warranty Repairs Completed.
- 4. Reimbursable warranty repairs paid.
- 5. Bond Release Form received.

I HAVE READ AND UNDERSTAND THE ABOVE CHECKLIST. I AM AWARE THAT NO METERS WILL BE SET, NO OCCUPANCY PERMITS RELEASED AND NO BONDING RELEASED UNTIL THE REQUIREMENTS, AS LISTED ABOVE, HAVE BEEN SATISFACTORILY COMPLETED.

Developer's Signature

Date

FIXTURE COUNT WORK SHEET

OWNER/DEVELOPER: _____ USE: Residential _____ Commercial _____
 SUBDIVISION: _____ Single Family: _____ Present Use: _____
 PHASE/BLOCK/SECTION: _____ Multi Family: _____ Intended Use: _____
 LOTS: _____ No. of Units: _____ No. of Rental Units: _____
 CONTACT PERSON: _____
 DAYTIME/HOME PHONE: _____

FIXTURE TYPE	Fixture Value		Number Of		Fixture Value
Bathtub	8	X		=	
Bedpan Washers	10	X		=	
Combination Sink and Tray	3	X		=	
Dental Unit	1	X		=	
Dental Lavatory	2	X		=	
Drinking Fountain - Cooler	1	X		=	
Drinking Fountain - Public	2	X		=	
Kitchen Sink - 1/2" Connection	3	X		=	
Kitchen Sink - 3/4" Connection	7	X		=	
Lavatory - 3/8" Connection	2	X		=	
Lavatory - 1/2" Connection	4	X		=	
Laundry Tray - 1/2" Connection	3	X		=	
Laundry Tray - 3/4" Connection	7	X		=	
Shower Head (Shower Only)	4	X		=	
Service Sink - 1/2" Connection	3	X		=	
Service Sink - 3/4" Connection	7	X		=	
Urinal - Pedastal Flush Valve	35	X		=	
Urinal - Wall Flush Valve	12	X		=	
Urinal - Trough (2 Foot Unit)	2	X		=	
Wash Sink (Each Set of Faucets)	4	X		=	
Water Closet - Flush Valve	35	X		=	
Water Closet - Tank Type	3	X		=	
Dishwasher - 1/2" Connection	5	X		=	
Dishwasher - 3/4" Connection	10	X		=	
Washing Machine - 1/2" Connection	5	X		=	
Washing Machine - 3/4" Connection	12	X		=	
Washing Machine - 1" Connection	25	X		=	
Hose Connection (Wash Down) - 1/2" Connection	6	X		=	
Hose Connection (Wash Down) - 3/4" Connection	10	X		=	
Hose Connection (50' Wash Down) - 1/2" Connection	6	X		=	
Hose Connection (50' Wash Down) - 5/8" Connection	9	X		=	
Hose Connection (50' Wash Down) - 3/4" Connection	12	X		=	

Combined Fixture Value Total _____

COMPLETED BY THE AUTHORITY

Customer Maximum Demand = _____ gpm
 Add Irrigation - _____ Squares x 1.16 or x 0.40 (1) = _____ gpm
 - _____ Hose Bibs x 6.5 = _____ gpm
 Add Continuous Demand Use = _____ gpm
 (1) For Spray Systems - Use 1.16, For Rotary Systems - Use 0.40
TOTAL MAXIMUM DEMAND = _____ gpm

REQUEST FOR SERVICE AND BUILDING PERMIT RELEASE
(Please PRINT)

Please complete the information below. Availability Fees etc. must be paid and/or submitted before the Building Permit will be released. Your Building Permit Release should be ready for pickup within 4 working days of your request. Please note that monthly Base Service Fees will be charged beginning upon payment and acceptance of Availability Fees. Continued availability of service is expressly subject to payment of the Base Service Fees.

APPLICATION DATE: _____

APPLICANT (OWNER OR REP.) _____

BILLING ADDRESS: _____

CONTACT PERSON: _____

WORK/DAYTIME PHONE: _____

HOME/EVENING PHONE: _____

SERVICE REQUESTED (WATER/SEWER/BOTH) _____

PROPERTY USE (RESIDENTIAL/COMMERCIAL) _____

PARCEL IDENTIFICATION NUMBER: _____
(Attach copy of Deed and Tax Map)

SERVICE DISTRICT: _____

SUBDIVISION NAME: _____

SECTION/PHASE: _____

LOT NUMBER(s): _____

I/we am/are the owner(s)/representative(s) of the property(ies) described in this application and attached deed(s). I/we have been afforded the opportunity to read the Authority's Rules and Regulations and hereby agree to follow them as they now exist or may be hereafter amended.

Print Name of OWNER/REPRESENTATIVE

Signature of OWNER/REPRESENTATIVE

Print Name of OWNER/REPRESENTATIVE

Signature of OWNER/REPRESENTATIVE

******* TO BE COMPLETED BY THE AUTHORITY *******

METER SIZE ASSIGNED: _____ Equivalent Residential Connections
(ERCs) ASSIGNED: _____

AVAILABILITY FEES PAID RECEIPT #: _____

INSPECTION FEES PAID RECEIPT #: _____

BASE SERVICE FEES PAID ACCOUNT #: _____

BUILDING PERMIT RELEASE ISSUED DATE: _____

Developer Services Representative

Director of Finance

Date:

Date:

BUILDING PERMIT RELEASE

Date:
To:
From:
Subject: Building Permit

OWNER/BUILDER:
PROPERTY DESCRIPTION:

Subdivision Name: _____

Section/Phase:

Lot Number(s):

Parcel ID #:

Type of Service to be provided by CCWSA: Water _____ Sewer _____ Both

___ The system to serve this/these lot(s) is **NOT** currently under the operational control of the CCWSA. Plans and specifications for construction have been approved, and upon satisfactory completion the system is to be owned and operated by the CCWSA. Completion of the system is the responsibility of the developer, and must be done in accordance with the CCWSA Rules and Regulations and Utility Standards. CCWSA intends to provide service to this lot at such time as the system is completed and has passed our final inspection.

___ The system to serve this/these lot(s) is owned and operated by the CCWSA. Service will be provided to this/these lot(s) by the CCWSA.

General Manager

Date:

CONSTRUCTION WARRANTY

As required by Section 300 and Section 300.13 et. al. of the Authority's Rules and Regulations, the undersigned as Owner/Developer of the property shown on the Construction Plans dated _____, 20____, and entitled _____, as prepared by _____ of _____, _____, do hereby affirm that I shall be responsible for and obligated to correct any deficiencies in construction or materials for any related water/sewer facilities, occurring during a period of one year from the date of successfully passing a Final Inspection, as indicated by written correspondence from the Authority.

Should the finished grade be changed after the Authority's inspection and acceptance, requisite adjustments will become the obligation of the Owner/Developer. Where valves and valve boxes are or will be located within paved areas, they shall be set and adjusted so that the cover is exposed and flush with the finished surface. If the paved surfaces are installed, renewed or replaced by the Owner/Developer after the related water system has been approved and accepted by the Authority, but while such paved areas or streets are still the obligation of the Owner/Developer, the valve boxes therein shall be re-adjusted relative to the elevation of the finish surface.

I further understand and acknowledge that this written guarantee shall constitute an irrevocable agreement between myself and the Authority and the Board of County Supervisors which indemnifies the Authority and Board of County Supervisors and any of its officers, agents, servants and employees against all responsibilities, all claims and all liabilities incurred by myself for all things done or furnished in connection with this work.

Printed Name of OWNER/DEVELOPER

Signature of OWNER/DEVELOPER

Date

COMMONWEALTH/STATE OF: _____

COUNTY/TOWNSHIP OF: _____ To Wit:

The foregoing instrument was acknowledged before me this ____ day of _____ 20 ____, by

_____ .

NOTARY PUBLIC

My Commission Expires: _____

WAIVER OF MECHANIC'S LIENS

As required by Section 300.14 of the Authority's Volume A, Part 4, Rules and Regulations, the undersigned as Owner/Developer of the following described property certify that as of the date hereof has any work, services, or labor been done, or any fixtures, apparatus or material been furnished, in connections with, or to, the property except such material, fixtures, work, apparatus, labor or services as have been fully and completely paid for; that there is no indebtedness to anyone for any labor, fixtures, apparatus, material services, or work done to, upon, or in connection with the said premises; that there is no claim of indebtedness; and, that there is no Mechanic's Lien claim against said premises, whether of record or otherwise.

SUBDIVISION NAME: _____

SECTION/PHASE: _____

CONSTRUCTION PLANS: _____

Work performed and/or materials furnished for the above property constitutes 100% of the project.

Printed Name of OWNER/DEVELOPER

Signature of OWNER/DEVELOPER

Date

COMMONWEALTH/STATE OF: _____

COUNTY/TOWNSHIP OF: _____ To Wit:

The foregoing instrument was acknowledged before me this ____ day of _____ 20____

by _____ .

NOTARY PUBLIC

My Commission Expires: _____

REQUEST FOR METER INSTALLATION

BUILDER'S NAME: _____

COMPANY ADDRESS: _____

DATE REQUESTED: _____ DAYTIME TELEPHONE: _____

SUBDIVISION NAME: _____ PHASE/SECTION: _____

LOT #: _____ TYPE OF SERVICE (W/S/W&S): _____

RESPONSIBLE SIGNATURE: _____

NAME(PLEASE PRINT): _____

BILLING INFORMATION (IF DIFFERENT FROM BUILDER)

NAME: _____

PHONE NUMBER: _____ ADDRESS: _____

OFFICE USE ONLY

ADMINISTRATION: _____ BILLING: _____

DATE METER PAID: _____ TYPE SERVICE: _____

RECEIPT #: _____ AMT: _____ WATER: _____ SEWER: _____

OCCUPANCY PERMIT RELEASE _____ ACCT: _____ RATE: _____

REQUIREMENTS MET? YES _____ PUMP: _____ ROUTE: _____

METER ID: _____ READING: _____

INSTALLED BY: _____ INSTALLED DATE: _____

REQUEST FOR OCCUPANCY PERMIT RELEASE FORM

BUILDER'S NAME: _____

COMPANY ADDRESS: _____

DATE REQUESTED: _____ DAYTIME PHONE: _____

SUBDIVISION NAME: _____ PHASE/SECTION: _____

LOT # _____ TYPE OF SERVICE (W/S/W&S) _____

RESPONSIBLE SIGNATURE: _____

NAME (PLEASE PRINT): _____

BILLING INFORMATION (IF DIFFERENT FROM BUILDER)

NAME: _____

PHONE NUMBER: _____

ADDRESS: _____

IF ALL REQUIREMENTS HAVE BEEN MET, THE OCCUPANCY PERMIT RELEASE FORM WILL BE COMPLETED BY THE CLOSE OF BUSINESS ON _____

OFFICE USE ONLY

ADMINISTRATION _____

DATE WATER AVAIL. PAID _____

DATE SEWER AVAIL. PAID _____

OCCUPANCY PERMIT RELEASE REQUIREMENTS MET? YES _____

OCCUPANCY PERMIT RELEASE

Date:

To:

From:

Subject: Certificate of Use and Occupancy

In reference to your Memorandum of _____ 20___, requesting approval in writing that the facilities (checked below) have been installed, inspected, and approved by the appropriate agency, this is to inform you that the following lot(s) have/has met all requirements of the Culpeper County Water and Sewer Authority for a Certificate of Use and Occupancy.

OWNER/BUILDER: _____

PROPERTY DESCRIPTION:

Subdivision Name: _____

Section/Phase: _____

Lot Number(s): _____

Parcel ID #: _____

Type of Service to be provided by CCWSA: Water _____ Sewer _____ Both _____

If you have further questions or require additional information, please this office at (540) 727-3409.

General Manager

Date:

Subject: Water/Sewer Service and/or Availability Fee payment Verification for
Property known as

Dear Sir/Madam,

This is to advise you that the Culpeper County Water and Sewer Authority owns and operates the central water/sewer system serving the above referenced property. Water/Sewer Availability Fees have/have not been paid. Attendant monthly Base Service Fees are/are not currently being assessed.

I hope this information will be helpful to you. Should you have further questions or require additional information, please contact this office.

Sincerely,

Developer Services Representative (DSR)

**VOLUME A
RULES AND REGULATIONS
PART 5
RATES, FEES, CHARGES, AND CUSTOMER SERVICE POLICIES
CULPEPER COUNTY WATER AND SEWER AUTHORITY**

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VOLUME A - RULES AND REGULATIONS

PART 5 – RATES, FEES, CHARGES, AND CUSTOMER SERVICE POLICIES

100 DEVELOPER FEES AND CHARGES

100.01 Plan Review Fees

An Owner/Developer seeking approval for a development site and subdivision plan shall pay a plan review fee to the Authority in accordance with the Authority fee schedule in effect at the time the development and subdivision plans are submitted to the County and Authority for review. The plan review fees are payable at the time the plans are submitted for review.

100.02 Availability Fees

Water and sewer availability fees are charged to defray the cost of treatment capacity and publicly-financed infrastructure needed to serve new customers. A portion of the fees are also allocated for cost of maintenance and reserved for facilities replacement. These fees are charged to the Owner/Developer of approved lots that will be connected to the Authority's water and/or sewer system. The availability fee for meters two inches or less is based on the meter size assigned to each new lot at the rate specified in the Authority's schedule of rates, fees and charges at the time the fee is paid. The availability fee for meters greater than two inches is based on the cost of capacity and other facilities needed to serve the project.

100.03 Availability Fee Payment and Connection

The water and sewer availability fee must be paid to the Authority at the time the subdivision plat is recorded. These fees are non-transferable and non-refundable and must be paid in full before a connection is made to the Authority's water and sewer system. After the availability fee has been paid and a building permit issued, the Owner/Developer has up to 36 months to connect units to the Authority's water and sewer system. After 36 months, the timing of the connections to the system will be at the sole discretion of the Authority and could be delayed for a substantial period of time if system capacity or source is not available. Availability fees are sold on a first come first serve basis. However, the Authority reserves the right to limit the sale of availability fees when in its sole determination, the safety, economy of operation or public health so warrants

100.04 Supplemental Availability Fees

A Supplemental Availability Fee will be charged to each existing customer when either their quarterly or annual usage exceeds the usage limits set forth for their particular meter size. The Supplemental Availability Fee will be equal to the difference between

the Availability Fee of the initial meter size and the Availability Fee for the larger meter size which corresponds to the customer's excess usage. All calculations for Supplemental Availability Fees shall be made at the rates in effect on the date of the bill.

100.05 Meter Charges

A meter charge shall be paid by the Owner/Developer of each new housing / building unit at the time a Request for Meter Installation is submitted to the Authority. The Authority will determine the size meter to be installed at each Owner/Developer's location based on existing and planned fixture count, in accordance with the procedures set forth by the American Water Works Association AWWA Manual M-22, Sizing Water Service Lines and Meters. The meter charge is designed to defray the costs of water meters that will be provided and installed by the Authority in the meter box, meter yoke, piping, and all other items installed by the developer. The meter charge will be based on the size of the meter assigned to each housing/building unit by the Authority and the schedule of rates, fees and charges at the time the meter charge is due and paid.

The Owner/Developer shall construct the water meter box, concrete block, meter yoke, and other items, associated with the meter in accordance with the Authority's Volume A, Part 1 Rules and Regulations. The Authority will perform a final inspection of the water meter assembly and sewer lateral prior to installation of the meter to ensure that materials and installation are in accordance with the details listed in the current Authority Utility Standards Manual, Volumes B, C, D, E, and F, prior to the issuance of an occupancy permit by Culpeper County.

If the meter assembly or sewer lateral is unacceptable, the Authority will notify the Owner/Developer of the deficiencies. The Owner/Developer must correct all deficiencies noted and schedule a reinspection. Reinspection will be scheduled at least two working days after the date of the rejection.

100.06 Inspection Fees

Inspection Fees for water and sewer mains, sewer laterals and water service lines shall be in accordance with the current fee schedule in effect at the time the fee is paid. Inspection Fees include closed-circuit TV inspection of sanitary sewer lines. If, prior to acceptance of sewer lines by the Authority, it is determined that the sanitary sewer lines need additional flushing prior to final TV inspection, the Owner/Developer shall pay the flushing fee per linear foot that is in effect at the time.

The inspection fees provide up to two inspections by Authority inspectors. If additional inspections are required, reinspection fees shall be assessed at the current rate in effect at the time of payment.

100.07 As-Built (Utility Permit) Fees

A fee shall be paid to the Authority, at the time a utility permit is issued, for preparation of as-built drawings after the utility development is complete. This fee shall be paid in accordance with the fee schedule in effect at the time of payment.

200 **CREATING AN ACCOUNT AND INITIATING SERVICE**

200.01 Creating a New Account

A new account will be established as of the effective date that a water meter is installed. All new accounts will be charged a monthly service charge starting with the first full month following the date the water meter is installed.

200.02 Account Transfers

Active and current accounts may be transferred from the current owner to a new Owner through the Customer Service Department. A non-refundable application fee is charged. However, accounts that have not received service may be transferred from one owner to another by a letter requesting the change that is signed by both the new and the previous owner. There is no charge for this transfer. This request must be submitted through the Customer Service Department.

200.03 Where and How to Apply for Service

Application for water and sewer service may be made by telephone or in person at the Authority's main office, during Customer Service hours, which are, 8:00 AM - 5:00 PM, Monday - Friday. Due to seasonal fluctuations in workload, it is recommended that application be made at least five working days prior to the date that service is to be initiated.

200.04 Application for Service

When applying for service, the application process will be expedited by having the following information readily available:

- a. The exact address for which the application is being made;
- b. The full name of the person applying for service;
- c. The complete billing address;
- d. The applicant's social security number or valid driver's license number;
- e. The applicant's home and work telephone numbers;

- f. The date service is to be initiated; and
- g. For customers renting the property, the owner's name, address and telephone number (or that of the owner's agent) must be provided at the time of application.

200.05 Application Fee

The Authority does not require a deposit, although a non-refundable application fee is charged in accordance with the current fee schedule. The application fee will appear on the customer's first monthly bill.

200.06 Connecting Service

The customer's plumbing must be in working condition and all outlets closed in order to connect water service. In the event that the water meter continues clocking when turned on, indicating that all outlets are not closed, and no one is at the premises, the Authority will NOT connect the water service. A maximum of two attempts will be made to connect water service. If the Authority cannot connect service after the second trip, a return trip fee will be assessed and must be paid before a subsequent trip will be authorized.

200.07 Testing of Backflow Preventers

It shall be the duty of the customer-user at any premises where reduced pressure backflow prevention devices (RP), double check valve assemblies (DCVA), and pressure vacuum breakers (PVB) are installed to have thorough inspections and operational tests made at least once a year or more often in those instances where inspections indicate a need. These inspections and tests shall be at the expense of the water user and be performed by the device manufacturer's representative, or by a certified device technician. The Authority will notify the customer or user when the backflow prevention tests are required and supply the necessary test forms and instructions.

300 CLOSING AN ACCOUNT

Accounts may be closed by telephoning Customer Service between the hours of 8:00 AM - 5:00 PM, Monday - Friday. It is recommended that customers call at least five working days prior to the date service is to be terminated. At properties where remote meters are located, access to the meter is necessary for turning off water service. It is the customer's responsibility to contact customer service in a timely manner in order to provide for the termination of service.

400 REFUSAL OF SERVICE

The Authority reserves the right to refuse requests for service for any of the following conditions:

- a. If the applicant incurred a bill that remains unpaid at the time service is requested, service will be denied until the outstanding bill is paid by the applicant or a third party.
- b. If an account has been out of service for more than one year, service cannot be initiated until all outstanding service charges and additional availability fees, if applicable, have been paid.

500 REAPPLYING FOR SERVICE

A customer that has closed an account or who has had an account terminated due to non-payment may reapply for service providing (1) the meter size has not changed since service was discontinued; and (2) The service has not been discontinued for more than one year.

If service has been discontinued for more than one year, service will be re-established providing:

- a. Water and sewage capacity is available;
- b. If there is a change in meter size, the owner pays the difference in availability fees between the existing and new meter size; and
- c. The owner pays all surcharges, delinquencies or special charges that have been imposed since service was discontinued.

Discontinued service is defined as a period of time in which there has been no payment activity on the account, the customer had requested discontinuance of service or the period of time the account is closed for non-payment.

600 MONTHLY BILLING PROCEDURES AND DATES

All water and sewer users within the service area of the Authority shall be metered and billed monthly according to the adopted rate schedule. Sewer charges are based on a percentage of the water meter readings.

- a. All accounts are charged the applicable monthly service charge regardless of consumption following the first full month after the account is opened and a meter is installed. Service charges are designed to recover the cost to replace water meters and administrative costs that are typically

independent of consumption and are based on the size of the meter at the property.

- b. Because monthly bills are based upon past usage, bills are due when rendered. Bills are considered past due thirty (30) days from the date of the bill.
- c. A transaction charge of \$10.00 will be assessed on payments not received within thirty (30) days from the date of the bill.
- d. Services may be cut off for non-payment if payment is not received within sixty (60) days from the date of the bill.

700 **CUSTOMER PAYMENT POLICIES**

- a. Payments (checks) should be mailed to the address shown on the bill. Payments may also be sent overnight or delivered to the Authority's Office in person (check or cash). The Authority will also accept payments by credit cards, debit cards and automatic bank drafts.
- b. A fee will be assessed for each returned check on the customers' next bill. The amount of the returned check, must be paid by certified check, cash or money order only.
- c. Payments are credited to the customer's account when they are received by the Authority. The Authority is not responsible for delays in transit due to the Postal Service or any other third-party bill payment service.
- d. A disconnect fee will be charged to all accounts that are not paid within sixty (60) days from the date of the bill regardless of whether physical disconnection occurs. The past due balance must be paid prior to service restoration. The fee will appear on the next month's bill. An additional reconnection fee will be assessed if the reconnection request is received after 5:00 p.m. on working days, or anytime on weekends or holidays.
- e. If service is transferred from one property to another within the Authority's service area, and the final bill remains unpaid after the due date, the outstanding balance will be transferred to the customer's new account.

800 **DISCONTINUATION OF SERVICE**

800.01 Discontinuation for Non-Payment

Accounts are subject to disconnection sixty (60) days after the date of the original bill. In the event disconnection occurs, the past due balance must be paid prior to service restoration. Service will be restored only during regular office hours unless other

arrangements have been made. After-hours service restoration will not be provided for accounts that have been disconnected more than twice in the past six months. If an account remains unpaid for more than five business days after disconnection, the account is closed and the meter may be removed. At this time, the entire account balance becomes due and must be paid in full prior to service reinstatement.

800.02 Other Reasons for Discontinuation

In addition to discontinuation of service for non-payment the Authority may discontinue service for any of the following reasons:

- a. Tampering – For molesting or tampering by the customer or others with the knowledge of the customer, with any meters, connections, service pipe, curb cock. Seal, fixture, or any other appliance of the Authority controlling, regulating or protecting the customer’s water and sewer service.
- b. Backflow Prevention – If a required backflow prevention device is not installed when such is required or if the device is inoperative, has been bypassed or removed or if the cross-connection exists on the premises. (See Volume A, Part 2 for further guidelines on backflow prevention devices).
- c. Violation of the Authority’s pretreatment rules and regulations.
- d. Failure to comply with emergency orders issued by the Authority, i.e., failing to abide by Authority’s Drought Management Plan.

800.03 Discontinuation of Service Procedures

The Authority may discontinue service five (5) days after written notification, delivered by regular first class mail to the last known address of record of the customer or by written notification on the customers monthly bill. Other notification procedures are:

- a. The Authority’s termination notification shall also include notice to the local fire marshal that the fire protection service will be terminated.
- b. In termination cases involving multifamily housing; in addition to notification to the owner, the Authority shall also notify by mail or hand deliver notification to each tenant and to County Department of Health.
- c. In termination cases involving rental properties, both the tenant and owner shall be notified of impending termination.

When service to a customer has been terminated, other than for the temporary vacancy of a premise, it will be renewed only after the condition, circumstances, or practices

which caused the service to be discontinued are corrected to the satisfaction of the Authority and upon payment of all charges due and payable by the customer.

900 LIEN PLACEMENT

- a. The Authority is permitted by law to file a lien for unpaid fees and other charges owed by a property owner or lessee or tenant.
- b. In the event a lien is filed due to a tenant-incurred bill, the tenant's name is included on the lien. All liens are filed in the Culpeper County Circuit Court, which is a court of record. These records are to be open to the public for inspection, and the placement of any lien may be reviewed and recorded by area credit reporting agencies.

1000 RETURNED CHECKS

Any check accepted as payment for charges or fees that are returned to the Authority will be subject to a return check charge. If three checks are returned in a 12-month period, the customer's privilege of paying by personal check is revoked for one year from the date of the most recently returned check. Should service be turned off for failure to pay the returned check charge, the account will be assessed a delinquency fee in addition to the returned check charge.

1100 METER READING

1100.01 Access to Water Meters

According to Authority policy, all water meters are to be read monthly for billing purposes. If the meter is not physically read, the customer's bill should read "ESTIMATED." The Authority must have access to the meter at all times. Please be aware of this requirement when re-paving driveways and making landscaping decisions.

1100.02 Water Meter Testing

A charge will be assessed to the account each time a 5/8" x 3/4" meter is tested for accuracy, at the customer's request, when the meter is found to be registering accurately. For meters larger than 3/4", the testing charge will be the actual cost of testing the meter plus 15 percent. A meter is considered to be accurate if it measures between 98.5% - 101.5% at the intermediate rate of three different flow rates. If the water meter is found to be over registering, the meter will be replaced and the customer's account adjusted. If the water meter is found to be under registering, a replacement meter will be installed and the customer's account will not be adjusted. Customers requesting meter tests are encouraged to be present when the meter is tested.

1100.03 Inspection and Installation Scheduling

Water meter box, concrete block, meter yoke, piping, and all other items installed by the Developer shall be inspected by the Authority prior to the Authority installing the meter. Requests for installation inspections are made by telephone to the Authority's main telephone line. Provide name, company, phone number, as well as the subdivision, phase, section and lot number of the property where the meter assembly inspection is requested. To the extent possible, meter assembly inspection requests received prior to 2:00 p.m. will be scheduled for the next working day. Calls received after 2:00 p.m. will be scheduled for two working days after receipt of call. The Authority will make every effort to perform the inspections as scheduled; however, extenuating circumstances, such as inclement weather, scheduled holidays or unusually heavy workload may cause delays. Developer/Customers are advised to consider these factors when scheduling final inspections prior to the Authority installing the meter, especially when such requests closely coincide with real estate settlement dates

1200 **SPECIAL ACCOUNTS**

1200.01 Water Only Accounts

All customers shall have the option of opening a separate water only account if they install at their own expense Authority approved piping, plumbing, meters, etc. The water only account must be physically separated from all other water connections on the property. The customer shall pay the Authority a separate availability fee for the water only account based on the size of the meter at the time actual connection is made to the water system. Customers having a water only account for such uses as pools, irrigation systems, yard hydrants, etc. are not subject to the sewer rates as long as there is no physical connection to the public sewer system.

1200.02 Sewer Only Accounts

- a. For accounts with no water meter that are connected only to the sewer system, the basis for the monthly billing shall be 7,000 gallons per month per equivalent residential connection (ERC), the established average use of a single-family residence.
- b. For new sewer only accounts, the Authority will require installation of a water meter on the well, or water source, at an approved location for the purpose of computing the sewer charges. This applies to both residential and commercial accounts. The Owner/Developer will be required to incur all expenses associated with the installation of the meter. As a part of this requirement, the Authority will provide the meter and inspect the installation. The Authority accepts full responsibility for only the water meter. The piping, well and hardware within the meter crock will be the Owner's/Developer's responsibility for maintenance should a problem occur. The Authority reserves the right to access the property at any time

to perform its duties regarding the monthly meter reading and routine maintenance of the meter. The Authority reserves the right to revert back to fixed flat rate billing if a meter problem occurs.

- c. The Authority reserves the right to install metering devices on any private or publicly owned sewage collection system or facilities connected to sewer and/or water facilities owned by the Authority. The Authority may elect to compute the sewer charges based on actual metered sewage flows at the established user charge rates.
- d. If a meter has not been set on the well within 90 days of certification, the Authority will commence billing the account at the currently applicable flat rate until a meter has been set.

1200.03 Swimming Pool Fills (Seasonal Pool Adjustment)

All customers with swimming pools are eligible for a “once a year” adjustment of sewer charges for the filling of swimming pools. The adjustment will be equal to the capacity of the swimming pool times the sewer volume rate in effect at the time the swimming pool is filled. When calling to request a seasonal pool adjustment, it is necessary to have the capacity of the pool in thousands of gallons. Pools with a capacity of less than 1,000 gallons are not eligible for the adjustment.

1300 **TEMPORARY WATER SERVICE**

1300.01 Construction Water

- A. A meter that will become a permanent part of a customer’s service may be used for a temporary construction water meter in accordance with Authority standards providing that the property has been certified and the meter crock and yoke are properly installed. Construction meters are available for commercial, industrial and large-scale residential projects.
- B. Once initiated, temporary construction water service must continue until the property passes final Authority inspection, at which time it is considered a permanent meter installation/service. Construction water consumption will be billed at the prevailing combined user charge rate.
- C. The Authority reserves the right to accept or reject applications for a temporary water connection to serve construction sites where no permanent connection is readily available.

The Owner/Developer shall be responsible for temporary construction meter accounts. This includes replacement costs for damaged, lost, or stolen meters. The Owner/Developer shall be responsible for the payment of water and sewer bills

associated with a temporary construction account. Monthly billing for actual consumption and service charges will begin upon the installation of the water meter

1300.02 Hydrant Permits for Temporary Hook Up

- a. Hydrant meters are available for use in areas where temporary water is needed and permanent service is not available. Hydrant meters cannot be used when resulting effluent requires discharge into the public sanitary sewer system.

- b. Fire hydrants opened by any individual other than employees of the Authority or Culpeper Fire Department must have a hydrant meter attached. The Authority has two sizes of meters available for rental. A deposit is required and may be used to defray the cost of damages to the hydrant meter, its attachments, and any other equipment or facilities damaged by the permittee. The deposit will be refunded when the hydrant meter and meter wrench are returned and payment is made on all outstanding charges or damages.

- c. There is a minimum monthly charge for each hydrant meter, which includes up to 5,000 gallons usage per month. Additional hydrant water is charged at the current hydrant water rate per 1,000 gallons used. For meters kept longer than one month, it is necessary to either telephone or fax the meter reading to the Authority's Customer Service Department, or bring the meter into the office by the first of the month. If the reading is not called in, a penalty will be assessed with no credit towards consumption.

- d. The permittee is responsible for utilizing the proper equipment and tools to operate the hydrant and meter safely and without damage. All hydrant meters must be returned to the office annually for inspection and testing.

1400 **UNAUTHORIZED WATER USE**

The act of diverting or wasting public water, tampering with a metering device, damaging or intentionally destroying water facilities is illegal. Any person opening a fire hydrant without a metering device, excluding Authority and firefighting personnel, as well as any person who tampers with the meter assigned to the property or who installs any type of device other than the assigned meter will be subject to the applicable unauthorized use charge.

1500 **ADJUSTMENTS FOR LEAKS**

1500.01 Underground Leaks between the Curb Stop or Meter and the Main Service Cutoff

In the case of an underground leak between the curb stop or meter and the main service cutoff in the house or building, an adjustment of 50% for water and 100% for sewer service may be made to the comparable period usage of the customer. In the event the customer has not established a comparable period usage, the adjustment will be based on average consumption, post-repair consumption or 7,000 gallons. Should a second underground leak occur, the Customer Service Manager may grant a second adjustment with the understanding that it will be a final adjustment unless new leaks are discovered subsequent to the replacement of the entire service line from the curb to the house. The period to be adjusted will not exceed six months.

1500.02 Undetected Leaks inside the House or Building

In the case of an unknown loss or undetected leak inside the house or building, a “one-time” courtesy adjustment for water and sewer service may be made for 50% of the amount in excess of the comparable period usage provided that the customer (1) was unaware that a the leak existed, (2) submits a letter to the Authority requesting bill adjustment, (3) promptly and properly repairs such leak, if detected, and (4) provides the Authority with proof of such repair. In the event the customer has not established a comparable period usage, the adjustment will be based on average consumption, post-repair consumption or 7,000 gallons. The period to be adjusted will not exceed 90 days. Customers may be granted only one such courtesy adjustment during any five-year period.

1500.03 Undetected Leak in a Sprinkler System or Swimming Pool

In the case of an unknown leak in a sprinkler system or swimming pool, a “one-time” courtesy adjustment of 50% for water and 100% for sewer service of the amount in excess of the comparable period usage of the customer may be made, provided that the customer (1) was unaware that the leak existed, (2) submits a letter to the Authority requesting a bill adjustment, (3) promptly and properly repairs such leak, if detected, and (4) provides the Authority with proof of such repair. In the event the customer has not established a comparable period usage, the adjustment will be based on average consumption or post-repair consumption. For swimming pools, the period to be adjusted will not exceed 30 days. For irrigation systems, the period to be adjusted will not exceed 90 days. Customers may be granted only one such courtesy adjustment during any five-year period.

1600 **SANITARY SEWER RESPONSIBILITY**

1600.01 Gravity Sewer Mains, Service Lines, and Laterals

The Authority is responsible for the operation and maintenance of all gravity sanitary sewer mains, force mains or low pressure force mains located within a public street (VDOT right-of-way) or sanitary sewer easement dedicated to the Authority providing the pipeline has been accepted by the Authority. The Owner/Developer retains operating and maintenance responsibility as well as liability for sewer backups within areas served by sewers or force mains that have not yet been accepted by the Authority.

Sewer stoppages in gravity sanitary sewer mains, generally eight inches or larger, will be cleared by the Authority regardless of cause. Sewer stoppages that occur in force mains or low-pressure force mains located within dedicated rights-of-way or in sanitary sewer easements will also be cleared by the Authority.

It is the customer's responsibility to clear any blockage in a service line to the customer's building. The Authority assumes no responsibility for what is put in the service line or in the building lateral. If the customer or the customer's plumber discovers that the cause of the blockage is due to roots or other similar structural or material defects, the Authority will only repair the service line located within a public street right-of-way or within a dedicated easement to the Authority. Grease is not considered a structural or material defect. Sanitary sewer laterals located within a dedicated easement are not service lines. If the sewer line needing repair or replacement is located in a townhouse or condominium common area, outside a dedicated easement, customers should contact their homeowner's association to see if the association has the ability to assist in replacement costs for building sewers outside the customer's property.

If a customer experiences a sewage backup, the Authority should be contacted by calling 540-727-3409 (Culpeper County, Department of Environmental Services). If the Authority determines that the main is clear, the customer will be advised that the blockage is his/her responsibility and the services of a plumber should be obtained. The Authority will not reimburse the customer for the cost of a plumber. If prior history is available on this particular sewer service indicating there is a pipe structure or material problem, the Authority's personnel will clear the stoppage. If a sewer cleanout is available near the customer's property line contiguous to a public street or common area, Authority personnel may unstop the service line in order to determine the cause of the blockage. If no structural or material defects are found, removal of future blockages will be the responsibility of the customer.

If a sanitary sewer main has blockage or surcharged flow that caused a backup into a business or residence, the Authority will offer to have a cleaning service clean and disinfect the affected areas at the Authority's expense. This service is offered to reduce

the impact of the backup on the affected business or residence. The Authority will not accept any liability for damage due to the sewage backup.

The Authority will replace missing or broken cleanout caps on service lines or building laterals if they are found to be missing, or will adjust cleanout to grade if such adjustment eliminates damage to the sewer line or prevents inflow of storm water into the wastewater collection system.

1600.02 Grinder Pumps

Grinder pumps may be installed at the customer's costs but only when approved by the Authority. Installed grinder pumps will be maintained by the Authority and the customer will be assessed a monthly maintenance fee.

1700 **AREAS OF CCWSA WATER SERVICE RESPONSIBILITY**

The Authority maintains all water mains and water service lines from the water main up to and through the water meter pit. The Authority is responsible for all water meters, angle valves, meter setters or other appurtenances located in the meter pit.

The Authority will also repair or replace that portion of a water service line located in the public street (VDOT right-of-way) between the meter and the customer's property line if the request is made before the service line is repaired or replaced and Authority personnel determine the leak is within the public street right-of-way.

1800 **AREAS OF CCWSA WATER SERVICE NON-RESPONSIBILITY**

The Authority will not reimburse a customer for the cost of replacement of the service line within the right-of-way if the line was replaced by the customer or the customer's plumber prior to calling the Authority. The Authority will not replace any appurtenances on a water service line, such as a pressure-reducing valve, located within the public street right-of-way and beyond the water meter pit. These appurtenances should be relocated inside the customer's residence or business and not underground. The Authority has no responsibility for any water service line on the customer's side of a meter pit located out of a public street (VDOT right-of-way) whether in a townhouse or condominium parking lot or common area, in an easement dedicated to the Authority or on private property. If the water meter pit is located between the curb and sidewalk of a public street, the Authority will be responsible for that portion of the service line under the sidewalk, assuming the conditions described above are met. If the meter pit is located in back of the sidewalk near the customer's property line, the Authority is only responsible for the facilities within the meter pit and nothing outside the meter pit.

1900

**AREAS OF RESPONSIBILITY FOR WATER SERVICE LINES ON
HOMEOWNER ASSOCIATION PROPERTY**

The customer is responsible for the cost of all metered water lost as a result of an underground leak, but may be eligible for a bill adjustment if certain conditions are met. Customers having to replace their water service line on property owned by a townhouse or condominium association should contact their homeowner's association to see if the association has the ability to assist in the replacement costs for water service lines off the customer's property. The Authority will not be responsible for sub-meters if installed outside an approved location. Sub-meters installed outside an approved location will be the responsibility of the customer. Approved locations for submeters will be decided by the Authority on a case by case basis.

2021

Town of Culpeper & Culpeper County Water & Sewer Utility Standards Manual

Replaces Volume B and C

Water Distribution and Wastewater Collection Systems Design &
Wastewater Standards and Construction Details

Effective June 2021



TOWN OF CULPEPER & CULPEPER COUNTY

**WATER AND SEWER
UTILITY STANDARDS
MANUAL**

This document, Town of Culpeper and Culpeper County Water and Sewer Utility Standards Manual (USM) represents the joint policies and standards required to design and construct extensions to water mains, sanitary sewers and minor sewage pumping stations to be owned and operated by the Town of Culpeper or Culpeper County.

APPROVED: Culpeper County Board of Supervisors

DATE: June 2021

APPROVED: Culpeper Town Council

DATE: October 2021



TOWN OF CULPEPER & CULPEPER COUNTY
WATER AND SEWER UTILITY STANDARDS MANUAL

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WATER AND SEWER UTILITY STANDARDS MANUAL

GENERAL CONDITIONS

100.01 Purpose and Authorization:

This Document, the Town of Culpeper and Culpeper County Water and Sewer Utility Standards Manual (USM) represents the joint policies and standards required to design and construct extensions to water mains, sanitary sewers and minor sewage pumping stations to be owned and operated by the Town of Culpeper or Culpeper County.

As a policy and standards document, these design and construction standards are supplementary to the most current regulations of the Virginia Department of Health, Office of Drinking Water *Waterworks Regulations* and the Virginia Department of Environmental Quality, Sewage Collection and Treatment Regulations (SCAT), and it is not intended to supersede these regulations. Where conflicts exist, the more stringent requirement shall apply. Nothing herein shall be deemed to waive or modify other requirements of existing regulations and law. Conflicts are encouraged to be brought to the attention of the Town of Culpeper Director of Public Services and/or the Culpeper County Director of Environmental Services.

In addition, for the applicable permitting requirements, refer to the codified ordinances of the Town of Culpeper Code and the Culpeper County, Code of Ordinances.

This manual is not intended to address all situations encountered in the design and construction of water and sewer facilities. It is understood that exceptions, may be warranted depending upon the nature of the engineering application.

The Utility Standards Manual's policies and standards have been adopted by the Town of Culpeper Town Council and the Culpeper County Board of Supervisors. Modifications to the manual are subject to the approval of the Council and the Board. Proposed modifications shall be reviewed by the Town of Culpeper Director of Public Services and the Culpeper County Director of Environmental Services, prior to submission to the Town Council and the Board of Supervisors for final approval.

Necessary revisions/amendments occur frequently and shall take effect as approved by the Town and County Directors. In general, plans submitted and accepted for review shall be reviewed to comply with the standards existing at the time of submittal. Construction methods and materials used on the project shall comply with the standards in effect at the time of the issuance of Town of Culpeper Construction Permit and/or the issuance of the Culpeper County Construction Permit. Supplemental design requirements may be imposed by the Town and/or County Directors when warranted by unique situations.



100.02 Definitions and Abbreviations:

The following definitions are used throughout the text:

Town Council -	The Town Council for the Town of Culpeper
Board of Supervisors -	The Board of Supervisors of Culpeper County
Town -	Town of Culpeper
County -	Culpeper County
Director(s) -	The Town of Culpeper Director of Public Services and Culpeper County Director of Environmental Services

In order to remain concise and enhance readability, the following abbreviations are used throughout this manual:

ADF -	Average Daily Flow
ANSI -	American National Standards Institute
ASCE -	American Society of Civil Engineers
ASTM -	American Society for Testing and Materials
AWWA -	American Water Works Association
CI -	Cast iron
DEQ -	Virginia Department of Environmental Quality
DIP -	Ductile iron pipe
DIPRA -	Ductile Iron Pipe Research Association
du -	dwelling unit
EPA -	United States Environmental Protection Agency
FAR -	Floor to Area Ratio
fps -	feet per section
gph -	gallons per hour
gpm -	gallons per minute
HP -	Horse Power
ISO -	Insurance Services Office
I.D. -	Internal Diameter
Ku -	K = Rankine's Ratios of Lateral Pressure to Vertical Pressure u = The Coefficient of Internal Friction of Backfill Material
KSI -	Kips per square inch
MADC -	Milliamperes Direct Current
MGD -	Million Gallons per Day
MJ -	Mechanical joint
ppm -	parts per million
psi -	pounds per square inch
PVC -	Polyvinyl Chloride
RPA -	Resource Protection Area
SCADA -	Supervisory Control and Data Acquisition



SCFH -	Standard Cubic feet per hour
SDR -	Standard dimension ratio
v -	velocity
VDH -	Virginia Department of Health
VDOT -	Virginia Department of Transportation
VUSBC -	Virginia Uniform Statewide Building Code
% -	Percent

100.03 Projects - General:

Be reminded that, in all cases, the applicable requirements of the Virginia Department of Health Office of Drinking Water *Waterworks Regulations* and the Department of Environmental Quality, Sewage Collection and Treatment Regulations, Town of Culpeper Code, Culpeper County Code where applicable, must be met. Projects proposing water systems serving fifteen (15) or more water connections or where fire flow is required, or projects proposing sanitary sewer systems serving populations of four hundred (400) or more must submit plans and specifications to VDH and/or DEQ for review and approval.

For projects located within Town and County limits, and provided public water is within 300 feet of a principle structure, the owner of all houses, buildings, or properties used for human occupancy, employment, recreation or other purposes, situated within the Town or County of Culpeper and abutting on any street, alley, or right-of way in which there is now located or may be located in the future a public water main of the Town or County, is hereby required at his expense to install suitable water facilities therein, and to connect such facilities directly to the proper public water main when it involves new construction, failed well, or by requirement of the health department.

For projects located in Culpeper County, outside of Town limits, major water distribution systems shall be designed in accordance with the densities and intensities reflected in the Culpeper County Water and Sewer Master Plan and the Culpeper County Comprehensive Plan. New development located in the development area, as designated by the Culpeper County Water and Sewer Master Plan, shall connect to a public water system, when available. New developments located in the rural area, may connect to a Community Water System, connect to a public water system or may be served by private wells, as requested by the applicant for the project. The approximate location and character of the proposed water facilities shall correspond with the County Master Water and Sewer Plan Systems Map.

For projects located within Town or County limits and provided public sanitary sewer is within 300 feet of a principle structure, the owner of all houses, buildings, or properties used for human occupancy, employment, recreation or other purposes, situated within the Town or County of Culpeper and abutting on any street, alley, or right-of-way in which there is now located or may in the future be located a public sanitary sewer or combined sewer of the Town or County of Culpeper, is hereby required at his expense to install suitable toilet facilities therein, and to connect such facilities directly to the proper public sanitary sewer main when it involves new construction, failed septic system, or by requirement of the health department.



For projects located in Culpeper County, outside of Town limits, sewer systems shall be designed in accordance with the densities and intensities reflected in the Culpeper County Master Water and Sewer Plan. New development located in one or more of the Service Areas in the development area, as reflected by the Master Water and Sewer Plan, shall connect to a public sewer system, when available. New developments located in the rural area shall be served by a Community Wastewater System. The approximate location and character of proposed public sewer facilities shall correspond with the Existing and Proposed Sewer System Map, as amended. Sewer systems shall be designed for the estimated future population from all contributing points in the development area under consideration. The estimated future population shall be based on the adopted County Master Water and Sewer Master Plan Systems Map.

100.04 Public Water:

Where Town or County of Culpeper public water is available, such service shall be extended, at property owner expense, to each lot within a subdivision. The Town or County of Culpeper water supply is considered available if a water line of adequate size (or at which point a water line has been proposed to be constructed within a period of 12 months of the initial date of application for recordation of the subdivider's plat) is located within 300 feet from the proposed subdivision provided adequate treatment and storage capacity exists to supply the volume of water required by the proposed subdivision.

100.05 Public Sanitary Sewer Facilities:

Where Town or County of Culpeper public sanitary sewer facilities are available, such service shall be extended, at the property owner expense, to each lot within a subdivision. The Town or County of Culpeper sanitary sewer facilities are considered available if a sewer line of adequate size (or at which point a sewer line has been proposed to be constructed within a period of 12 months of the initial date of application for recordation of the subdivider's plat) is located within 300 feet from the proposed subdivision, provided adequate treatment capacity exists to treat the volume of wastewater to be discharged by the proposed subdivision.

100.06 Private Water and Sanitary Sewers:

Nothing in this manual shall prevent the installation of privately owned water or sewerage facilities or both in areas where public water or sewerage facilities or both are not available; provided that such installations shall meet all State requirements, Town of Culpeper Code or Culpeper County Code applicable to such installation. Specifications of all private water or sewerage systems serving more than 1 dwelling unit shall be as those standards established for public water or sewer systems. Where a public or combined sewer is not available under the provisions of this document, the building sewer shall be connected to a private sewage disposal system complying with the Town of Culpeper Code or Culpeper County Code. The type, capacities, location and layout of a private sewage disposal system shall meet all State requirements. No septic tank or cesspool shall be permitted to discharge to any natural outlet.



100.07 Local Review Authority:

Under the provisions established by the Virginia Department of Health (VDH) and the Virginia Department of Environmental Quality (DEQ) the Town of Culpeper and Culpeper County will apply for Local Review Authorities (LRAs) respectively. When this LRAs are granted, construction plans providing for extensions to water and sewer systems, and consistent with the master plan, may be reviewed solely or jointly as warranted by the Town and/or County. (Notification will be given when these LRAs have been approved.) Accordingly, after approval, it is anticipated that project plans do not require a construction permit from the Health Department provided that water main extensions are no greater than 12-inch diameter mains and sanitary sewer mains are no greater than 12-inch diameter pipe. All project plans containing pump stations, grinder pumps, force mains, or lines larger than stated above must be submitted to VDH or DEQ for review and approval. It is the Engineer's responsibility to insure that the required plans and supporting information are submitted to the appropriate State agency.

100.08 Review Process:

Until the LRAs are approved, all applications will require review by VDH or DEQ and shall be submitted through the Town and/or County that will in turn transmit copies of the project plans to the appropriate State agency thus acting as the "Applicant". Once LRAs have been approved and in situations where review by VDH or DEQ is required, modifications to project plans required by the Town and County shall be incorporated in final submissions to them. In this manner, the plans reviewed by the Town and County and VDH or DEQ will be the same document.

Approved project plans shall be submitted to the Town and County before construction of utilities will be approved. No water or sanitary sewer lines shall be connected to the Town water or sanitary sewer system without first being approved by the Town or County.

100.09 Information Required on Project Plans:

Project plans shall provide plan and profile views of all proposed water and sanitary sewer lines for the project. Water and sanitary sewer profiles shall be separate drawings. The location, type and size of all valves, fittings, manholes, frames and covers, laterals and other appurtenances shall be detailed on both the plan and profile views. Additionally, the plans shall specifically identify new pipe size, class and material, as well as valves, fittings and appurtenances on profile views. Show bearings and angles of deflection on plan views for sewers. Show existing utility crossings on plan and profile views. To insure that adequate crossing can be accomplished, the Town and County may require test holes to be dug on existing utility lines and test hole information shall be shown on plan and profile views.



100.10 Variances:

Variations are defined as approval of specific engineering design practices when deemed to be exceptional and reasonable by the Town and County Directors and that are unrelated to the Virginia *Waterworks Regulations*. Requests for variations are to be included in the cover letter, or letter of transmittal, accompanying the application. Variations shall be fully described and justified by the Engineer. Approval of variations will be facilitated under the current review process. However, VDH-ODW approval may also be required.

Variations cannot be requested for policies and standards of a general nature which are commonly shared by all, but shall be of a non-recurring and exceptional nature (Example: Use of a factor less than 0.013 to reflect the recommendations of a manufacturer cannot be authorized by a variance since such use of 0.013 is shared by all. Rather, such a change shall be facilitated by modification of the standards themselves). However, in a situation involving unusual existing topography, a variance for minimum cover that is supported by technical documentation, may be granted by the Town and County Directors in order to alleviate a specific condition. In all cases, the decision of the Town and County Directors shall be final.

100.11 Easements:

Water and sewer utilities which will become the property of the Town and County, and which do not lie wholly within a public right-of-way, shall require easements dedicated to the Town and County, and as follows:

- Minimum easement widths shall be 15-feet for water mains and 20-feet for sanitary sewers. The minimum easement width for a sanitary sewer force main shall be 15-feet. For sanitary sewer trenches greater than 10-feet deep, 5-feet additional width shall be required for each 5-feet of additional depth. Increased easement widths may be required when determined by the Town and/or County Directors.
- Easements dedicated to water and sewer utilities will preclude construction of permanent structures and fences within the easement.
- Easements will be provided to allow adjacent properties access to water and sanitary sewer lines and to allow the extension of water and sewer lines.
- In cases deemed necessary by the Town and/or County Directors, and in order to assure routine and emergency maintenance, access (ingress/egress) easements shall be provided.
- The owner/developer shall be responsible for maintaining the easement until the project is accepted by the Town and/or County. Maintenance shall include cutting



vegetation, removing trees, and grading sufficient to allow maintenance vehicles to traverse the easement.

100.12 References:

In order to properly utilize this manual, the project manager, engineer or user in general should have certain publications readily available, as they are referenced throughout this document. A listing of the most commonly utilized publications is as follows:

1. American Water Works Association (AWWA), Latest Editions;
2. American National Standards Institute (ANSI), Latest Editions;
3. American Society for Testing and Materials (ASTM), Latest Editions;
4. Department of Environmental Quality: State Water Control Board “Sewage Collection and Treatment Regulations,” Latest Edition;
5. Commonwealth of Virginia; State Department of Health “*Waterworks Regulations,*” Latest Edition.
6. Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban BMPs
7. Federal Manual for Identifying and Delineating Jurisdictional Wetlands
8. Guide for Determination of Required Fire Flow, Insurance Services Office, 160 Water Street, New York, NY 10038
9. Grading Schedule for Municipal Fire Protection, Insurance Services Office, 160 Water Street, New York, NY 10038
10. NFPA Standards, National Fire Protection Association
11. Soils Map of Culpeper County, Department of Agriculture, Soil Conservation Service
12. The Building Official's Code Administrators, “The BOCA Basic Building Code,” latest edition
13. The Culpeper County Comprehensive Plan



14. The Culpeper County Water and Sewer Master Plan
15. The Federal Safe Drinking Water Act (SDWA) and the National Primary and Secondary Drinking Water Standards
16. The Federal Water Pollution Control Act (Clean Water Act)
17. Virginia Erosion and Sediment Control Handbook
18. Virginia Uniform Statewide Building Code

100.13 Corrections of Deficiencies Noted During the Inspection Process:

Water and sanitary sewer lines, structures, facilities or appurtenances thereto not meeting the requirements of these standards shall be replaced or repaired in a manner approved by the Town and County. Defective materials, pipe or fittings shall be completely removed and replaced with new materials in a manner approved by the Town and County. Evidence of excessive leakage, or unsatisfactory alignment, or poor workmanship shall be justification for the Town and County to require complete removal of the substandard materials and its reconstruction in accordance with the approved plans and specifications and the standards of the current USM. .

100.14 As-Built Plans and Bond Release:

The project engineer will prepare the water and sanitary sewer as-built plan for projects. As part of the process, the contractor/developer/project engineer must request a bond release inspection from the Town in order to obtain the release of the performance bond for the project. The Town's bond release inspection is entirely separate from the County's inspection process, and the contractor/developer/project engineer must request a bond release inspection directly from the Town Engineer. All requests for bond release inspections shall include: the County Plan Name, the County Plan Number, and the name and address of the contact person to whom the list of deficiencies, or punch list, will be sent. Utilities and roads can be a separate release. Partial releases in certain instances may also be granted.

Once a valid request for a bond release inspection has been received by the Town or County a bond release inspection will be performed of the public water and sanitary sewer facilities within 30 days. A punch list, noted during this inspection shall be sent to the contact person listed in the inspection request. It is the contractor/developer/project engineer's responsibility to correct these deficiencies and schedule a re-inspection with the Field Inspector. Once the Field Inspector signs off on the project, the Town or County will provide a letter stating that the Town or County does not object to the release of the performance bond for the project. At this point, the Town or County assumes ownership and maintenance responsibilities for the public water and sanitary sewer facilities within the project.



WATER DISTRIBUTION SYSTEMS

110 GENERAL REQUIREMENTS

110.01 General:

The requirements of this USM shall be satisfied for all systems to be incorporated into the Town or County's inventory. Such systems shall include construction within a public right-of-way or private property where a dedicated easement exists, or will be provided. Specific variances to these standards shall be requested, in writing, and approved in accordance with this manual.

All standards referenced in this section shall refer to the latest edition of the referenced standard at the time of final approval. The authority for amendment to water standards shall vest with the Town and/or County. It shall be the responsibility of the developer, project manager or project engineer to familiarize themselves with all applicable specifications relating to utilities design and construction.

New development located in the development area in Culpeper County and not located in or integrated into the Town of Culpeper, as designated by the Culpeper County Water and Sewer Master Plan, shall connect to a public water system, when available. New developments located in the rural area, not covered by a Culpeper County Service Area, may connect to a community water system, connect to a public water system or may be served by private wells, as requested by the Applicant if public water service is not available. The approximate location and character of the proposed water facilities shall correspond with the Culpeper County Master Water and Sewer Plan Systems Map.

- Easements:
 - To provide for maximum utilization of public water systems, appropriate easements shall be required to adjacent properties for access to, or extension of, said utilities. Such easements shall be dedicated to the Town of Culpeper or Culpeper County depending on the location of the project.
- Private Water Service Connections:
 - All water service connections from the meter to the building, except when within a dedicated easement, are regulated by the Virginia Uniform Statewide Building Code and are to be privately maintained.
- Water Supply Interconnections:
 - There shall be no physical connections between a drinking water supply and a sanitary or storm sewer, or appurtenance thereof. All facilities furnished with a public drinking water supply will have no physical connection with private wells or other private water supply system, or any other source of contamination.



- Fire Safety Systems:

- Fire Safety systems shall be designed and constructed in accordance with this manual and ISO and NFPA guidelines.

110.02 Hydraulic Analysis Parameters and Reporting:

A hydraulic analysis report shall be included with all project plans submitted for review and approval. The analysis shall state assumptions made about the existing system. Calculations will show available flows at the proposed hydrants and node pressures throughout the proposed system. Water lines shall be interconnected as directed by the Town and County to enhance the reliability, water quality, and operation of the water system.

The hydraulic analysis report shall be prepared using KYPIPE Hydraulic Software as developed by the University of Kentucky, WaterCAD or other acceptable computer program with the approval of the Town and County. The completed analysis with flow calculations shall be submitted to the Town or County for approval.

Water systems shall be so designed to adequately supply the projected peak day flow within the subdivision or site under consideration and maintain a pressure of not less than 30 psi at all points of delivery. Additionally, the water system will be designed to provide the fire flows specified in this manual and in conformance with ISO and NFPA guidelines, with a residual pressure of not less than 20 psi at any point in the distribution system. Fire flow calculations must be included with all project plans submitted for review and approval.

The pipe friction factor, "C", will be equal to 120 for pipes 12-inches in diameter and larger. "C" will equal 100 for pipes smaller than 12-inches in diameter. Since a conservative "C" factor is used, losses from valves and other fittings need not be considered.

The line velocity shall not exceed 10 feet per second under any flow condition. The velocity restriction does not apply to hydrant leads or to the pipe where the simulated pump is applied. The Town and County reserve the right to waive velocity restrictions in other areas if deemed appropriate to improve water quality.

The project engineer shall size all pipes to meet the fire flow, pressure and velocity requirements, but shall size the pipe no larger than needed in dead-end runs or closed loop systems that will not be extended in the future.

The submittal shall provide computations for maximum day demands and maximum day with fire flow applied simultaneously.

Flow calculations shall state assumptions made about the existing system, calculations to show available flows at the proposed hydrants and node pressures throughout the proposed system. If a project will be developed in sections or phases, the fire flow calculations will indicate the



available fire flows during each section or phase of the project. For small sites that propose no major water line extensions, an evaluation of the existing available fire flows may be substituted for the fire flow calculation. Again, water lines shall be interconnected wherever feasible to enhance the reliability and operation of the water system.

The available water storage system shall have adequate capacity to sustain required fire flows in conformance with ISO and NFPA guidelines. Documentation showing conformance with these guidelines shall be part of the complete design submittal.

Additionally, if irrigation is provided, irrigation demands shall be submitted by the project engineer based on the characteristics of the systems to be installed. Any proposed development project planning to utilize landscape irrigation or offering landscape irrigation systems as an optional feature for residential development shall demonstrate to the Town and/or County that the proposed landscape irrigation systems will have no detrimental effect on the water distribution and transmission systems and service pressure to the community.

110.03 Public Water Service Connections:

The water meter box and accessories therein necessary for meter installation shall be furnished and installed by the contractor/developer or owner and according to specifications contained herein. The Town and County shall provide and install standard water meters. Any increase in meter size or additional meters shall be at the expense of the contractor/developer or owner. The Town and County shall have the option to provide and install any and all size water meters, or in lieu thereof, establish a list of approved water meter types and manufacturers to be incorporated in the development or building. Each water meter is the property of the Town or County and at all times subject to its control and inspection. In residential areas, the water meter shall be installed one foot behind the sidewalk outside of the right-of-way. When curbs and sidewalks are not required, water meter boxes shall be set outside of the right-of-way at the property line. The water meter and service line size and location shall be shown on commercial and industrial site plans. Sizing of service lines and water meters will be based on the fixture loading imposed by the building and in accordance with AWWA No. M22, Sizing Water Service Lines and Meters. The Town and County shall have final approval authority of all line and meter sizes. Water meters shall not be located in sidewalks, driveways, travel ways or parking spaces. Water meters shall be protected from vehicular traffic by curbs, bollards or other means approved by the Town and County. Meters shall be located so as to be accessible to Town and County personnel at all times. Where any meter is located on any private property, building or premises, the Town or County shall have the right to enter the same at all reasonable hours for the purpose of examining, repairing, replacing or removing such meter or to obtain meter readings. Meter lids shall be located out of normal pedestrian walkways. All water meter settings shall be in conformance with the details and specifications in this manual. The cost for the service connection shall be set by the Town or County as applicable.

Residential fire suppression systems for single-family homes, duplexes and townhouses shall be approved by the Town and County as well as the Fire Marshal's Office. The preferred design configuration consists of the water supply for fire suppression flowing through the customer's



domestic service line and meter. Other configurations will be considered when adequate flows or pressures cannot be provided through the domestic supply. The required domestic service size and water meter size shall be shown on the project plans. The domestic service size and water meter size shall be consistent throughout the project. Calculations verifying the sizes of the domestic service and water meter shall be provided to the Town and County. The size of the water meter specified shall be able to accurately measure any anticipated low flow rates.

110.04 Private Water Service Connections:

Private water service connections from the meter to the building are regulated by VUSBC and will be maintained by the property owner. Water services and plumbing shall conform to the Uniform Statewide Building Code. Where the pressure at the service tap exceeds 80 psi, the provisions of the USBC shall apply.

110.05 Large Meter Installations:

For 1-inch, 1.5-inch and 2-inch water meter installations, the Town and County shall retain the option of specifying the use of appropriately sized vaults in lieu of meter crocks. Water meters larger than 2-inches shall be installed with a bypass in order to isolate the meter for repairs. Plans for the installation of larger meters shall be submitted for approval. Water meters 3-inches or larger shall be stored at Town or County warehouses, as applicable, until ready for installation. The contractor/developer responsible for installing the meter shall make arrangements to pick the meter up from the warehouse. Water meters 3-inches and larger shall have provisions for in-place testing. All meters are paid for by the contractor/developer.

110.06 Water-Only Accounts:

In incidents where water used at a site will not be discharged into the sanitary sewer, a water-only account may be established with the Town. The County does not allow water only accounts for irrigation, swimming pools etc. due to limited groundwater supplies. Water-only accounts will not be charged fees for sewer use. Typical examples of water-only accounts are those solely for irrigation systems and public/commercial swimming pools. Each water-only account will be served by independent connection to the public water main with a separate domestic service line and meter. No "subtraction" meters will be allowed. The location and size of the domestic service line and meter serving the water-only account shall be shown on the project plans. Water-only accounts will comply with all applicable state and local cross connection ordinances. Cross connection prevention devices shall be located downstream of the water meter.

The size of the water meter for an irrigation system will be based on the peak flow rate needed to operate the system. The project engineer will provide the Town and County with the necessary information to determine the meter size. The developer must acquire all of the necessary approvals and permits from Culpeper County prior to the installation of an irrigation system. The location of the irrigation meter shall be shown on the project plans.



A water-only account may be established for a swimming pool only when the pool drain and the filter backwash discharge line discharge into a storm drainage system. The location of the pool drain, filter backwash discharge line, and pool meter shall be shown on the project plans.

110.07 Valve Boxes:

During the initial installation by the contractor/developer and prior to acceptance by the Town and County, valve boxes shall only be adjusted by sliding the casting up or down. No risers shall be permitted. Valve boxes located in sod or other off-street areas shall be set and adjusted such that the covers shall be exposed and flush with the immediate surface. Valve boxes shall be set and adjusted such that covers shall be exposed and flush with the street surface. If street surfaces are renewed or replaced by the contractor/developer or owner after the water system has been installed and placed in service by the Town or County, but while such streets are still the obligation of the contractor/developer or owner, the valve boxes therein shall be readjusted to proper location relative to the new street surfacing by the contractor/developer or owner.

110.08 Cross Connections:

In order for water service to be established, appropriate backflow prevention devices shall be provided in compliance with the adopted cross connection and backflow ordinances of the Town and County, and in accordance with the *Waterworks Regulations*.

120 DESIGN PARAMETERS

120.01 General Planning and Design

Commonwealth of Virginia Waterworks:

The design of water supply systems shall be governed by the Commonwealth of Virginia's *Waterworks Regulations*, the requirements of this manual and Town and County Code. The Town and County are using this Utility Standards Manual (USM) to apply for state and local review authority for water mains up to 12-inches in diameter from the Virginia Department of Health (VDH). Therefore, the Applicant is cautioned that until such time as the Town and County have approval authority, plans, and specifications for all projects must be submitted to VDH for approval. Notification will be given when the Town and County are granted this approval authority. Accordingly, the *Waterworks Regulations* shall be augmented by this USM, unless such augmentation is specifically waived by the Town and/or County, depending on where the project is located.

Water Lines in Public Rights-of-way:

Water lines shall be allowed within the right-of-way of any roadway, except within limited access right-of-way unless, as determined by Virginia Department of Transportation (VDOT), there are compelling design or safety issues which would demand consideration of an alternate



location. In instances that require special consideration, applicants are encouraged to seek Town and County concurrence of the waterline design concept prior to or during the preliminary plan process. It is also strongly recommended that the applicant review with the Culpeper VDOT Residency, the placement of any proposed water and sewer lines under VDOT pavement.

Water lines will not be allowed under the pavement of divided roadways with four or more lanes, except under the following conditions and with the approval of the Town and County:

- When a roadway has more lanes than required for the projected traffic, such as when a divided roadway is used for aesthetic purposes.
- In a subdivision, commercial, and industrial areas with adjacent development with direct access to a roadway and where sufficient road network exists such that noncircuitous alternate access is available within the development.
- The extension of existing water lines already located under existing pavement.
- The continuation of water lines under undivided roadways through widened intersections, only through the intersection, to a divided section.
- When the location of other items such as storm sewer, signs, landscaping, mature trees, or other utilities are such that sound engineering judgment would indicate the placement of water lines under the roadway pavement is appropriate.

When water lines are permitted under pavement, they should be located 5 feet from the outside edge of pavement or 7 feet from the face of curb.

Water lines greater than 24-inches in diameter, while permitted in most instances to cross any roadway, except a "limited access" right-of-way, shall not be permitted under the pavement parallel with the roadway alignment, due to the necessity for structures, vaults, etc.

VDOT should be contacted at the preliminary plan stage to determine the acceptability of locating water lines under the pavement and/or within the right-of-way of proposed roadways, especially if, from preliminary review, it appears these guidelines will be difficult or impossible to meet.

Nothing within these guidelines is intended to preclude VDOT from working with the local governments and utility owners to address situations requiring special consideration and is not intended to preempt local government guidelines that may be more restrictive.

- **Site Plan Development Submitted:**
All site development plans proposing a water system shall be submitted to the Director(s) as applicable, who shall coordinate the review and approval of all elements of the plan in accordance with this manual.



- **Site Development Plan Elements:**
The following information shall be provided on the site development plans: The size and location of all proposed water lines, valves, fittings, air relief valves, meters, discharge lines, blow-off chambers, and other appurtenances. On industrial and commercial developments; also show the water meter and service line size and location.

120.02 Line Sizes:

The minimum size of water line shall be as follows:

- In residential districts, 8-inches; 6-inch diameter pipe may be used at the discretion of the Director(s) when it completes a good gridiron and loops do not exceed 600 feet in length.
- In commercial and industrial areas, 12-inches; 8-inch pipe may be used at the discretion of the Director(s) and only when it completes a good gridiron and does not exceed 600 feet in length.
- Detailed design calculations may be submitted to substantiate line sizes other than those specified above. In any case, the minimum line size acceptable shall be 4-inches and shall not be used without the approval of the Director(s).
- Fire hydrants shall not be installed on lines less than 6-inches in diameter.
- 10-inch and 14-inch water lines are nonstandard sizes and shall not be used without the permission of the Director(s).

120.03 Depth of Cover:

All pipe shall be laid to a minimum depth of 36-inches from finished grade to the top of the pipe. Water pipe shall not be laid at excessive depths. Water lines will not be laid at depths greater than 8-feet without the permission of the Director(s). Water lines shall not be installed within the zone of influence of the foundation of a building or other structure.

120.04 Valve Locations:

Valves shall be installed at the intersection of water lines. The valving of the water system will be designed so as to allow segments of the system to be isolated for repairs and maintenance while leaving the rest of the system in service. Unless authorized otherwise, four valves will be used at crosses and three valves at tees. A valve shall also be installed at least every 1,000 feet on all lines. A valve will be provided approximately 2 pipe sections from the end of all water lines that will be extended in the future to provide a point to test against when the line is extended.



120.05 Separation of Water Mains and Sanitary Sewers:

The VDH *Waterworks Regulations* and DEQ standards for the separation of water mains and sanitary sewers shall be complied with.

The following factors shall be considered in providing adequate separation:

- Materials and types of joints for water and sewer lines
- Soil conditions
- Service branch connections into the water line and sewer lines
- Compensating variations in the horizontal and vertical separations
- Offsetting of pipes around manholes

Parallel Installation:

- Normal conditions - No water pipes shall pass through, or come in contact with, any part of a sewer manhole. Water lines shall be laid at least 10 feet horizontally from a sewer manhole and other utilities whenever possible; the distance shall be measured edge-to-edge.
- Unusual conditions, sanitary sewers - When local conditions prevent a horizontal separation of 10 feet, the water line may be laid up to 7.5 feet from the sanitary sewer or sewer manhole provided:
 - The bottom (invert) of the water main is at least 18 inches above the top (crown) of the sewer.
 - Where this vertical separation cannot be obtained, the sewer is constructed of AWWA approved water pipe, pressure tested in place to 50 psi without leakage prior to backfilling. The sewer manhole is of watertight construction and tested in place.
- Unusual conditions, other utilities - When local conditions prevent a horizontal separation of 10 feet, the water line may be laid up to 7.5 feet from utility lines other than sanitary sewers with the permission of the Director(s). Under no circumstances, including state right-of-way, shall the utilities be installed closer than the minimum separation required by section 20VAC5-309-140. Excavator's Responsibilities to Avoid Damage, Dislocating or Disturbances of Utility Lines in the Code of Virginia.



Crossing:

- Normal conditions - Water lines crossing above 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.
- Unusual conditions - When local conditions prevent a vertical separation described above, the following construction shall be used:
 - Sewers passing over or under water lines shall be constructed of AWWA approved water pipe, pressure tested in place without leakage prior to backfilling.
 - Water lines 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 line,
 - ◆ Adequate structural support for the sewers to prevent excessive deflection of the joints and the setting on and breaking of the water line, and
 - ◆ 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.
- Maintain a minimum of 12 inches between water lines and utility lines other than sanitary sewers. Whenever possible, water lines should cross over the other utility lines. The cover over the water line may be reduced to 3 feet at a utility crossing to maintain the waterline over the other utility. Where water lines cross gas lines, water lines will be encased in polyethylene across the entire width of the gas line easement. Polyethylene encasement will also be used where corrosive soils or other corrosive environments are encountered. Polyethylene encasement will be as specified in ANSI/AWWA C105.

120.06 Blow-offs:

Provide a means for a blow-off at dead-end lines. Blow-offs will be sized to provide a flow velocity of 3 fps or greater. On lines 6-inches in diameter or larger, fire hydrants will be used for a blow-off unless otherwise directed by the Town and County. Blow-off assemblies or valve boxes shall not be placed in unpaved or gravel areas of rights-of-way.



120.07 Air Release:

Air release valves or hydrants shall be placed at high points in the system to provide for the release of trapped air.

Transmission mains shall be provided with blow-off valves or fire hydrants at strategic low points in the line and air release systems at high points. Blow-offs will be sized to provide a flow velocity of 3 fps or greater. On lines 6-inches in diameter or larger, fire hydrants will be used for a blow-off unless otherwise directed by the Town and County.

120.08 Termination of Water Mains:

Where a water main is terminated, the minimum length of pipeline between the isolation valve and end of the line shall be two pipe lengths, or as directed by the Town and County.

No water main shall terminate under a concrete gutter.

120.09 Valve, Air Release, Meter, Blow-off Chambers and Sample Stations:

Air and sediment accumulations may be removed through a standard fire hydrant. Compressed air and pumping may be used to dewater mains through hydrants. Chambers or pits containing valves, blow-offs, meters, or other such appurtenances to a distribution system shall not be connected directly to any storm drain or sanitary sewer, nor shall blow-offs or air release valves be connected directly to any sewer.

Chambers or pits shall be drained to the surface of the ground where they are not subject to flooding by surface water, or to absorption pits underground.

The open end of an automatic air release pipe shall be enclosed in the underground vault or chamber as shown and provided with a screened, downward-facing elbow. A ball valve with handle shall be attached so that it can be closed from outside the manhole and the manhole shall be vented for air release. Indicate the size of the air release line required on the project plans.

Distribution system sampling stations shall be provided for the water system being reviewed per the Town and County specifications.

120.10 Fire Hydrant Locations:

In general, fire hydrants shall be located as follows:

- At street intersections and at intermediate locations no greater than 500 feet of hose length from the structure to be protected and no greater than 1,000 feet from the nearest hydrant measured along the water main. All distance measurements are to be



taken along the center line of accessible streets, travel ways, or other unobstructed path used by the fire department.

- In areas with curb and gutter, the center of the fire hydrant shall be not less than 18 inches nor more than 36 inches away from the face of the curb. Under no circumstances will any part of a fire hydrant conflict with or overhang any sidewalk, trail, or vehicular travelway. On roads with ditches, fire hydrants will be located behind the ditch. In parking areas where the proposed site improvements do not provide adequate protection of fire hydrants from vehicular traffic, bollards or other protective measures will be provided.
- No plantings or erection of other obstructions shall be made within 4 feet of any fire hydrant.
- When installed in parking areas, they shall be protected by barriers that will prevent physical damage by vehicles. Clear access shall be provided to the front of and 15 feet to either side of the fire hydrant.

The location of all new and existing hydrants that are to serve the property shall be shown on the project plan.

When considering placement of fire hydrants, the engineer should avoid areas that are subject to high groundwater, flooding, contaminant and pollutants, and surface groundwater ponding. If there are no alternative locations to avoid these hazards, then the engineer must take steps to protect the water system from potential backflow and contaminants entering through the hydrant.

120.11 Surface Water Crossings:

Water lines crossing surface waters, both above and below the watercourse, present special problems, and should be discussed with the Town and County before final plans are prepared. The design engineer shall be responsible for obtaining all required State and Federal permits to install a surface water crossing.

Crossing of surface waters above the watercourse shall only be made when other methods are impractical.

When crossings are permitted, they shall be as close to a right angle to the stream as possible. No more area shall be disturbed than is necessary to provide for the construction of the water line at that location.

- Above Water Crossings – the pipe above water crossings shall be:
 - adequately supported (plans will include details of the piers and supports);



- protected from damage from freezing;
 - accessible for repair or replacement;
 - above the 100 year flood level;
 - constructed of mechanically restrained joint pipe; and
 - valved on each side of the crossing.
- Under Water Crossings – the pipe crossing under a water body shall be:
 - of special construction, having flexible watertight joints;
 - valved at both ends of the water crossing so that the section can be isolated for tests or repair; the valves shall be easily accessible and not subject to flooding; and
 - sample taps shall be installed at each end of the crossing and at a reasonable distance from each side of the crossing. Sample taps shall be located outside of the 100 year flood plain.

120.12 Dedicated Fire Lines:

All water lines serving a fire suppression system in a building shall be shown on the project plans. Combined domestic and fire services shall not be allowed. All fire lines shall be owned and maintained by the property owner. A detector check assembly shall be located on the fire line at the point it connects to the public water system. The minimum size fire line shall be a 6-inch I.D., ductile iron line.

130 DESIGN STANDARDS - PIPE AND FITTINGS

130.01 Water Pipe Fittings and Accessories:

All pipe for water main construction shall be ductile iron pressure pipe of the "push-on" or "mechanical" joint variety, conforming to ANSI A21.51 (AWWA C151). Minimum class shall be Class 52 for all pipe 12-inches or less in diameter and a minimum of Class 51 for all pipe greater than 12-inches in diameter.

- Ductile Iron Standard Mechanical Joint Pipe:



Ductile iron standard mechanical joint water pipe shall conform to ANSI A21.51 and shall be double lined with cement mortar and have a protective exterior coating. The linings and protective coatings equal to "Enameline" with tar coating on the exterior will be considered as a satisfactory lining and coating for the water pipe; however, any substitution in pipe lining and/or coating from the ANSI A21.4 shall be specifically approved by the Director(s). Joints and gaskets of standard mechanical joint pipe shall conform to ANSI A21.11.

High strength ductile iron tee head bolts, hex nuts, ductile iron glands, and rubber gaskets shall be as furnished by the pipe manufacturer. Steel accessories are not acceptable.

- Ductile Iron Pipe - "Push-On" Joint:

"Push-on" or "slip" joint pipe shall conform to the requirements for mechanical joint in regard to strength, class, protective coating and lining.

- Pipe Fittings:

Fittings for ductile iron pipe shall be in accordance with ANSI A21.10 or A21.53 (AWWA C110 or C153), with a minimum pressure rating of 250 psi for fittings larger than 12-inches and pressure rating of 350 psi for fittings 12-inches and smaller. All pipe fittings shall be restrained with Megalugs or other restraining system approved by the Town and County. All fittings shall be cement mortar lined in accordance with ANSI 21.4 (AWWA C104).

- Water Service Lines:

All water service pipe less than 3-inches in diameter from main connections to the meter box assembly shall be seamless, annealed, "K" type copper made in conformance with ASTM B88. HDPE CTS made in conformance with ASTM D2737, Municipex made in conformance with ASTM D3350 or equal may be used but must have dual tracer wires installed. All connections shall use flared type fittings for sizes up to 1-inch and compression for sizes greater than 1-inch). The minimum size service connection shall be "K" type copper, 0.75-inch, I.D. Corporation stops shall be Ford F-600, Mueller or an acceptable equal substitute approved by the Town and County. Water services 3-inches in diameter and larger shall be Class 350 Ductile Iron Pipe between the main and the meter box. No joints shall be allowed in the copper service line between the main and the meter.

- Meter Boxes and Appurtenances:



- Meter boxes shall be one piece construction of concrete or rigid fiberglass (not Orangeberg).
- Meter yokes shall be constructed of cast iron, with two angle valves. Meter yokes shall be Ford No. 500 Series, or approved equal.
- Meter box covers shall be cast iron, (or other acceptable material as necessary to facilitate automatic meter reading system), 4 inches in depth and shall include a "worm" type lock. Meter box covers shall be designed to accommodate automatic meter reading applications used by the Authority. Covers for 18-inch meter boxes shall be Ford No.A32-REC-NPR-T, or approved equal.

130.02 Casings and Tunnels:

Pipe lines which must be bored or tunneled under a roadway, or other natural obstruction, shall be installed in a steel casing or tunnel. Pipe in casings and tunnels shall be constructed of a minimum of Class 350 ductile iron pipe, wall thickness minimum of 0.25-inches, with restrained joints. For railroad crossings, the minimum casing wall thickness shall be 0.375-inches. Prefabricated stainless steel pipe supports with non-conductive skids or another acceptable support system will be provided to support the pipe. Pressure treated timber skids shall not be permitted. Install casings and tunnels on a slope so that they will drain. Casings must conform to the details provided in this manual. Complete design information for a utility tunnel must be provided in the project plans.

130.03 Gate Valves:

Gate valves shall be of superior quality cast iron body with double disc parallel seat with full bronze mount. All gate valves shall be factory tested, withstand a working pressure of at least 150 psi and shall be in strict conformance with AWWA C500 and upon request the manufacturer shall furnish certified copies of test reports. The 2-inch square AWWA operating nut shall turn to the left (counterclockwise) to open the valve. The valves shall be so arranged to fit into pipelines having standardized "push-on" or mechanical joints. Gate valves shall be Mueller No. A2380-20, or approved equal and shall be installed as shown in the details.

Resilient seat wedge valves may be used for valves 12-inches and smaller. Gate valves smaller than 3-inches shall be bronze, solid wedge, rising stem, at least 200 psi working pressure, with Jenkins 49-U threaded ends. Resilient seat wedge valves shall conform to AWWA C-509 and shall be approved by the Town and County.

Valve ends shall be mechanical joint (MJ) for underground service and flanged joints for meter vaults and above ground service in accordance with AWWA C111. The valve body shall be fusion bonded epoxy coated in accordance with AWWA C550.



130.04 Check Valves:

The check valves shall operate in the direction denoted in the plan.

The check valve shall Mueller or approved equal, meet the requirements of AWWA C508 for iron bodied, bronze mounted, swing check valve. The valve shall be rated at a minimum of 150 psi non-shock working pressure.

130.05 Butterfly Valves:

Rubber seated butterfly valves conforming to AWWA C504 shall be used for water mains larger than 12-inches in diameter, unless directed otherwise.

Bodies of all valves shall be cast iron construction of ASTM A126, Class B, or ASTM A48, Class 40, and shall be as manufactured by Mueller or Kennedy or an approved substitute.

Underground valves shall be provided with operators with noncorrosive type of construction for input shaft, seals, bushings and bolting. Operators shall be totally enclosed and permanently lubricated for direct burial of the valves and frequent submergence in water up to 20 feet of head. The operators shall open the valve on a counterclockwise rotation of the operator wrench.

Valve ends shall be mechanical joint in accordance with AWWA C111. The valve body will be fusion bonded epoxy coated in accordance with AWWA C550.

130.06 Valve Boxes:

Valve boxes, base extensions, head and cover shall be of cast iron. Valve boxes shall be of the Mueller sliding type or Buffalo Type-4905 manufactured by Bingham Taylor Corporation, with 5.25-inch shaft and round head marked "Water". The shaft diameter shall not be less than 5-inches. The valve boxes shall have a minimum range of extension to fit 2-inch to 12-inch valves inclusive, placed on mains at depths of 3 to 5 feet of cover in order that the top cover of the valve box is set to finished grade.

Valve boxes shall be a Mueller Company 10364, or approved equal. Valve boxes shall be centered over the valve screw and set plumb.

All valves in which the operating nut is greater than 5 feet below the normal ground or road surface shall be provided with extension stems to bring the operating nut to within 5 feet of the finished grade. The extension stem shall be provided with a 2-inch square operating nut on top and a coupling to connect the extension to the operating nut of the valve. Extension shall be keyed to the valve stem with a stainless steel pin. A stem guide shall be provided to keep the valve stem extensions concentric with the valve box. Extension stems shall be of the same diameter as the valve stem unless otherwise specified.



130.07 Fire Hydrants:

Hydrants shall be traffic model either Mueller Super Centurion A-423, Kennedy Guardian K81A, American Darling B62-B-5 or acceptable substitute approved by the Town and County. Hydrants shall be post type, dry-barrel, compression type with main valve openings not less than 5.25-inches in diameter, double O-ring seals and safety flange, and shall conform to AWWA C502 requirements. Hydrants shall have a cast iron body with full bronze trim and shall withstand a hydrostatic test pressure of at least 150 psi. Hydrants shall have a minimum 6-inch connection base for setting with a minimum of 36-inch cover on connection pipe. Hydrants shall be equipped with hose connections as follows:

- Two each 2.5-inch, N.S.T. hose connections
- One each 4.5-inch, N.S.T. pumper connection

Hydrants shall conform to National Standard and be operated by a 1.5-inch pentagon shaped operating nut, opening counterclockwise. The direction of opening shall be clearly marked by an arrow case on the outside of the hydrant. Hydrants shall be connected to the main with a 6-inch ductile iron pipe and shall be controlled by an independent 6-inch gate valve. The 6-inch gate valve shall be located as near to the service main as practical. Where the 6-inch hydrant service line is longer than 50 feet, a second 6-inch gate valve shall be located not less than 1 foot and no more than 6 feet from the hydrant. The gate valve shall be rodded to the tee and the hydrant shall be rodded to the valve with anchor blocks placed at opposing ends and sized on a case by case basis. The 4.5-inch connection shall face the street, travel lane, service drive, or normal vehicular travelway, whichever applies.

Hydrants connection caps shall be fitted with connection chains. Also, hydrants shall be equipped with safety flange, breakaway top type and stem. Hydrant barrels shall be ordered from the supplier and delivered to the field, painted safety red (Rust-Oleum Fire Hydrant Enamel #43827 or acceptable substitute). Upon installation, hydrants bonnets and caps shall be painted according to AWWA and NFPA 291:

Class	Flow	Color of Bonnets & Caps
AA	1,500 gpm or greater	Blue
A	1,000 gpm or greater	Green
B	500 to 1,000 gpm	Orange
C	Less than 500 gpm	Red

130.08 Flush-Type Hydrants:

Flush-type hydrants shall be GIL Industries, Inc. 2-inch post flush hydrant or equal as approved by the Town and County.

Hydrants shall be connected to the main with a 3-inch ductile iron pipe branch tee and shall be controlled by an independent 3-inch gate valve. The 3-inch gate valve shall be located as near to the service main as practical. The 3-inch gate valve shall be fitted with a 3-inch by 2-inch reducer for the 2-inch hydrant service line. Where the 2-inch hydrant service line is longer than



50 feet, a second 3-inch gate valve shall be located not less than 1 foot and no more than 6 feet from the hydrant. The gate valve shall be rodded to the tee and the hydrant shall be rodded to the valve. The 2-inch connection shall face the street, travel lane, service drive, or normal vehicular travelway, whichever applies.

130.09 Automatic Flushing Devices:

Automatic flushing devices shall be Kupferle #9400-A Automatic 1" Flushing Device or equal as approved by the Town or County.

Automatic flushing device shall have a 1 inch brass inlet, leading vertically into a 1 inch automatic solenoid valve. The automatic solenoid valve shall have a 150 psi rating. Each unit shall be furnished with a stand-alone valve controller. The valve controller will not require a second hand held device for programming. It must have a minimum of 12 possible flushing cycles per day with up to 6 hour of flush per cycle and shall be submersible to 12 feet, operate with a 9 volt battery (compartment holds 2 batteries) and must have a rein-sealed electrical components. The solenoid shall have no loose parts when removed from the valve. Each unit shall have a single valve, all brass sampling point. Removal of the 1 inch solenoid valve shall be possible via an O-ring connector located under the valve after removal of stainless steel access plate. Under ground parts shall be housed in a PVC enclosure and each unit shall be self draining, non-freezing. All above ground components shall be contained in a UV resistant locking dome cover, as manufactured by Kupferle Foundry Company, Model 9400-A or approved equal.

130.10 Air Release Valves:

Air release valves shall be the universal type, orifice diameter of 0.25-inches, with a working pressure from 0 to 150 psi, stainless steel float, and resilient seat. Valves shall be type "AV" with 2-inch diameter screwed connection as manufactured by APCO (Model 145C), Crispin Multiplex Manufacturing or equal. Manual air release assemblies may be permitted on a case-by-case basis as approved by the Town and County.

Air release valve vaults shall be a standard precast concrete manhole. The valve vault atmospheric drain shall be a 4-inch cast iron pipe discharging into a one cubic yard dry well or discharging to free atmosphere. The outlet of the 4-inch pipe shall be screened.

130.11 Tapping Valves and Sleeves:

Tapping sleeves shall be mechanical joint type, with an iron body, and a brass test plug suitable for installation on the existing pipe, in accordance with AWWA C110. Tapping sleeve shall be Mueller Model H-615, or approved substitute.

Tapping valves shall be mechanical joint type with O-ring seals and non-rising stem. Inlet end shall have a Class 125 flange for attending sleeve. Tapping valves shall be manufactured in accordance with AWWA C500, and shall be Mueller Model 11-667, or approved substitute.



130.12 Inserting Valves:

Inserting valves shall be parallel seat and double disc design, conforming to the requirements of AWWA C500. Valves shall be designed for a working pressure of 200 psi, with specifically designed mechanical joint ends. Valves shall be Mueller Model H-842, or approved substitute.

130.13 Sample Stations:

Sample Stations shall be Water Plus Corp. 301-D-NL or equal as approved by the Town or County.

The water sampling station shall consist of a main shut-off ball valve, a spigot and throttling valve and a built-in evacuation tube. The unit shall be constructed with a brass and/or stainless steel water way. The below grade water way portion of the station shall be encased in a non-corrosive housing. The above grade portion of the station shall be enclosed within a lockable polyethylene housing.

The main shut-off valve shall be ball valve type with brass body and a stainless steel ball. This valve shall be one-quarter turn operation and shall be of a maintenance free design. The throttling spigot shall consist of a ball valve of the same design and a stainless steel spigot. The throttling valve shall be placed inline, above grade, at a distance from the spigot end which facilitates a steady flow of water containing no aeration.

The evacuation tube shall allow all water to be removed from the unit by means of a portable, hand-held pump. This tube shall allow all water to be removed from the station after each use to minimize bacteria growth and provide freeze protection.

All piping in the unit shall be constructed of brass or stainless steel or a combination of these materials. All waterway materials shall be non-corrosive. The buried portion of the water way shall be completely enclosed in a noncorrosive, non-conductive outer housing.

The above grade portion of the unit shall be enclosed in a polyethylene enclosure. The enclosure shall have a removable top which, when removed, provides complete access to the throttling valve, spigot, main shut-off valve and evacuation tube. The removable top shall be lockable by means of a tamper proof lock. The enclosure shall be manufactured with ultraviolet inhibitors for maximum life expectancy in outdoor installations.

The unit shall be Model 301D as manufactured by Water Plus Corporation or approved equal.

140 WATER LINE CONSTRUCTION

140.01 General:

The construction of all public water supply systems shall conform to the Virginia *Waterworks Regulations*, and plans and specifications approved by the Town and/or County.



The materials listed in this Utilities Standards Manual (USM), are for general information. Engineers and contractors working in the Town or County shall contact the respective authority to determine what materials are acceptable for each specific project.

- **Storing of Materials:**
Materials to include all pipe, fittings, and other appurtenances stored onsite or in the contractor/developer's storage yard shall be protected from intrusions by foreign materials, animals, insects, soil, and water at all times. End caps will be installed by the manufacture and will be left in place until the pipe is installed in the trench. End caps will be made of closed-cell polypropylene and will fit snugly on both ends of the pipe. The contractor/developer may use a flexible bag covering or shrink-wrap as a means of protection providing they have written approval from the Director.
- **Handling of Materials:**
To avoid shock or damage, load and unload pipe, fittings, valves, hydrants and accessories by lifting with hoists or skidding. Under no circumstances shall such material be dropped. Handle pipe such that the coating and lining shall not be damaged. The Town and County have the authority to reject any or all materials found damaged.
- **Line and Grade Stakes:**
Prior to the construction of an approved water main, the engineer shall place adequate line and grade stakes which identify the main, fittings, valves, hydrants, and water meter that are located within 1 foot of the property line or other appurtenances to insure the system can be constructed in accordance with the approved plans.
- **Cut Sheets:**
 - The engineer shall prepare legible cut sheets at 100 foot stations. Cut sheets will contain all data pertinent to the construction of the water main, the station and length of service connections, and all fittings including hydrants, tees, and bends.
 - Five (5) sets of cut sheets, certified by a Professional Engineer or surveyor shall be submitted to the Town and County for review and approval. The Engineer or surveyor who certifies the cut sheets shall also provide the following statement on all sets: "The professional seal and signature appearing on this document certifies that information shown conforms to the approved plan and/or actual field conditions." If a deviation from the approved plans in the horizontal location or grade of any main, structure or appurtenance is necessary; a revision to the approved plans showing the proposed deviation must be submitted to the Town and County for review and approval before the changes are constructed.



140.02 Blasting:

Blasting, where required shall be done with great care and in accordance with all applicable Federal, State and local laws, ordinances, and regulations. The contractor/developer shall be responsible for obtaining all required permits and bonds prior to blasting. Permits must be on site and available for review upon request by the Town and County. Any damages to foundations, structures, facilities, pipelines, utility conduits or any other damages attributed to the use of explosives shall be corrected at the contractor/developer's expense. The contractor/developer shall provide the owners of adjacent buildings, structures and properties, in writing, a description of the blasting and seismic operations, prior to blasting.

When explosives are used, work shall be executed by persons who are properly licensed to use explosives. Each blast shall be covered with rubber tire or steel mats. Blasting is not permitted within 24 feet of utilities, facilities or structures. Blasting closer than 24 feet must be pre-approved by the Town and County providing the project engineer can demonstrate that the safety or soundness of existing facilities are not in any manner endangered. Blasting shall not occur within 300 feet of any radio transmitter or radio frequency emission equipment. The magazine keeper shall maintain accurate records and inventory for all explosives, detonators and equipment from time of delivery, until used or removed from the site. The contractor/developer shall provide the required security for the site.

140.03 Excavation, Bedding and Backfill:

The work site shall be conservatively cleared of all vegetation, shrubs, trees and objectionable material which may interfere with construction. Vegetation, shrubs and trees which do not interfere with construction shall be protected from damage.

All excavated material shall be stockpiled in a manner that will not endanger the work and will prevent obstruction of driveways, gutters, and natural water sources. Hydrants, under pressure, valve pit covers, valve boxes or other utility controls shall be left unobstructed and accessible at all times. Topsoil shall be stockpiled separately to guarantee its placement at the top of the backfill trench.

Excavate trenches such that pipe can be laid to the alignment and depth required. Do not leave trenches open for more than 500 feet in advance of the completed pipe laying operation. The width of the trench shall be ample to permit the pipe to be placed, backfilled and thoroughly compacted in accordance with the requirements of these specifications. Trenches shall be of such extra widths as required to permit the convenient placing of timber supports, sheeting and bracing and handling of special fittings or appurtenances. Sheeting and shoring shall be furnished in accordance with the provisions of OSHA.

Excavate trenches to the depth required so as to provide a uniform and continuous bearing and support for the pipe on solid and undisturbed ground at every point between bell holes, except that it will be permissible to disturb and otherwise damage the finished surface over a maximum length of 18-inches near the middle of each length of pipe by the withdrawal of pipe slings or



other lifting tackle. Backfill the bottom of the trench, excavated below the specified grade, with approved bedding materials and thoroughly compact. The finished subgrade shall be prepared accurately.

Where excavation is made in rock, boulders, or other unsuitable materials, the subgrade shall be made by backfilling with a minimum 6 inches of #57 aggregate which shall be thoroughly compacted.

Provide bell holes at each joint to permit the jointing to be made properly.

Remove ledge rocks, boulders, and large stones to provide a clearance of at least 6-inches below and on each side of all pipe, valve and fittings for pipe up to 24-inches in diameter. A larger clearance may be required for pipes larger than 24-inches in diameter. The specified minimum clearances are the minimum clear distances which will be permitted between any part of the pipe and appurtenances being laid and any part, projection or joint of such rock or stone.

No pipe shall be laid in water or when, in the opinion of the Directors, trench conditions are unsuitable.

Place backfill in two, 1 foot layers over the pipe and thoroughly tamp to 85 percent compaction. The remainder of the backfill shall be placed in 2 foot layers tamped to 85 percent compaction. Backfill material shall be free of perishable material, frozen clods, sticky masses of clay and other unsuitable matter. Rock pieces larger than 2 inches shall not be used in the backfill within the 2 feet directly above the pipe.

Any work within existing or proposed Rights-of-Way shall meet all requirements of the Town, County and the VDOT.

140.04 Installation of Pipes, Valves, Fittings and Hydrants:

When installing pipe in the trench, proper implements, tools, and facilities satisfactory to the Directors and as recommended by the material manufacturer shall be provided and used by the contractor for the safe and convenient prosecution of the work. Carefully lower pipes, valves, and fittings, hydrants and accessories into the trench, piece by piece, by means of a derrick, ropes, slings or other suitable tools or equipment and in such a manner as to prevent damage to the water main material as well as protective coatings and linings. Do not drop or dump water main materials into the trench. Inspect pipe, fittings, valves, hydrants and other appurtenances for defects, damage immediately before installation while suspended above grade. Defective materials shall be marked and held for inspection by the Town and/or County, who may prescribe corrective repairs or reject materials. Installation of materials shall be in accordance with AWWA C600.

Remove lumps, blisters and excess coal tar coatings from the ends of each pipe, and wire brush and wipe clean the outside of the spigot and the inside of the bell. Spigots shall be dry and free from oil and greases, dirt, sand, grit or any other foreign material before pipe is laid.



Every precaution shall be taken to prevent foreign material, including non potable water from entering the pipe while it is being placed in the line, thus the trench shall be dewatered prior to pipe installation. If the pipe-laying crew cannot put the pipe into the trench and in place without preventing the entry of foreign material, a heavy, tightly woven canvas bag of suitable size shall be placed over each end and left there until the connection is to be made to the adjacent pipe. During laying operations, do not place debris, tools, clothing, or other materials in the pipe. At the end of each day place a watertight plug in the end of each pipe opening.

After placing a length of pipe in the trench; the spigot end shall be centered in the open bell of the pipeline and the pipe pushed home so that the face of the spigot is in close contact with the shoulder of the bell. Prior to joining pipe sections, mark spigot end insertion depth around pipe with a visible marking to provide confirmation that joint is thoroughly seated in bell. Lay ductile iron pipe with the bells facing the direction of the laying.

The cutting of pipe for inserting valves, fittings, or closure pieces shall be done by machine in a neat and workmanlike manner without damage to the pipe or the cement lining and so as to leave a smooth end at right angles to the axis of the pipe.

When machine cutting is not available for cutting pipe 24-inches in diameter or larger, the electric-arc cutting method will be permitted using a carbon or steel rod. The flame cutting of pipe by means of oxyacetylene torch shall not be allowed.

After cutting the pipe by any method, bevel the outside cut-end of the pipe approximately 0.25 of an inch back at an angle of about 30 degrees with the center line of the pipe. Remove any sharp edges or burrs that could damage the gasket.

Whenever it is necessary to deflect pipe from a straight line, either in the vertical or horizontal plane, to avoid obstructions or plumb stems, or where long-radius curves are permitted, the amount of deflection allowed shall not exceed that required, for satisfactory joining of the pipes, as specified by the manufacturer.

Restrain all tees, bends, plugs, caps and fire hydrants against movement by restraining joints. Restraining glands are preferred and shall be Megalugs as manufactured by EBAA Iron or other restraining glands acceptable to and approved by the Town and County. Concrete reaction blocking may be used on a limited basis in place of restraining glands or manufacturer's restrained joint pipe as approved by the Town and County. All concrete blocking will rest against undisturbed soil. All concrete blocking will be in accordance with the details in this manual.

In making connections of ductile iron pipe using the standard mechanical joint, place the gland followed by the rubber gasket over the plain end of the pipe, which shall be carefully inserted and aligned into the socket end of the pipeline. The gasket shall then be pushed into position so that is evenly seated in the socket. The gland shall then be moved into position against the face of the gasket, bolts inserted and made finger tight. Tighten the bolts by using a ratchet wrench



not less than 14 inches in length. All other requirements outlined previously concerning bedding, alignment, and cleaning of the pipe before making the joint, shall be followed.

Valve boxes shall be provided for all buried valves. The valve box shall not transmit shock or stress to the valve and shall be plumb and centered over the operating nut of the valve, with the box cover flush with the finished grade. Proper drainage around the valve box shall be provided.

All dead ends on new mains shall be provided with a fire hydrant or flushing hydrant. Temporary dead-end mains shall be provided with a 2-inch blow off valve.

Fire hydrant location, position and drainage shall be in accordance with AWWA C600. Prior to installation, all hydrants shall be inspected for direction of opening, nozzle threading, operating-nut and cap-nut dimensions, tightness of pressure-containing bolting, cleanliness of inlet elbow, handling damage and other defects. Defective hydrants shall be held for inspection by the Town and/or County, who may prescribe corrective actions or reject materials.

Placement of the hydrant shall be so that the bottom of the 4.5-inch nozzle shall be 18 inches above the elevation of the edge of the shoulder on streets without curb and gutter and 18 inches above the elevation of the curb on streets with curb and gutter. The 2.5-inch hose connections shall have a minimum of 4 feet clearance on all sides. Each hydrant shall be connected to the main with a 6-inch branch controlled by an independent 6-inch valve. Upon installation, hydrant bonnets and caps shall be painted according to AWWA and NFPA 291.

140.05 Pressure and Leakage Testing:

All newly laid pipe or any valved section thereof shall be subjected to a hydrostatic pressure of not less than 150 psi above.

All high points in the portion of the system under test shall be vented and air shall be expelled from the system prior to beginning the test. After all the air has been expelled, the corporation cocks shall be closed and test pressure applied. At the conclusion of the test, the corporation cocks shall remain closed and left in place.

Fittings and hydrants shall be properly braced or blocked before applying pressure. Where concrete thrust blocks are used, they shall have attained their final set prior to testing.

Pressure shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Town and/or County. After the valved portion of the system under the test has reached the required pressure as stated herein, the pressure shall be maintained for at least two hours and not vary by more than 5 psi for the duration of the test. Pressure readings at the test gauge shall be corrected to account for the difference in elevation between the test gauge and the critical points of the portion of the line being tested. At the conclusion of the pressure test, the volume of makeup water required to refill the pipeline shall be determined by measurement with a displacement meter or by pumping from a vessel of known volume.



All exposed pipe, joints, fittings, valves and hydrants at which leakage occurs shall be reworked to insure tightness. If the measured amount of leakage exceeds the values for the appropriate size as found in AWWA Specification C600-17, Hydrostatic Testing, the pipeline shall be repaired and retested until leakage is within the limit set. Methods of repair prior to retesting will be done with the Town and/or County approval and inspection and at the contractor's expense. No visible leaks will be allowed.

Allowable leakage shall be determined using the following calculation:

Testing allowance shall be defined as the maximum quantity of makeup water that can be added into a pipeline undergoing hydrostatic pressure testing, or any valved section thereof, to maintain pressure within ± 5 psi (34.5 kPa) of the specified test pressure (after the pipeline has been filled with water and the air has been expelled*). The testing allowance is exceeded if the quantity of makeup water is greater than that determined by the following formula(s):

In inch-pound units; (Eq 1)

$$L = \frac{SD\sqrt{P}}{148,000}$$

Where:

L = testing allowance (makeup water) (gph)

S = length of pipe tested (ft)

D = nominal diameter of the pipe (in.)

P = average test pressure during the hydrostatic test (psi [gauge])

In metric units; (Eq 2)

$$L_m = \frac{SD\sqrt{P}}{794,797}$$

Where:

L_m = testing allowance (makeup water) (L/hr)

S = length of pipe tested (m)

D = nominal diameter of the pipe (mm)

P = average test pressure during the hydrostatic test (kPa)

These formulas are based on a testing allowance of 10.49 gpd/mi/ in. (0.971 L/d/km/mm) of nominal diameter at a pressure of 150 psi (1,034 kPa). When testing against closed metal-seated valves, an additional testing allowance per closed valve of 0.0078 gal/hr/in. (1.2 mL/hr/mm) of nominal valve size shall be allowed. When hydrants are in the test section, the test shall be made against the main valve in the hydrant.

140.06 Wet Taps:

All wet tap installations require a Town and/or County representative to be present at the time of the tap. The tap shall require the approval of the Town and County. Sleeve and valve assemblies shall be properly tested for 10 minutes before the actual tap is made.



Wet taps shall employ a ductile iron mechanical joint sleeve, or other fitting specifically designed for this purpose as approved by the Director(s).

140.07 Disinfection of Water Mains:

After testing and before final inspection of the completed systems, flush new water mains and chlorinate in accordance with AWWA Specification C651. All valves, hydrants and appurtenances shall be operated during this time. Flushing shall be accomplished at a flow velocity of not less than 3 feet per second.

The disinfection solution shall remain in the new piping for no less than 24 hours, after which time a minimum chlorine residual of 25 ppm throughout the line shall be required.

Following chlorination, the new piping shall be thoroughly flushed and refilled with potable water. The heavily chlorinated water shall be flushed from the new main until the chlorine residual is no higher than that generally prevailing in the existing system. The water in the new main shall be proven comparable in quality by testing. The environment to which the heavily chlorinated water is to be discharged shall be inspected and if there is any question that the chlorinated water may cause damage to the environment, then a reducing agent shall be applied to the water that is to be wasted to thoroughly neutralize the chlorine residual that is remaining. When necessary, federal, state and local regulatory agencies shall be contacted to determine special provisions for the disposal of the heavily chlorinated water. If finished water from an existing public water supply is introduced into the new water main, the contractor shall tightly close the gate valve separating the new main from the existing main immediately after introduction of water, to ensure that heavily chlorinated water cannot enter the existing potable system.

The *Virginia Water Regulations* require at least two consecutive satisfactory bacteriological samples taken 16 hours apart, analyzed at a laboratory certified for bacteriological analysis, from the new water main/distribution system before the system can be placed into service. If the results of these samples indicate contamination, the disinfection procedure must be repeated. These samples shall be collected at regular intervals, not exceeding 1200 feet, throughout the length of the new water main.

150 ON-SITE PRIVATE WELLS

150.01 Applicability:

Private wells are allowed in developments located in the rural area, as designated by the Culpeper County Master Water and Sewer Plan. Private wells are also allowed on individual lots in the development area, where a public water system is not available. The use of private wells shall be governed by ordinance and, if permitted, must be approved by the Culpeper County Health Department. The minimum area for any such use shall be 1 acre or more as required by the Culpeper County Health Department. No person shall install or maintain any connection



whereby water from an auxiliary system may enter the Town and/or County water system(s) unless the auxiliary water system and the method of connection and use of such system shall have been approved by the Town and/or County. State Regulations: Private wells shall be designed and tested in accordance with the Commonwealth of Virginia's *Waterworks Regulations* and Private Wells Regulations.

150.02 Review and Approval:

Information pertaining to private wells shall be submitted as part of the site/subdivision plans and in accordance with this manual. The review and approval of this information shall be performed by the Culpeper County Health Department.

160 FIRE SAFETY SYSTEMS

Fire Safety systems shall be designed and constructed in accordance with this manual and ISO and NFPA guidelines.

160.01 General Policy and Requirements:

Water Supply Systems:

- Water supply systems shall be provided in accordance with this manual.

Fire Protection Lines:

- All fire protection lines shall be privately owned and maintained and provided with approved backflow prevention.
- All fire protection lines shall have an approved detector check and vault installed within the Town or County utility easement.

Fire Flow Calculations:

- Fire flow calculations shall be included with the site development plans.
- Deviations from the minimum fire flow requirements of this manual shall require a conditional fire flow waiver with the site development plan application. The waiver shall address current fire flow available and provide a system analysis to determine measures for bringing deficiencies up to minimum standards.
- Public Works, after coordination with the Fire Marshal's Office, shall approve additional fire protection measures proposed for every building not covered by adequate fire flows, prior to the approval of the site development plans. Any waivers will be coordinated with the Town and County as applicable.



- Fire protection lines will be reviewed for general conformance only, to include location and materials of construction. Sizing of the fire protection line shall be the responsibility of the design engineer and shall be in accordance with the requirements of the sprinkler manufacturer.

160.02 Submission Requirements:

Plan Elements in General: The site development plans shall include the following:

- Emergency access.
- Existing and approved fire hydrants.
- Fire protection lines.
- Water storage systems, where applicable.
- Rural water supplies, where applicable.

Fire Hydrants in General:

- Fire hydrants shall be connected to a water main with a 6-inch ductile cast iron pipe, and shall be controlled by an independent 6-inch gate valve. The gate valve shall be located as near to the service main as practical.
- Where the hydrant service line is longer than 50 feet, a second 6-inch gate valve shall be located not more than 6 feet from the hydrant.
- All hydrant barrels shall be painted safety red (Rust-Oleum Fire Hydrant Enamel #43827 or acceptable substitute). Upon installation, hydrants bonnets and caps shall be painted according to AWWA and NFPA 291.
- The 4.5-inch pumper connection on the hydrant shall face the street, travel lane, or service drive.
- The bottom of the 4.5-inch nozzle shall be 18 inches above the elevation of the edge of the shoulder on streets without curb and gutter and 18 inches above the elevation of the curb on streets with curb and gutter.
- The 2.5-inch hose connection shall have a minimum of 4 feet of clearance on all sides.



Fire Hydrants Location in Relation to Streets and Parking Lots:

- Fire hydrants shall be located along the right-of-way at street intersections and at intermediate locations where necessary, as determined by the Fire Marshal's Office in cooperation with the Town and County. All distance measurements are to be made along the water main between the two hydrants. In no case shall the distance between fire hydrants be greater than 1,000 feet.
- In areas with curb and gutter, the center of the fire hydrant shall be located from the face of the curb no less than 18 inches or more than 36 inches. Any part of a fire hydrant shall not conflict with or overhang a sidewalk, trail, or vehicular travelway.
- On roads with ditches, fire hydrants shall be located behind the ditch.
- Traffic bollards or other protective measures shall be provided in areas such as parking lots, where the proposed site improvements will not provide adequate protection of the fire hydrant from vehicles.
- When installed in parking areas, clear access shall be provided to the front of the hydrant (that portion with the large pumper connection at the center), and 15 feet to each side. This clear access area shall be marked as fire lane.
- Plantings or other obstructions shall be kept clear of fire hydrants for a minimum of 4.5 feet around the hydrant.

Fire Hydrants Location in Relation to Buildings:

- Fire hydrants shall be located to serve remote areas of buildings. Those hydrants used to meet fire flow requirements shall be located within 500 feet of the building to be protected.
- Fire hydrants shall be required along the perimeter of the building. The remote distance shall be measured to the most remote distance the hydrant will serve. Fire hydrants shall be a minimum of 50 feet away from all buildings, except single-family dwellings.

Fire Hydrants location in Relation to Sprinklers/Standpipes:

- Fire hydrants shall be located within 100 feet of any fire department sprinkler connection or standpipe where those systems are required in buildings.

Fire Hydrants location in Relation to Pipestem Lots:

- A fire hydrant may be required, as determined by the Fire Marshal, to be placed within 500 feet of all pipestem lots.

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Fire Protection Lines:

- Fire protection lines shall be a separate connection to the water main unless otherwise directed by the Town and County.
- Fire protection lines shall have a valve at its connection to the main.
- Plans for fire protection lines and a permit application shall be submitted for review and approval by the Town and County, as applicable, prior to installation.

Sprinkler/Standpipe Fire Department Connections:

- Fire department connections shall be located to be visible from a street. If a visible location from a street is not possible, alternate locations shall be approved by the Fire Marshal's Office. Such connections shall be located to provide immediate access to the fire department. Walls, fences, trees, shrubs, and other obstructions shall not prevent access.
- Fire department connections shall be arranged to allow the use of anyone water sprinkler connection to serve all the sprinklers within the building, and to allow the use of anyone standpipe connection to serve all the standpipes within the building.
- Fire department connections shall not be less than 18 inches and not more than 42 inches in elevation measured from ground level to the centerline of the inlets.
- In buildings classified as high rise by the building code, the fire department connections shall be located a minimum of 50 feet from the building. The location of this yard connection shall be approved by the Town and County, as appropriate and the Fire Marshal's Office.

Water Systems and Fire Flow Requirements:

- Water systems shall be designed to provide fire flows, plus the domestic demand required by the Town and County. A residual pressure of not less than 20 pounds per square inch (psi) at the required fire flow to at least one point within 500 feet of each building proposed to be served shall be provided.
 - New development shall provide adequate fire flow as required by the Town and County. Where the size and the scope of the development may exceed design standards, additional flow shall be provided in accordance with Insurance Services Office (ISO) requirements.
 - The minimum size water line used for fire protection to properties zoned single family residential shall be 6 inches in size. The minimum size water line used for fire
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protection to properties zoned multifamily residential, commercial or industrial shall be 8 inches in size.

- Fire flow requirements may be met in single-family residential and two-family developments with a single hydrant within 500 feet of a structure.
- In areas of multiuse development, the higher flow rates listed above shall be provided for each hydrant.
- Other residential, commercial, institutional, and industrial developments shall provide a fire flow of 1,500 gallons per minute.

Fire Flow Calculations:

- Fire flow calculations shall include assumptions about the existing system. The calculations shall indicate available flows at the proposed hydrants and the pressure throughout the proposed system.
- Fire flow calculations for projects to be developed in sections or phases shall indicate the available fire flows during each section or phase of the project.
- For small sites that propose no major waterline extensions, an evaluation of the existing fire flow available may be substituted for existing fire flow calculations.
- In the event that minimum fire flows cannot be achieved, the developer of a property shall design additional fire protection measures into every building not covered by adequate flows. Any deviation from the minimum fire flow requirements shall require a site development plan waiver application, for conditional fire flow requirements.
- Flow calculations shall be prepared using a computer program that is acceptable to the Town and County, such as KYPIPE Hydraulic Software as developed by the University of Kentucky or WATERCAD, Version 6.0 or latest published revision.
- Flow calculations shall utilize a pipe roughness factor, $c=120$ for pipes that are 12-inches in diameter and greater. For pipes smaller than 12-inches, roughness factor, $c=100$ shall be utilized. Since a conservative "c" factor is utilized in the calculations, no allowance is required for the losses in valves and other fittings.
- The line velocity shall not exceed 10 feet per second (fps) under any flow condition. Consideration shall be given to the line size used in areas where a domestic service line extends from a dead end line. In this instance, the line velocity may be permitted to exceed 10 fps to avoid stale water problems.



Water Storage Systems:

Water storage systems utilized to maintain fire flow shall have capacity to sustain the required flows and volumes in accordance with guidelines set forth by ISO and NFPA.

Rural Water Supplies (County Only):

- Suitable static water sources such as storm water management or BMP wet ponds in areas beyond the limits of public water services shall be accessible to fire department pumps. Access to static water sources may include dry suction hydrants and/or access lanes capable of supporting heavy fire apparatus under all weather conditions.
- The location and method of access shall be approved by the County and shall be constructed in accordance with this manual.

160.03 Construction Standards:

Rural Water Supply Access (County Only):

Access to a static rural water supply shall be constructed in accordance with design criteria, NFPA Standard 1231.

Acceptance Testing for Fire Protection Lines:

- Acceptance testing shall be required on all fire protection lines prior to concealment and use. Fire protection lines, except those serving single-family detached and two-family dwellings, shall be hydrostatically tested at not less than 200 pounds per square inch (psi) for 2 hours or at 50 psi in excess of the maximum static pressure when the maximum static pressure is in excess of 150 psi.
- Concealment of an underground fire protection line prior to acceptance testing may occur if a visual inspection of the system is conducted to verify that piping and anchorage is installed in an approved manner, and if the developer or contractor assumes responsibility for corrections to failures of the hydrostatic test.
- Flushing of a fire protection line shall occur prior to admittance of any water through the line and into the fire protection system. The minimum water flow required for line flushing or the hydrostatically calculated water demand rate of the system, whichever is greater.
- Hydrostatic testing of the fire protection line shall consist of testing the line from the valve at the water main up to, and including, the temporary flange/gate valve assembly.



Fire Protection Line Anchorage:

- Pipe anchorage shall be required on fire protection lines whenever they change direction. This includes bends, tees, and pipe ends. The pipe shall bear on a surface which is capable of resisting the loads imposed by moving water.
- Restraining systems shall comply with the standards in Section 130 of this manual.

Fire Detection Check Valves:

- Approved detection check valves shall be required on all fire service mains in buildings served by a "wet pipe" type sprinkler system.
- The detection check valve shall be equipped with a bypass meter assembly. An appropriately sized gate valve shall be installed on either side of the check valve.
- The vault housing the detector check valve should be adequately sized.
- Detection check valves shall not be required on exterior fire lines, unless otherwise directed by the Town and County.
- The Director(s) approved back flow preventer detector check valve and vault housing shall be required on all fire protection lines. Furnish detail drawings of both for prior approval.

160.04 Specifications:

Fire Hydrants:

- All fire hydrants shall be traffic model type, either Mueller Super Centurion A-423, Kennedy Guardian K81A, or approved equal.
- Fire hydrants shall be of the post type, dry-barrel, compression type with main valve openings not less than 5.25-inches in diameter, double O-ring seals and safety flange, and shall conform to AWWA C502 requirements. Hydrants shall have a cast iron body with full bronze trim and shall withstand a hydrostatic test pressure of 150 pounds per square inch (psi).
- Fire hydrants shall have a minimum 6-inch connection base for setting, with a minimum of 36 inches cover on connecting pipe.
- Fire hydrants shall be equipped with 3 hose connections. Two of the connections shall be 2.5-inch N.S.T., and the third connection shall be 4.5-inch N.S.T.



- Fire hydrants shall have a standard 1.5-inch pentagon shaped operating nut, opening counterclockwise. The direction of the opening shall be clearly marked by an arrow case on the outside of the hydrant.
- Fire hydrant connections to the water mains shall be 6-inch ductile cast iron pipe and shall be controlled by an independent 6-inch gate valve.
- Hydrants connection caps shall be fitted with connection chains.
- Hydrants shall be equipped with safety flange, breakaway top type and stem.
- Fire hydrant barrel paint shall be safety red, high performance acrylic Rust-Oleum Fire Hydrant Enamel #43827, or equal. Upon installation, hydrant bonnets and caps shall be painted according to AWWA and NFPA 291.

Sprinkler Standpipe Connections:

- All fire department connections shall be fitted with national standard threads.



SANITARY SEWER SYSTEMS

170 GENERAL REQUIREMENTS

170.01 General:

It shall be the responsibility of each developer, contractor and engineer to familiarize themselves with all applicable specifications relating to utilities design and construction. The applicable requirements of the Virginia Department of Health Office of Drinking Water *Waterworks Regulations* and the Department of Environmental Quality, Sewage Collection and Treatment Regulations, the Building Officials and Code Administrators International (BOCA), the Virginia Department of Transportation (VDOT), the American Water Works Association (AWWA), Town of Culpeper Code, Culpeper County Code and any other specifications where applicable, must be met. All standards referenced in this section shall refer to the latest revision or revised edition of the referenced material. The authority for discretionary provisions for sewer designs shall vest with the Director(s). Any references to acceptance and/or approval shall mean acceptance and/or approval by the Town and/or County.

For projects located within Town or County limits and provided public sanitary sewer is within 300 feet of a principle structure, the owner of all houses, buildings, or properties used for human occupancy, employment, recreation or other purposes, situated within the Town or County of Culpeper and abutting on any street, alley, or right-of-way in which there is now located or may in the future be located a public sanitary sewer or combined sewer of the Town or County of Culpeper, is hereby required at his expense to install suitable toilet facilities therein, and to connect such facilities directly to the proper public sanitary sewer main when it involves new construction, failed septic system, or by requirement of the health department.

For projects located in Culpeper County, outside of Town limits, sewer systems shall be designed in accordance with the densities and intensities reflected in the Culpeper County Master Water and Sewer Plan. New development located in one or more of the Service Areas in the development area, as reflected by the Master Water and Sewer Plan, shall connect to a public sewer system, when available. New developments located in the rural area shall be served by a Community Wastewater System. The approximate location and character of proposed public sewer facilities shall correspond with the Existing and Proposed Sewer System Map, as amended. Sewer systems shall be designed for the estimated future population from all contributing points in the development area under consideration. The estimated future population shall be based on the adopted County Master Water and Sewer Master Plan Systems Map.

Sewers shall be designed and constructed to achieve total containment. Sewers shall be designed for the ultimate tributary population with an upper limit consisting of the 50 year population growth projection, except when considering parts of the line that can be readily increased in capacity. Sewers shall remain fully operational during the 25 year flood wave action. Sewers and their appurtenances located along streams and rivers shall be protected against normal range of high and low water conditions, including the 100 year flood wave action.



To provide for maximum utilization of public sewer systems, appropriate easements shall be provided to adjacent properties for access to, or extension of, said utilities. Such easements shall be dedicated to the Town and County depending on the location of the project.

All sewers and service laterals located outside of state rights-of-way or public easements are regulated by the Virginia Uniform Statewide Building Code (VUSBC), and shall be privately maintained.

There shall be no physical connections between a drinking water supply and a sewer or appurtenance thereof.

170.02 Private Sewer Service:

Building sewer connections, or portions of building sewer connections outside the VDOT right-of-way or easement shall be privately owned, operated and maintained. Building sewer connections, or portions of building sewer connections within the VDOT right-of-way or easement in the County shall be owned and maintained by the County. Sewer laterals that are on private property will be inspected by the Building Official

All sewer service connections between the building and the public main in Town shall be owned and maintained by the property owner. The Town and County will provide lateral inspection services for acceptance by the Town and County as applicable.

170.03 Relationship to Waterworks Structures:

Public wells, other public water supply sources, structures, and sewers shall meet the requirements of the Virginia *Waterworks Regulations* with respect to minimum distances from water supply wells or potable water supply sources and structures. No sewer line shall pass within 50 feet of a potable water supply source or structure unless special construction and/or pipe materials are used to obtain adequate protection. The engineer shall identify and adequately address the protection of all potable water supply structures within 100 feet of the proposed project.

170.04 Location of Sewers in Relation to Streams, Estuaries, Lakes and Reservoirs:

For the location and installation of sewer lines in relation to streams, estuaries, lakes and reservoirs, refer to the State Water Control Board (SWCB), Sewage Collection and Treatment regulations.

Sewer lines crossing streams or standing bodies of water, both above and under water, present special problems and should be discussed with the Town and County before final plans are prepared. Sewers located along streams shall be located outside of the stream bed wherever possible and sufficiently removed therefrom to protect the natural stream channel. Reasons for requesting sewer lines to be located within stream beds shall be given in the site development



plan application. Sewers laid on piers across ravines or streams shall be allowed only when it can be demonstrated that no other practical alternative exists.

Sewers entering or crossing streams shall be of sufficient depth below the natural bottom of the streambed to protect the sewer line. In paved channels, the top of sewers shall be placed below the bottom of channel pavement. Sewers shall remain fully operational during a 25 year storm event. Sewers and their appurtenances located along streams shall be protected against the 100 year storm event. Sewers located along streams shall be located in conformance with this manual and the State Water control Board (SWCB), Sewage Collection and Treatment regulations.

170.05 Sewer-Only Accounts:

Under special circumstances, the Town and County will allow sewer-only accounts. Sewer-only accounts will not be charged water use fees, but the private wells supplying such accounts must be fitted with sewer meters. Meters will be read by the Town and/or County as applicable in order to establish quantities per billing cycle. The size and location of the sewer meter shall be shown on the project plans.

170.06 Grease Traps:

Private grease traps, volatile liquid separators, or other such devices may be required for restaurants and other facilities where, due to the nature of the operation, it is deemed necessary or required by the VUSBC or the Town and County. The owner of the facility served by a grease trap, volatile liquid separator or other such device, shall be responsible for its proper installation, operation and maintenance.

170.07 Inverted Siphons:

Inverted siphons shall not be allowed without the written approval of the Director(s) and only in cases where other alternatives make the use of inverted siphons in the best interest of the Town and County.

180 DESIGN PARAMETERS

180.01 Virginia Department of Environmental Quality, State Water Control Board, Sewage Collection and Treatment Regulations:

The design of sanitary sewer systems and sanitary sewer pump stations shall be governed by the DEQ, SWCB, Sewage Collection and Treatment Regulations and the requirements of this manual. The Town and County have applied to have local review authority for the design of wastewater systems using this manual as its application. Accordingly, after approval, it is anticipated that the Sewage Collection and Treatment Regulations shall be augmented by the USM, unless such augmentation is specifically waived by the Director(s), depending upon where the project is located.



Specific parameters of the proposed project's sewer system, e.g., lift stations and sewers larger than 12-inches in diameter, must be reviewed both locally and by the DEQ. The developer or the engineer must coordinate with the Director(s) to ensure that the appropriate agencies review the various portions of the sewer utility plan.

180.02 Submission Requirements:

All site development plans proposing a sewer system shall be submitted to the Director(s), as appropriate, who shall coordinate the review and approval of all elements of the plan in accordance with this manual.

All site development plans shall include horizontal and vertical views of all of the proposed sewer lines and appurtenances. The diameter, length, material, and slope of all proposed sanitary sewer lines shall be shown on the plan profiles. Sanitary sewer design calculations shall be submitted for all proposed sewer mains as part of the site development plans along with a sewer shed map. Deviations from the flow rates of Table 180-1 shall be included in the submission of the site development plan, with a description of the procedure used for the calculations, and must be approved by the Director(s), depending upon the location of the project. Also, if there is sewer crossing watercourses, design information and details shall be submitted for review.

180.03 Tributary Population:

Sewer systems shall be designed to carry the peak flows generated by the estimated future population from all contributing points under consideration. The estimated future population will be based on the adopted Town of Culpeper Comprehensive Plan and the Culpeper County Master Water and Sewer Plan for the watershed to be sewered. The estimated average daily flow will be computed using the unit flows from Table 180-1.

Consideration will be given to domestic, commercial, institutional, and industrial wastes plus groundwater infiltration in determining the necessary capacity of the sewer system. A design analysis and sewer shed map will be submitted with all project plans.

180.04 Sewer Systems in Relation to Waterworks Structures:

Sewer systems shall meet the requirements of the Virginia *Waterworks Regulations* as well as private well regulations with respect to minimum distances from water supply wells or water supply sources and structures. No sewer line shall pass within 50 feet of a water supply source or structure unless special construction and/or pipe materials are used to obtain adequate protection. The proposed design shall identify and adequately address the protection of all water supply structures within 100 feet of the proposed project.

180.05 Design Quantities:

New sewer systems will be designed to carry the estimated peak flow from the contributing watershed plus any flows pumped into the watershed from a lift station. The peak flow will be



computed by multiplying the average daily flow by the appropriate peaking factor from Figure 180-1. The unit flows from Table 180-1 will be assumed to cover infiltration. When deviations from the flow rates of Table 180-1 are proposed, a description of the procedure used for the sewer design shall be included with the submission of the site development plans. The use of any flows other than those listed in Table 180-1 must have the written permission of the Town and County.



FIGURE 180-1

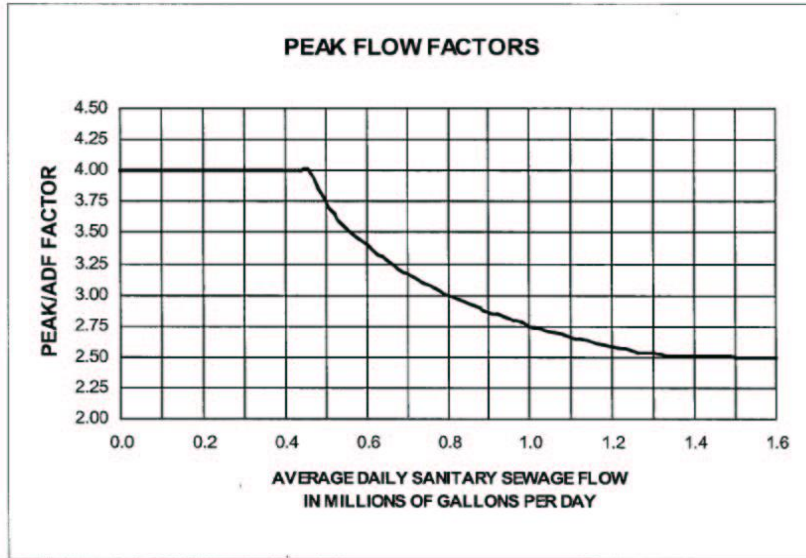


TABLE 180-1**AVERAGE DAILY WASTEWATER FLOWS
Unit Flows by land Use Category**

Land Use Category	Maximum Density (Unit/Ac)	Unit	Flow/Unit (gpd)
Residential:			
RMH	3.0	DU	300
R-4	12.0	DU	300
R-3	3.0 – 8.0	DU	300
R-2	1.7 (25,000 ft ² min.)	DU	350
R-1	1.1 (40,000 ft ² min.)	DU	350
RA, RR	0.3 (3 Ac. min.)	DU	350
A-1	0.2 (5 Ac. min)	DU	350
Office:			
OC	---	Acre*	2000
Industrial:			
M-2, HI	---	Acre	2000
M-1, LI	---	Acre	1500
Commercial:			
CC, VC, CS, SC	---	Acre	2000

* Note:

- (1) Acre refers to gross acreage
- (2) A-Agricultural; RA-Rural Area; RR-Rural Residential; RMH – Residential Mobile Home; CC-Convenience Center; VC-Village Center Commercial; CS-Commercial Services District; OC-Office District, SC-Shopping Center District; LI-Light Industry (Industrial Park); HI-Heavy Industry (Industrial District), M-Manufacturing.

Sanitary sewer design calculations and a sewer shed map will be submitted for all proposed sewer mains as part of the project plans.

180.06 Hydraulic Design Criteria:

Sewers shall have a uniform slope and straight alignment between manholes. Sewers will be designed to be free flowing with a hydraulic grade below the crown of the pipe. All sewers will be designed with slopes sufficient to provide a velocity during peak flow conditions of not less

than 2 feet per second (fps). Capacity and velocity computations for gravity sewers will be done using the Manning formula as follows:

$$v = 1.49/n R^{2/3} S^{1/2}$$

$$Q = 646,300 (1.49/n A R^{2/3} S^{1/2})$$

Where: V = Velocity (fps)
 n = Roughness coefficient
 R = Hydraulic radius
 S = Slope (feet per foot)
 A = Cross-sectional area (square ft.)
 Q = Flow rate (gpd)

A roughness coefficient (n) of 0.013 will be used for all pipe materials. All sewers will be designed so that the actual depth of flow in the pipe during peak flow conditions will not exceed 80 percent of the pipe's nominal inside diameter. Due to low flows, upper or terminal sewer runs shall have a minimum slope of 0.80 percent unless there is a distinct possibility of the sewer being extended in the near future. Sewers shall be designed such that the maximum velocity is 10 fps. Where velocities must exceed 10 fps, the sewer shall be constructed of ductile iron pipe conforming to this manual. Where smaller sewers discharge into larger sewers, the 0.80 flow line of the pipes shall be matched. The minimum size sewer main shall be 8 inches in diameter. The diameter, length, and slope of all proposed sanitary sewer runs will be shown on the profile views of the sewer on the project plans.

Table 180-2 shows the minimum slopes in feet per hundred feet.

Table 180-2	
MINIMUM SLOPES	
Sewer Diameter in Inches	Minimum Slope
8	0.47
12	0.26
15	0.18
18	0.14
21	0.113
24	0.088
30	0.062
36	0.048
42	0.040
*	-

* Note: For sewers larger than 42-inches in diameter, the minimum slope will be computed by the formula –

$$S = V^2/[1.49R^{2/3}/n]^2 \quad (V = 2 \text{ fps})$$

Hydraulic losses at manholes will be accounted for by providing minimum of 0.2 foot difference between the invert in and the invert out for sewer lines up to 12-inches in diameter.



At intersections and transitions of sewers larger than 12-inches in diameter, the hydraulic losses shall be computed separately and the hydraulic analysis submitted to the Town and County for approval.

180.07 Separation of Water Mains and Sanitary Sewers:

General - The following factors shall be considered in providing adequate separation:

- Compliance with VDH and DEQ requirements.
- Materials and types of joints for water and sewer lines.
- Soil conditions.
- Service branch connections into the water line and sewer lines.
- State variations in the horizontal and vertical separations.
- Offsetting of pipes around manholes.

Parallel Installation:

- Normal conditions - Sewer lines shall be laid at least 10 feet horizontally from other utilities whenever possible, the distance shall be measured edge-to-edge.
- Unusual conditions - When local conditions prevent a horizontal separation of 10 feet, the sanitary sewer line may be laid up to 7.5 feet from water lines provided that:
 - The bottom (invert) of the water main shall be at least 18 inches above the top (crown) of the 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.
- Unusual conditions - When local conditions prevent a horizontal separation of 10 feet, the sanitary sewer line may be laid up to 7.5 feet from utility lines other than water lines with the permission of the Director(s).

Crossing:

- Normal conditions - Sanitary sewer lines crossing below 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.
- Unusual conditions - When local conditions prevent a vertical separation described above, the following construction shall be used:

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- Sewers passing over or under water lines shall be constructed of the materials described in 130.01 and meet AWWA standards.
- Water lines 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 line.
 - ◆ Adequate structural support for the sewers to prevent excessive deflection of the joints and the setting on and damage to the water line. The project engineer shall evaluate each crossing on a case-by-case basis.
 - ◆ 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.
- A minimum of 12 inches will be maintained between sanitary sewer lines and utility lines other than water lines.

Sewer Manholes:

- No water pipes shall pass through or come in contact with any part of a sewer manhole.

180.08 Sewer Pipelines:

In general, sewers shall be placed along the centerline of the street or travel way. On curved streets, the sewer main shall not vary more than 10 feet on either side of the centerline, except at street intersections. Manholes will not be located in areas where water backs up in the street during a storm, such as the spread area in front of storm drainage inlets. In state road right-of-ways the location of all sewers and manholes must meet VDOT's criteria. On primary and other high volume roads, VDOT may not allow sewers or manholes to be located in the pavement. At the initial stage of design it is strongly recommended that the applicant renew with the Culpeper VDOT Residency the placement of any proposed water and sewer lines under VDOT pavement.

All other utility lines shall be a minimum horizontal distance of 10 feet, measured edge to edge, from all sewer lines and manholes whenever possible. When unusual conditions make it impossible to provide a 10 foot horizontal separation, the required horizontal separation may be reduced to as low as 7.5 feet at the discretion of the Town and County, provided that a minimum vertical separation of 18 inches can be maintained. Sanitary sewers shall be designed to run below the water system. All water lines will cross above sanitary sewers with a minimum vertical separation of 18 inches. The Town and County may require the sanitary sewer to be constructed of ductile iron pipe when the minimum separation is provided. At all utility



crossings, except for water, a minimum vertical separation of 12 inches will be maintained between the utility line and the sanitary sewer.

All crossings of streams, estuaries, lakes and reservoirs shall be constructed of Class 350 ductile iron pipe. The pipe shall exhibit no infiltration, and shall be designed, constructed and protected against anticipated hydraulic and physical, longitudinal, vertical and horizontal loads and erosion and impact. Sewers laid on piers across ravines or streams shall be allowed only when it can be demonstrated that no other practical alternative exists. Such sewers on piers will be constructed of Class 350 ductile iron pipe with mechanically restrained joints. Design information and details of the aerial crossings and piers will be included in the project plans. The design engineer shall be responsible for obtaining all required State and Federal permits (such as the Virginia Marine Resources Commission Permit) to install a surface water crossing. All aerial crossings will be designed in conformance with DIPRA recommendations. At stream crossings, the top of the sewer will be a minimum of 1 foot below the stream channel when the stream bed is rock, and 3 feet when the stream bed is an unconsolidated material. When the sanitary sewer runs parallel to a stream, the invert of the sewer will be a minimum of 3 feet below the invert of the stream channel to insure that adequate crossings can be made. The invert of the stream channel will be shown on the sanitary sewer profile.

When sanitary sewer lines cross gas transmission lines the sanitary sewer will be constructed of Class 350, ductile iron pipe or the sewer line will be installed in a steel casing running the width of the gas line easement. If the sanitary sewer is constructed of ductile iron pipe, the line will be polyethylene encased in accordance with ANSI/AWWA C105. If the gas transmission main is constructed of steel pipe, the distance to the nearest anode bed will be shown on the project plans. Test pits will be dug on the gas transmission main at the proposed crossings. The test pit information will be shown on the project plans.

180.09 Manholes:

Manholes shall be constructed of precast circular manhole block, or precast concrete with cast iron frames and covers as shown on construction plans. Precast manholes shall conform to ASTM C478. All reinforcing steel shall conform to ASTM A615. Joints shall be sealed with flexible butyl resin sealant conforming to Federal Specifications SS-S-210A and AASHTO M-198. Manholes shall be provided with galvanized iron, rubber-coated steps as shown on construction plans.

The minimum inside diameter for a manhole shall be 4-feet. A larger inside diameter may be required depending on the pipe diameter and the type of connector used. The inside diameter of the manhole shall be noted on the project plans whenever the lines connecting to the manhole are greater than 12-inches in diameter. Pipes larger than 24-inches in diameter shall have specially designed manhole structures.

Manholes shall be provided at all junctions with other sewers, at all points in change in alignment, grade, or pipe size and at the terminal point of the main. All sewer lines 8-inches or



larger shall terminate with a manhole. The maximum distance between manholes shall be 400 feet.

At all collector system manholes, the difference between the influent and effluent inverts shall not be more than 12 inches. Where this difference occurs, a smooth transition between the pipes, equal in height to 0.80 of the diameter of the pipe, shall be provided. No connections shall be made where the difference in the invert elevations is between 12 and 30 inches. Where the difference in invert elevations is greater than 30 inches, drop connections conforming to the details in this manual will be used. For interceptor sewers larger than 18-inches, the difference in invert elevations may be up to 24 inches.

Manhole frames and covers shall be in accordance with the requirements shown on the plans. They shall conform to the current version of ASTM A283. The words, "Sanitary Sewer" shall be cast in the cover so as to be plainly visible. Manholes shall extend above the known level of flooding or, if this is not possible or practical, watertight manhole frames and covers shall be installed. All manholes that do not have watertight frames and covers, will be provided with a watertight manhole insert. All manholes will have a manhole chimney seal between the manhole casting, adjusting rings, and cone section to prevent inflow and infiltration into the manhole throughout a 20 year design life. On watertight gravity sewer lines manhole vents conforming to the details shown in this manual will be provided at least every 1,000 feet. Manhole tops located in open areas out of yards, roads, travel ways, and parking areas will be set a minimum of 2 feet above the surrounding finished grade unless otherwise directed by the Director(s). Under no circumstances will manholes be located in sidewalks or other pedestrian travel ways or in parking spaces.

Manhole connections shall be made to sewer lines utilizing rubber gaskets cast integrally into the pipe opening of the manhole at the time of manufacture. Rubber gasket seals shall be manufactured in accordance with Rubber Joint Specifications ASTM C4333 and shall meet performance and test requirements of ASTM C425.

Dog house manholes may be allowed over existing sewer lines. The dog house manhole shall be set on a minimum of 8-inch solid concrete block with a minimum 8-inch of 3000 psi concrete base. The manhole shall be tested prior to existing sewer line being cut out.

Manholes within 1,000 feet or the first 3 manholes downstream (whichever is the greater number of manholes) of discharge points for sanitary sewer force mains shall have interior linings to prevent corrosion. New manholes shall have protective linings applied that are approved by the Town and County. When force mains are tied into existing manholes, the interior of downstream manholes within 1,000 feet or the first 3 manholes downstream (whichever is the greater number of manholes) of the discharge shall be thoroughly cleaned and protected from corrosion by the application of a lining system approved by the Town and County. The proposed lining system will be shown on the project plans.

Manholes constructed on fill will have a false bottom extending to undisturbed ground or another approved means of preventing settlement of the manhole.



All manholes in a project will have a unique alphanumeric identifier on the project plans.

180.10 Manhole Water Tightness:

Watertight manhole frames and covers shall be provided for all manholes located outside of paved areas in areas where the frames are at or below the 25-year flood level. Watertight systems shall be vented at least every 1,000 feet.

180.11 Service Connections:

Service connections installed from the main to the property line or right-of-way shall have a minimum 4-inch inside diameter. A 4-inch sewer cleanout shall be installed just inside the property line for all anticipated service connections at the time of construction of the sewer main. The cleanout will not be located in a sidewalk, driveway or entrance. No building service connection to the public sanitary sewer will be allowed to tie into the vertical cleanout riser at the property line allowing a vertical drop to exist in the line. All clean-outs shall have a brass cap. All service connections must be connected by means of a manhole connection or a pre-manufactured tee or wye, or with an approved saddle type connection approved by the Director(s). Service connections to terminal manholes shall not exceed three in number. Service connections to in-line manholes must obtain prior approval of the Town and County. A sanitary sewer lateral table will be included in the project plans. The table will include the invert of the lateral at the main, the finished floor elevations of the proposed buildings, and the size, length, and slope of the laterals.

The lowest floor elevation of any structure to be served by gravity shall be a minimum of 4 feet above the invert elevation of its sewer service connection at the sewer main. For existing structures, connection to the public sewer with plumbing fixtures located on a floor of the structure that is not 4 feet or more above the sewer main as specified above shall not be allowed unless a written waiver is obtained from the Town and County or a pumping operation is utilized.

Sewer laterals shall not be tied directly into a trunk sewer unless specifically approved by the Director(s).

180.12 Pipeline Depth of Cover:

All sewers with a depth of cover of 18 feet or greater will be constructed of ductile iron pipe. The class of pipe used will be in accordance with Table 180-3. All sewers constructed on fill will be constructed of at least Class 350 ductile iron pipe.



TABLE 180-3

Pipe	MAXIMUM DEPTH OF COVER* TYPE "4" LAYING CONDITION Cement-lined D.I.P.			CLASS I GRAVEL BEDDING PVC**
	Class 350	Class 300	Class 250	SDR-35
8	34	--	--	18
10	28	--	--	18
12	28	--	--	18
14	27	26	23	--
15	--	--	--	18
16	24	26	24	--
18	28	26	23	18
20	28	26	23	--
21	--	--	--	18
24	28	26	23	18
27	--	--	--	18
30	28	25	23	--
33	--	--	--	--
36	28	25	23	--
42	28	25	23	--
48	28	25	23	--
54	28	25	23	--
60	28	25	23	--

* All depth shown in feet

** For depths in excess of 18 feet, engineer shall provide design data.

No sewer shall be installed at depths greater than 20 feet without the written permission of the Town and County.

Normally, sewers constructed in a street or travel way will have a minimum of 5 feet of cover. Sewer lines may be installed with between 3.5 feet and 5 feet of cover, provided that the sewer is constructed of Class 350 ductile iron pipe.

Sewer constructed in open areas will have a minimum cover of 3.5 feet. Sewer lines may be installed with between 2 feet and 3.5 feet of cover provided that the sewer is constructed of Class 350 ductile iron pipe. Any time the depth of cover is less than two pipe diameter for a significant distance, calculations will be provided showing that buoyant forces will not cause floatation of the line.



180.13 Pipeline Slope:

Sewer lines at a slope of 20 percent or greater will require the approval of the Director(s) and if approved will be anchored securely as described in this manual. Structural and installation details of the anchors will be included in the project plans. The anchors will be spaced on the sewer one as shown on Table 190.1. All sewers with slopes greater than 14 percent will be constructed of ductile iron pipe.

190 DESIGN STANDARDS - SANITARY SEWERS

190.01 Pipe Materials for Sanitary Sewers:

- Structural Requirements:
 - The structural design of sewers shall conform with the methods given in the ASCE Manual Number 37 for the design and construction of sanitary and storm sewers. In the use of this manual, the backfill weight shall equal 130 pounds per cubic foot and K_u shall be 0.130. The live load for sewers subject to traffic loading shall be determined from a minimum wheel load equivalent to an H-20 loading (16,000 pound wheel load). An allowance of 50 percent of the design wheel load shall be added for impact. A minimum wheel load of 10,000 pounds per wheel shall be applied to all other sewers not subject to traffic load. Ultimate strengths of rigid pipe shall be measured in terms of ultimate three-edge bearing strength divided by a safety factor of 1.5. The allowable load shall be the working strength times a 2.5 load factor for concrete cradle or arch bedding and times a 1.9 load factor in Class B gravel bedding condition.
- Bedding:
 - Pipes up to and including 18-inches in diameter, except ductile iron, shall be bedded in compacted granular material placed on cradle or arch bedding. Pipe shall be placed on compacted granular bedding having a minimum thickness of one-fourth (0.25) of the pipe's outside diameter (4 inches minimum), and the granular bedding shall extend to a depth of 4 inches over the crown of the pipe, completely wrapping the pipe barrel. The granular material shall be gap-graded, crushed stone meeting the requirements of gradation 57, 67, or 78. Ductile iron pipe shall have a minimum of 4 inches of granular bedding. Bedding for pipe larger than 18-inches shall be designed on an individual basis and approved by the Director(s).

Sewers to be constructed on fill shall require that the finished grade be completed to the pipe invert prior to pipeline bedding preparation. Thereafter the fill material for the full trench width shall be excavated and replaced entirely with VDOT aggregate 21-A.



- Pipe Material Selection:

- The pipe materials listed hereunder have been generally approved for use in the Town and County. However, the acceptability of specific pipe materials for use shall be determined by the Town and County on an individual basis at the time of review of final project plans. This will necessitate that prospective developers/builders or their engineers contact the Town and County directly to ascertain its specific pipe material requirements. The type or types of pipe allowable for use on any specific project shall be shown on the approved project plans.

- ◆ Ductile-Iron Pipe: Conform to "Ductile-Iron Pipe Centrifugally Cast in Metal Molds or Sand-Lined Molds, For Water or Other Liquids," ANSI A21.51 (AWWA C151), Thickness Class 350, unless a higher pipe class is needed as determined by the Town and County. Use Class 350 pipe in exposed pipe installations, at stream crossings and for excessive cover where other pipe materials may be subject to crushing. Supply with "push-on" joints conforming to ANSI A21.11 (AWWA C-111). If required for special aerial pipelines, use mechanical joint systems. Conform fittings to ASTM A-21.1 0, using ductile iron with mechanical or push-on joints. Provide interior coating for pipe and fittings conforming to one of the following:

Apply minimum 0.281-inch thick lining consisting of sand and high alumina cement. Conform to AWWA C-104, except for cement used. Protect exterior spigot ends (6-inch maximum) and spigot face with 16-mil epoxy coating. Protect interior faces of bell, including gasket cavity, and all interior surfaces of fittings with like thickness of epoxy coating.

Apply minimum 40 mils (dry film thickness) Ceramic Epoxy Lining to pipe and fitting interiors. Protect gasket area and spigot ends (6 inch maximum) with 6 mils nominal, 10 mils maximum Protecto Joint Compound. Apply all materials according to manufacturers' specifications. The ceramic epoxy must be a high build multi-component Amine cured Novalac Epoxy Lining, Protecto 401 or approved substitute. Test every section of pipe and every fitting for pinholes with a nondestructive 2,500 volt test.

- ◆ PolyVinyl Chloride (PVC): PVC sewer pipe shall be manufactured in accordance with ASTM designation 3034 (SDR 35). Gravity sewer pipe shall be unplasticized polyvinyl chloride with integral rubber ring wall bell and spigot joints furnished in 12.5 feet and 20 feet nominal lengths. Installation of PVC gravity sewer pipe and fittings shall be in accordance with ASTM designation 2321 and manufacturer's recommendations. PVC



sewer pipe shall be stored in accordance with manufacturer's recommendations on flat, even surfaces and shall remain racked on the pallets as delivered to the job site until such time as the trench is ready for the placement of the pipe; i.e., PVC pipe shall not be strung out on the job site. Pipe stored for more than one year prior to installation shall be covered with an opaque covering to prevent damage by the sun.

- ◆ There will be no change in pipe material from manhole to manhole unless approved by the Director(s).

190.02 Manholes:

Manhole sections shall be precast and manufactured in accordance with ASTM C478 for most installations. Composite polymer concrete manholes manufactured in accordance with ASTM C478 and ASTM C857 shall be installed downstream of a force main as directed by the Town and County.

Each section shall have lifting lugs or keyways for the purpose of handling and setting. Joints shall be of the a-ring rubber gasket type or other jointing system approved by the Town and County. The joint design shall meet the requirements of ASTM C443. Gaskets shall meet the requirements of ASTM C361. When assembled the joint shall be uniform and watertight.

Steps for manholes shall be made of fiberglass, cast iron or steel and shall have a plastic coating.

All manholes with standard frames and covers shall be equipped with watertight manhole inserts.

Castings shall be of best quality, tough, gray iron, free from cold shuts, blow holes, and other imperfections and shall meet the requirements of ASTM A48, Class 30. The castings shall be sound, true to form and thickness, cleaned by sandblasting and neatly finished. The bearing surfaces shall be machine ground and finished to insure satisfactory seating and anti-rocking. Covers shall receive one coat of black asphaltum paint at the factory.

Standard covers shall be furnished with two pick holes. Watertight covers shall be used in easements and remote locations. Watertight frames and covers shall be anchored to the manhole.

190.03 Casings and Tunnels:

Pipe lines which must be bored or tunneled under a roadway, or other natural obstruction, shall be installed in a steel casing or tunnel. Pipe in casings and tunnels shall be constructed of a minimum of Class 350 ductile iron pipe with restrained joints. Prefabricated stainless steel pipe supports with non conductive skids or another acceptable support system will be provided to support the pipe. Pressure treated timber skids shall not be permitted. Install casings and tunnels on a slope so that they will drain. Casings will conform to the details provided in this manual. Provide complete design information for a utility tunnel in the project plans.



Where crossings are to be installed beneath a roadway, all operations and materials shall conform to the requirements of VDOT governing such crossings and the contractor shall obtain approval of all materials and methods to be employed before such work is started. A copy of such permission shall be filed with the Town and County prior to starting the work. The contractor will also be required to furnish a release from the proper authorities before final acceptance of the work by the Town and County. The contractor shall bear any expenses required by VDOT for inspection, permits, insurance, etc.

190.04 Anchors:

Sewer lines approved for slopes of 20 percent or greater shall be anchored securely with concrete anchors or other approved method. Structural and installation details of anchors shall be included in the project plans. Space anchors as shown on Table 190-1. Sewers with slopes greater than 14 percent will be constructed of ductile iron pipe.

TABLE 190-1

ANCHOR SPACING	
Percent Slope	Anchor Spacing (center to center)
20-35	36-ft.
35 – 50	24-ft.
Over 50	16-ft.

190.05 Sewer Service Connections:

The following standards shall apply to sewer service connections that are located within dedicated rights-of-way and easements. These service connections will be constructed of hub and spigot cast iron pipe (extra heavy conforming to ASTM A74), PVC sewer pipe conforming to ASTM 3034 (SDR 35) or schedule 40 PVC pipe conforming to ASTM 1785. Sewer service connections with a depth of cover of 18 feet or greater will be constructed of Class 350, ductile iron pipe to the property line. PVC SDR 35 joints shall be made with integral rubber ring wall with bonded-in-bell elastomeric seal. The schedule 40 PVC joints shall be made with a solvent weld bell and spigot joint using PVC pipe glue as supplied by the manufacturer. No solvent weld joints will be permitted within the state road right-of-way. No-hub pipe shall not be permitted.

190.06 Private Building Sewer Connections:

All building sewer connections outside of the state road right-of-way are regulated by the VUSBC.



200 DESIGN STANDARDS - LIFT STATIONS

200.01 General:

Consideration for allowing the construction of new sanitary sewer lift stations to serve new development shall only be made by the Town and County after all other options to serve the development by gravity sanitary sewer mains have been exhausted by the developer to the Town and County's satisfaction, and only possible option for such service is through the construction of a sanitary sewer lift station.

Sanitary sewer lift stations will be designed in conformance with the Commonwealth of Virginia Sewage Collection and Treatment Regulations. The developer shall submit plans and specifications for the lift station to the Town and County and shall be responsible for any modifications to the plans and specifications as required by the Town and the County. The developer shall obtain a Certificate to Construct (CTC) from Town and County prior to any construction activities. A copy of the CTC shall be provided to the Town and/or County as applicable. During construction, the Town and/or County shall conduct inspections of the project to ensure compliance with the approved plans and specifications. Upon completion of construction, the developer shall be responsible for scheduling the final inspection of the project with the Town and County. Upon approval from Town and County to operate the lift station, a Certificate to Operate (CTO) issued by the Town and County in the name of the Town of Culpeper or Culpeper County as appropriate. In addition, five copies of the Operations and Maintenance Manual approved by the Town and /or County, shall be provided, and certified pump curves. Also, a certificate of substantial completion with the approved plans and specifications, must be issued by the Town and/or County as applicable.

Upon issuance of the CTO, the developer shall deed the lift station and the property on which it is located over to the Town or County as applicable. Such deed shall include all necessary ingress/egress easements and shall be at no cost to the Town or County. At such time the deed is properly recorded, the Town or County will accept the lift station and will be responsible for its operation.

There shall be no cost to the Town or County with regard to design, construction, permitting or any other expenses related to the delivery of the fully constructed and operational lift station. The developer shall solely bare such costs up to and including deeding of the lift station (with necessary easements) to the Town or County.

200.02 Lift Stations:

Lift station sites shall be accessible by vehicle at all times. An all weather paved access road shall be provided for ingress and egress before conveyance to the Town or County and shall be a minimum of 15 feet in width. The minimum road section will consist of a compacted subgrade, 6 inches of compacted VDOT 21A stone, and 2 inches of compacted VDOT SM-2A bituminous concrete. The grade on the road will not exceed 10 percent.



Lift stations will be located above the level of the 100 year flood/wave action. The minimum lot size shall be 100 feet by 100 feet. The pumping station lot will be fenced and visually screened/landscaped. Lift station sites are to be fenced by a 6 foot high chain link fence, topped with 3 strands of barbed wire. The fenced area of the site shall be at least 70 feet by seventy 70 feet and shall be located in the center of the entire site. The fence shall have a double swing 16 foot wide gate that is lockable. Visual screening shall be provided between the fence and property line. Such screening shall consist of 1 row of evergreen trees planted 10 feet on center, and shall be a minimum distance of 10 feet from the fence. Such screening shall have a 1 year warranty by the developer.

Lift stations shall be of Smith and Loveless design unless approved by the Directors. The lift station will be designed for the peak flow from the drainage area. The peak flow for a lift station will be a minimum of 2.5 times the average daily flow unless otherwise directed by the Town or County. Pump curves, flow calculations and a drainage area map will be included in the project plans for lift stations. All lift stations will have at least two pumps. For stations with two pumps, each pump must be able to pump the design peak flow with the other pump out of service. For lift stations with more than two pumps, with any pump out of service, the remaining pumps must be able to pump the design peak flow. During the review process, the Town or County shall receive three copies of all project plans, specifications and engineering reports for the proposed lift station. The project plans will include all of the structural, electrical and mechanical design information and details necessary to construct the station. There are three types of sewage lift stations:

- **Temporary Lift Station:** A temporary lift station will be used to serve a single subdivision or commercial site. The station will be abandoned when gravity sewers reach the station. Temporary stations shall meet all of the design and construction criteria specified in this manual.
- **Interim Lift Station:** An interim lift station shall be designed to serve the portion of the sewer shed upstream of the station site. The station will be abandoned when the permanent lift station and associated interceptor sewers are constructed. Interim stations are subject to a special review process by the Town and County.
- **Permanent Lift Stations:** Permanent lift stations shall be designed and sited to serve the entire sewer shed service area. A permanent station may not be initially constructed with capacity for the entire sewer shed, but the major structures in the facility will be designed to accommodate the ultimate capacity of the station. Permanent stations are subject to a special review process by the Town and County.

The lift station wet well shall be either cast-in-place concrete or pre-cast concrete, and shall meet or exceed the minimum requirements of the Town and County. Access to the wet well shall be provided by a 30 inch by 30 inch aluminum hatch that is lockable. A stainless steel bar shall be provided inside the wet well for float switch control mounting. This bar shall be mounted to the inside top of the wet well using stainless steel hardware. The interior floor of the wet well shall



be sloped at an adequate grade to ensure all solids can be pumped from the wet well. The wet well shall include a ductile iron screened vent pipe.

The lift station building shall be either frame construction, with a full brick exterior and a pitched roof, or an aggregate pre-manufactured building approved by the Town and County. The Town and County shall determine the minimum acceptable dimensions of the building upon submittal of the draft plans and specifications. The floor of the building shall be concrete. The building shall have double swing metal doors with a minimum opening of 6 feet. The doors shall be located so as to be in line with the gated opening in the fence. The doors shall have a commercial grade lockset and shall be keyed as required by the Town or County. Six lockset keys shall be provided. The lift station building shall be located on the site in such a way as to be partially over the wet well, thereby providing suction line access to the wet well through the floor of the station. The floor penetrations to the wet well shall be sealed so as not to allow any gases from the wet well to enter the lift station building.

Ventilation of the lift station building shall be provided by the installation of an exhaust fan. The exhaust fan shall be wall-mounted and located on the opposite wall from a through-wall louvered intake. The exhaust fan shall be controlled by a switch that activates the exhaust fan upon opening of the exterior building door, as well as a wall switch that overrides the door switch when extended occupancy of the lift station building by personnel is required.

All electrical installation shall comply with all national, state and local building codes. The developer shall contract with the electric utility provider for service, and shall be responsible for any fees associated with providing power to the lift station. Upon the issuance of an occupancy permit, and conveyance by deed, the electric service shall be placed in the name of either the Town of Culpeper or Culpeper County as applicable. The developer shall obtain and install the appropriate meter base for the lift station. A minimum of 2 GFIC duplex outlets shall be provided inside the lift station building. All wiring from the main service panel to its termination point shall be in conduit. Separate heavy-duty 600 volt disconnect switches shall be provided to each pump motor.

A 600 volt manual transfer switch of adequate amperage rating shall be provided. The transfer switch shall have a manual throw switch handle capable of being locked in either the normal or standby power position, shall be mounted on the interior wall of the lift station building, and shall be rated NEMA 3R. A conduit shall be installed from the manual transfer switch to the outside of the building. An Appleton receptacle (#AJA20034200) shall be connected to the conduit at the outside of the building, and shall be housed in a NEMA 3R enclosure.

The lift station building shall be electrically heated so as to maintain a minimum temperature of 68 degrees F in the winter. The heater shall be controlled with an adjustable thermostat.

Interior lighting shall be provided through 2 ceiling-mounted LED light fixtures.



Exterior lighting shall be provided as follows:

- One LED light fixture mounted on the wall adjacent to one side of the exterior door. This fixture shall be controlled by a photocell.
- One LED light mounted on the exterior wall on which the Appleton receptacle is mounted. This fixture shall be controlled by a switch located inside the lift station building.
- One LED light on the exterior wall that faces the wet well. This fixture shall be controlled by a switch located inside the lift station building.

The lift station shall be new, manufactured by Smith & Loveless, Inc., and shall be the standard wet well mounted suction lift pump station (2 pumps). The lift station shall be constructed in one complete factory-built assembly.

200.03 Design Criteria:

All sewage lift stations will be designed in accordance with the following criteria:

- **Lift Stations and Pumping Units:** The manufacturer of the lift station shall guarantee for one year from the date of acceptance of the operational lift station that the structure and all equipment will be free from defects in design, material and workmanship. The manufacturer shall be solely responsible for the guarantee of the lift station and all components. In the event a component fails to perform as specified or is proven defective in service during the guarantee period, the manufacturer shall provide a replacement without cost to the Town or County.
 - **Protection Against Clogging:** All lift stations will have a vertical screen at the influent end of the station. The vertical screen will be sized for the estimated peak flow into the station. The vertical screen will be designed so as to be easily removable from the flow channel without disturbing any piping connections. Vertical screens shall be designed for continuous operation and will automatically restart after power failures. The screen shall also be equipped with a bypass mechanical bar screen and flow diverter so that the vertical screen can be taken out of service for repair and maintenance. The clear openings on the bar screen will not exceed 2.5 inches in any dimension.
 - **Pump Openings:** All pump openings and passages shall be large enough to permit the passage of a sphere 3 inches in diameter and any trash or stringy material which can pass through a 4-inch house collection system. All pumps will have cleanout ports.
- **Lighting:** Adequate LED lighting will be provided throughout the station. All lighting fixtures shall be rated for the environment in which they will be installed. All lighting located in a wet well shall be explosion proof, corrosion resistant and shall be



mounted with stainless steel hardware. All lighting located in a wet well shall be serviceable from the catwalk. All lighting located in a dry well shall be vapor proof, corrosion resistant, and shall be mounted with stainless steel hardware. All exterior photoelectric switches shall be intrinsic.

- Ventilation: Ventilation shall be provided for all lift stations during all periods when the station is manned. Where the pumps are below ground, mechanical ventilation is required and shall be arranged so as to independently ventilate all of the wells and/or vaults at the station. No damper shall be used on the exhaust or fresh air ducts, and there will not be any fine screens or other obstructions in the ducts that may cause clogging. The switches for the operation of the ventilation equipment shall be well marked and located above grade near the entrance hatches. The lighting and ventilation switches on all wet wells shall be interlocking. If three phase service is available the exhaust fans motors shall be three phase motors. Time clock switches will be provided to allow a programmed run time of the exhaust fans. There will be no interconnection between the ventilation systems in the wet well and dry well.
 - Wet Wells: Ventilation may be either continuous or intermittent. Ventilation, if continuous, shall provide at least 12 complete air changes per hour; if intermittent, at least 30 complete air changes per hour. All wet well electrical equipment and devices shall be explosion proof. Wet well ventilation fans and ducts shall be constructed of either stainless steel or fiberglass.
 - Dry Wells: Ventilation may be either continuous or intermittent. Ventilation, if continuous, shall provide at least 6 complete air changes per hour; if intermittent, at least 30 complete air changes per hour.
- Water Supply: Wherever possible, a 3/4 inch public water service line supplied by a 5/8 inch meter will be extended to the lift station for wash down and cleanup operations. A non-freeze yard hydrant will be installed at the station.
- Structures: Access hatches will be located in the station so as to facilitate the removal of the pumps, motors and other equipment in the station without disrupting the operation of the facility. All hatches will be aluminum with stainless steel hardware. All hatches will have locking hasps and automatic hold-open arms. A fixed or portable hoist suitable for removing the pumps, and other equipment will be provided at the station. If a portable hoist is provided, wall sockets will be installed at the pump well. The valve vault, and flow meter vault will have floor drains. The floor drain will have a "P" trap and will discharge into the wet well. The floor drain shall be installed with a check valve or flapper valve to prevent sewage from entering the structures if the wet well floods.
 - Wet Wells: The wet wells at major lift stations (1.0 mgd or larger) will be divided into two interconnected sections to facilitate repairs and cleaning. The



effective capacity of the wet well will be such that one pump will run continuously at least 5 minutes of every 30 minute period at the minimum flow. The wet well fillets shall have a minimum slope of one-to-one to the hopper bottom. The hopper bottom shall be no larger than necessary for the proper installation and function of the inlet.

- All wet wells shall have a lining system to prevent corrosion. The wet well size and control settings shall be designed to avoid heat buildup in the pump motor due to frequent starting and to avoid septic conditions due to excessive detention times. A visual gauge of the wet well level shall be provided.
- Generator and Control Building: The requirement for housing the stand by generator shall be reviewed and required by the Director(s) on a case-by-case basis. If required, the generator and control building for interim and permanent lift stations will be designed. The building shall be sized to accommodate all of the proposed equipment and to provide adequate space for personnel to operate and repair the equipment in the building with the access doors closed. A thermostatically controlled heater and exhaust fan sized for the building will be provided in the generator and control building. The exhaust fans shall be adequately sized to cool the heat generating equipment located in the building. The thermostats controlling all HVAC equipment shall be located in an easily accessible area. The fuel storage tank for the emergency generator shall be within the secure perimeter of the site and have the volume to contain sufficient fuel for 72 hours of continuous operation. Access to the fuel lines shall be locked. Prefabricated buildings shall be an "Easi-Set Building" as manufactured by the Smith-Midland Corporation or an acceptable substitute approved by the Town and County.
- Reliability: All lift stations will be reliability Class I. Electric power shall be provided to the station by distribution lines and by an emergency generator. Both power sources shall be sufficient to operate the pumps, critical lighting and ventilation systems during peak flow conditions.

The distribution lines and the generator shall have a means of being disconnected before the generator switch gear. The generator will automatically switch on-line in the event of a power failure. The generator switch gear will be fully automatic with the ability to sense a single phase power condition and switch to the generator power system with a minimum time delay. Both power sources shall be protected by fuses or breakers prior to the transfer switch. The transfer switch shall be capable of being operated manually.

- Lift Station Power System Design: The station's power supply shall be protected from lightning. A final stepdown transformer shall be provided on each electric feed line with adequate physical separation between them to prevent a common mode failure. Separate buses shall be provided for each power source. The electric transmission line and the emergency generator will remain separate and form separate distribution



substations up to the internal bus system transfer switch to preclude a common mode failure of both sources. Breaker settings or fuse ratings shall be coordinated to effect sequential tripping such that the breaker or fuse nearest the fault will clear the fault prior to activation of other breakers or fuses to the degree practical. All lighting transformers shall be pad mounted. The load distribution panel shall not be an internal part of the transformer.

- **Equipment Location:** All electrical switch gear, controls, and the emergency generator will be located in a building. Any equipment remotely located from the distribution panel shall have a lockable service disconnect on the line side. Adequate ventilation will be provided for the operation of the emergency generator. All louvers for the ventilation of the generator shall automatically open when the generator is operating and automatically close when the generator ceases operation. Fuel for the generator will be stored in a skid mounted tank. Skid mounted tanks shall be double-walled for leak containment and shall meet all DEQ and EPA regulations. The fuel tank will be sized to hold adequate fuel to run the generator for 72 hours. A fuel storage level indicator will be provided in the generator and control building. The generator will be equipped with a block coolant heater. The generator will be equipped with an alarm indicator to display the cause of a generator failure. The means for starting an emergency generator shall be completely independent of the normal electric power source. The starting system shall be sufficient to start the generator a minimum of three times without recharging. The starting system shall be alarmed and instrumented to indicate loss of readiness.

All motors and control enclosures will be adequately protected from moisture from the weather and water under pressure. Indoor motors will be of a splash resistant design.

All equipment shall be installed in accordance with the manufacturer's recommendations. When laying out the location of the equipment in the control and generator building the engineer will consider the necessary separation between devices to provide adequate ventilation, the location of door, hatches and panel covers to avoid conflicts between these items when they are opened and closed, and provisions for housekeeping pads to keep equipment off of the floor. Any equipment located outside of the generator and control building will be located in a moisture proof, NEMA 4x enclosure constructed of noncorrosive materials.

- **Equipment Type:**
 - The electrical equipment in the generator and control building, wet well, dry well and the valve vault will comply with the appropriate requirements of the National Electric Code. No aluminum bus bars, wire, connectors or lugs shall be allowed.



- Three phase motors and their starters will be protected from electric overload and short circuits on all three phases.
- All motors will have a low voltage protection device which will cause and maintain the interruption of power to the motor upon the reduction or failure of voltage.
- Temperature detectors shall be provided in the stators and bearings of larger motors 100 hp and larger to indicate overheating problems.
- All wires installed in underground conduits will have moisture resistant insulation as identified in the National Electric Code. All wiring installed in raceways shall be THHN stranded wire. Electrical cables shall be type SO with sunlight & ultraviolet protection. All 4 - 20 MADC signal cables shall have shielding properly terminated on one end of the cable run.
- Concrete, metals, control and operating equipment, and safety devices will be constructed of corrosion resistant materials.
- Electrical power devices or equipment used to convert single phase power to three-phase power will be dedicated to a single specific motor.
- All surface mounted electrical device boxes and small junction boxes subjected to moisture shall be Crouse Hinds cast device boxes constructed of noncorrosive materials. All boxes shall have mounting lugs. Drilling mounting holes in the back of the box shall be unacceptable. Gasketed covers with stainless steel screws be provided for all boxes. The covers will be from the same manufacturer as the boxes. All boxes will be mounted with stainless steel hardware. Moisture proof bell boxes are not acceptable.
- Any cable subjected to stress or strain shall be equipped with a stainless steel wire mesh strain relief fitting properly sized for the cable. All cables shall be routed and installed so as to be protected from stress, crush and abrasion hazards.
- Generators shall be manufactured by Kohler, Caterpillar or approved equal. The generator switch gear shall be provided by the same manufacturer as the generator. All electrical distribution equipment shall be manufactured by Cutler Hammer or approved equal. The motor starters shall be Citation Series. Electrical equipment shall be protected by a Solid State Advanced Control Phase Monitor, model RLM 911 (480 volt) or model RLM 611 (240 volt). Monitoring



device shall be provided to monitor over and under voltage and shut down generator if either condition occurs, prior to damaging equipment being provided power.

- All electrical enclosures located indoors, except in wet wells, and above grade shall be NEMA 4. All enclosures located below grade and outdoors shall be NEMA 4X. Electrical enclosures located in the wet well shall be explosion proof and corrosion resistant. All pulling devices and junction boxes in the wet well shall be PVC coated.
 - Wiring conduit shall be PVC conduit no smaller than 3/4 of an inch in diameter except for conduits located in the wet well. Conduits shall be sized to facilitate wiring for the ultimate design conditions. All conduit straps used in the wet well will be PVC coated. All other conduit straps shall be corrosion resistant. Fasteners used outdoors and below grade shall be stainless steel. Channels used to mount electrical equipment or conduits shall be aluminum or other material approved by the Town and County.
 - All foreign sources of electrical power entering a control cabinet or motor control cabinet shall be identified and a means of disconnecting the power shall be provided.
- Alarm Systems: All lift stations will be monitored by the Town and County's Supervisory Control and Data Acquisition (SCADA) systems. The SCADA systems will be installed by the Town and County. The cost of the SCADA system equipment and installation will be reimbursed to the Town and County by the developer. Dry, normally open contacts will be provided for all status and alarm circuits. This will include pump run/fail, generator run/fail, high wet well, AC power status, generator starting system loss of charge and pump overload. A description of SCADA status and alarm circuits is listed below. Both an audible and visual alarms will be provided at the lift station. A press-to-test circuit will be installed for all of the control and alarm panel indicator lights. High wet well, generator fail and power fail alarms shall function upon complete loss of power. All alarms shall clear after events return to normal (no latching alarms to SCADA).
 - Instructions and Equipment: One WORD and one PDF copy of the approved Operations and Maintenance Manual will be supplied to the Town and County prior to completion of the station. The Operations and Maintenance Manual will be reviewed and approved by the Department of Environmental Quality and the Town and County. The Operations and Maintenance Manual will contain a reduced set of the lift station plans, including as-built electrical and control schematics. All necessary tools and spare parts will be supplied with the station. In addition, copies of all equipment manuals and warranties will be provided.



- **Access and Security:** A 15 foot wide, paved access road within a 50 foot right-of-way will be provided to the lift station. The minimum road section will consist of a compacted subgrade, 6 inches of compacted VDOT 21A stone, and 2 inches of compacted VDOT SM-2A bituminous concrete. The grade on the road will not exceed 10 percent. Unrestricted ingress and egress will be granted to the Town and County from a public right-of-way to the lift station. On long access roads a locking gate will be provided at the entrance to the access road from the public right-of-way.

An unrestricted, all weather access road to the station will be maintained by the developer until the permanent access road is complete and accepted by the Town and County. The Town and County shall have access to the station at all times.

A 6 foot high, chain link security fence topped with 3 strands of barbed wire will be provided around the lift station lot. Access into the station will be through a double swing 16 foot wide, lockable gate. All door locks and padlocks in the station will be keyed to the Town and County's standard keys.

Adequate provisions will be made for parking and turning vehicles around at the station.

Visual screening shall be provided between the fence and the property line. Such screening shall consist of 1 row of evergreen trees planted 10 feet on center and shall be a minimum of 10 feet from the fence. Such screening shall have a 1 year warranty by the developer.

- **Spare Parts & Special Tools:** The Town and County shall be provided with sufficient spare parts for all major equipment. A specific spare parts list will be generated by the Town and County after the review of the equipment submittals for the lift station. Special tools may be required for a given station that uses special (non-standard) equipment. Special tools shall be specified during the review of the lift station plans by the Town and County.
- **Odor Control:** The engineer will evaluate the need for odor control measures for each lift station design on a case-by-case basis, subject to approval by the Director(s). The required odor control measures used at a station will be determined during the review of the plans for the station.
- **Sump Pumps:** In installations where sump pumps are required, the sump pumps shall have a minimum discharge rate of 40 gpm. Sump pumps shall be a Myers, Series WHRH pumps or an acceptable substitute approved by the Town and County.
- **Protective Coatings:** The project specifications will specify a paint or other protective coating for all corrodible materials not otherwise protected. The type, color and



thickness of the paint or other protective coating is subject to the approval of the Town and County.

200.04 Force Mains:

The minimum force main size will be 4-inches except for grinder pump systems. The flow velocity in the force main shall not be less than 2 fps nor more than 8 fps. Air release valves, conforming to the details shown in this manual, will be provided at the high points in the force main. Blow-off pits will be installed as directed by the Town and County at low points in the force main. Force mains will be adequately anchored within the lift station and throughout the line. The number of bends in the force main will be minimized. Restrained joints will be provided at all bends and other required locations. A resilient seat wedge valve shall be provided on the force main just outside of the flow meter vault.

The force main shall enter the receiving manhole at no more than 1 foot above the flow line of the manhole. The force main shall enter the receiving manhole with its centerline horizontal. The receiving manhole will have a lining system as specified in Section 180.09 of this Volume.

All force mains will be constructed of pressure type pipe with pressure type joints. All force mains will be constructed of ductile iron pipe unless otherwise approved by the Director(s). Class 52, ductile iron pipe will be used for force mains 12-inches in diameter and smaller. Force mains larger than 12-inches in diameter will be constructed of Class 51 ductile iron pipe. The interior coating of ductile iron pipes shall conform to the standards of this manual. All bends and fittings shall be pressure rated and will meet all applicable AWWA Standards. A No. 12 solid copper tracer wire or other locating system will be installed with all non-metallic force mains.

The force main will be tested at a minimum pressure of at least 50 percent above the design operating pressure for at least 30 minutes. Leakage will not exceed the criteria of AWWA Standard C-600.

Pipe bedding will conform to the standards of this manual or the pipe manufacturer's recommendations, whichever is more stringent.

210 SANITARY SEWER CONSTRUCTION

210.01 General:

Construction of sanitary sewers and appurtenances within the Town and County respective service areas shall be in accordance with plans and specifications approved by the Town and County. Prior to the construction of an approved sanitary sewer, the engineer shall place adequate line and grade stakes identifying the sewer, sanitary sewer cleanouts located at the property line and other appurtenances to insure the system can be constructed in accordance with the approved plans. The engineer shall then prepare legible cut sheets at 100 foot stations. Cut sheets will contain all data pertinent to the construction of the sewer main, the station and length of service connections, the location of all concrete encasements or cradles and the finished grade



of all manhole rims. Five sets of all cut sheets shall be submitted to the Town and County for review and approval.

If a deviation from the approved plans in the horizontal location or grade of any sewer, structure or appurtenance is necessary, a revision to the approved plans showing the proposed deviation must be submitted to the Town and County for review and approval before the changes are constructed.

210.02 Construction Standards:

Construction of sanitary sewers and appurtenances within the Town and County service areas shall conform to the Department of Environmental Quality, “Sewage Collection and Treatment Regulations”, and plans and specifications approved by the Town and/or County.

- **Handling of Materials:**
Load and unload pipe, fittings, valves, and accessories by lifting with hoists or skidding so as to avoid shock or damage. Under no circumstances shall such material be dropped. Handle pipe such that the coating and lining shall not be damaged. The Town and County have the authority to reject any and all materials found damaged.
- **Line and Grade Stakes:**
Prior to the construction of an approved sanitary sewer, the engineer shall place adequate line and grade stakes identifying the sewer main, sewer laterals, and other appurtenances to insure the system can be constructed in accordance with the approved plans.
- **Service Connections:**
Proposed service connections to in-line manholes must be approved by the company providing service.
- **Water Crossings:**
The water crossings shall be tested in place, and shall exhibit no infiltration or exfiltration. Pipes and joints shall be constructed so as to be protected against anticipated hydraulic and physical impact, longitudinal, vertical and horizontal loads and erosion impact. Construction methods and materials of construction shall be such that sewers shall remain watertight and free from change in alignment or grade.
- **Inspections:**
All sanitary sewers, including manholes, shall be inspected prior to acceptance testing, and any water leakage into the system sufficient to constitute any noticeable trickle or dribble shall be corrected and eliminated prior to undertaking the acceptance test.
- **Cut Sheets:**



- The engineer shall prepare legible cut sheets at 100-foot stations. Cut sheets will contain all data pertinent to the construction of the sewer main, the station and length of service connections, the location of all concrete encasements or cradles and the finished grade of all manhole rims.
- Five (5) sets of cut sheets, certified by a Professional Engineer or surveyor shall be submitted to the Town and County for review and approval. The engineer or surveyor who certifies the cut sheets shall also provide the following statement on all sets: “The professional seal and signature appearing on this document certifies that information shown conforms to the approved plan and/or actual field conditions.” If a deviation from the approved plans in the horizontal location or grade of any main, structure or appurtenance is necessary; a revision to the approved plans showing the proposed deviation must be submitted to the Town and County for review and approval before the changes are constructed.

210.03 Erosion and Sediment Control:

The Virginia Erosion and Sediment Control Handbook, this USM, and Code of the Town of Culpeper Chapter 7, land disturbing activities, shall be the accepted references in the preparation of grading plans and erosion and sediment control proposals and measures. The erosion and sediment control plan shall provide for two phase erosion and sediment measures. The first phase shall reflect the perimeter controls and any interior controls necessary to protect undisturbed land areas and shall reflect existing conditions including drainage divides. Existing drainage divides shall be the basis to determine the use of sediment traps versus sediment basins. The second phase shall reflect specific controls once the sewer pipes are installed.

Erosion and sediment control measure generalities:

- All applicable erosion and sediment control measures shall be installed prior to the beginning of construction.
- The contractor/developer shall provide all materials for required erosion and sediment control.
- No more than 500 feet of trench shall be open at any one time.
- Any disturbed area, not paved, sodded or built upon by November 15, is to be seeded on that date with oats, Abruzzi rye or equivalent and mulched with hay or straw.
- Synthetic filter fabric fencing shall be used for sediment control when the utility line or land disturbing activities are within 25 feet of a live creek or stream.
- No excavated material shall be placed in streambeds.



- The contractor/developer shall inspect all erosion and sediment control devices at the close of each work day and after each weather event. Make any necessary repairs or cleanup to maintain the effectiveness of the device immediately.
- The contractor/developer shall 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.
- Upon completion of construction work and after spoil and debris have been removed, the contractor/developer shall re-grade any areas disturbed by operations.
- No disturbed area shall remain denuded for more than 30 calendar days after the completion of utility installation. Those areas which were used for access to or from the actual construction site may remain in a denuded form if erosion control is properly provided. There shall be no erosion runoff traversing across or out of the existing easement provided to the contractor/developer.
- All disturbed areas, not in the streets and not used for access to or from the continuing job, are to be permanently seeded and mulched within 15 days of reaching final grade between March 15 and October 15. Those areas which are used for access during construction shall be permanently seeded and mulched within 30 calendar days of completion of the job or within 15 days after the use of the access area is no longer required. When final grades are reached between October 16 and March 14, disturbed areas shall be temporarily mulched as outlined previously. Permanent seeding and mulching shall then occur during the proper season.

Mulching:

If permanent stabilization of a disturbed area cannot be completed for any reason, the contractor/developer shall apply mulch asphalt emulsion, jute matting or similar materials for temporary protection. Areas brought to final grade during an off-season shall be mulched immediately and overseeded during the proper season with permanent grass land legume species. The mulch shall be properly anchored to prevent dislodging.

Temporary Sediment Barriers:

- The contractor/developer shall provide silt fence barriers across or at the toe of slopes to intercept and detain sediment. The location of all silt fences shall be shown on the construction plans.
- The contractor/developer shall place securely tied down hay or straw bales, having a dry weight of not less than 50 pounds, in a single row, lengthwise in ditch lines as shown on the construction plans.



- The contractor/developer shall securely anchor bales in place using Number 3 steel reinforcing bars, steel pickets or 2-inch by 2-inch wooden stakes driven 1.5 feet into the ground and extending 4-inches above the bale. Wire ties running lengthwise between anchors to secure bales shall be used.

Removal:

The contractor/developer shall remove all temporary erosion and sediment control devices after the work has been completed and restore the site as required by the Town and County.

210.04 Excavation:

Excavation shall conform to the lines and grades shown on the approved project plans and cut sheets. The slope of the sides of the excavation shall be kept as nearly vertical as possible consistent with the types of materials encountered. Where required to maintain safe working conditions, trench walls will be sloped or benched. Maintain a clear area a sufficient distance back from the top edge of the excavation to avoid overloading which may cause slides, cave-ins or shifting of the pipe. The contractor shall provide sheeting, bracing and shoring necessary to perform the work, and protect existing structures and excavations in accordance with the Virginia OSHA Regulations. The width of the trench from the foundation to 12 inches above the pipe shall not exceed the maximum width as shown in Table 210-1.

**TABLE 210-1
MAXIMUM TRENCH WIDTH**

Nominal Pipe Diameter (in.)	8	10	12	14	15	16	18	20	21
Max Trench Width (in.)	42	42	42	42	42	42	44	44	48
Nominal Pipe Diameter (in.)	24	27	30	33	36	42	48	54	
Max Trench Width (in.)	51	55	60	63	69	78	87	96	

The bottom of the trench shall be accurately graded to provide a uniform bearing and support for each section of pipe on undisturbed soil along the entire length of the pipe, except where it is necessary to excavate for bell holes and for the proper sealing of pipe, except where it is necessary to excavate for bell holes and for the proper sealing of pipe joints. Bell holes and depressions for joints shall be only of such length, depth, and width as required to make a proper joint. Bell holes and depressions for joints shall be backfilled with granular material and compacted. Do not carry excavation below the established grades unless unsuitable materials incapable of supporting the pipe are encountered. Wherever the soils encountered at the trench bottom are incapable of adequately supporting the pipe, the trench shall be over excavated until a stable foundation is reached. Fill the over excavation with a granular material having a maximum particle size of 1-inch, place in 6 inch lifts and compact until the trench bottom is brought to grade.



Remove and properly dispose of all water entering the trench excavation. Dewatering equipment shall be sized to maintain the trench in a satisfactory condition for pipe laying. Pipe laying will be permitted only where the depth of water is maintained below the invert of the pipe joint. Dispose of water in a suitable manner without damage to adjacent property or in a manner protective of public health and convenience.

Do not open more than 150 feet of trench in advance of completed pipe laying. Excavation at manholes and similar structures shall be sufficient to have a minimum of 12 inches of clear area between their outer surface and the embankment or sheeting.

210.05 Blasting:

Blasting, where required shall be done with great care and in accordance with all applicable Federal, State and local laws, ordinances, and regulations. The contractor/developer shall be responsible for obtaining all required permits and bonds prior to blasting. Permits must be on site and available for review upon request by the Town and County. Any damages to foundations, structures, facilities, pipelines, utility conduits or any other damages attributed to the use of explosives shall be corrected at the contractor/developer's expense. The contractor/developer shall provide the owners of adjacent buildings, structures and properties, in writing, a description of the blasting and seismic operations, prior to blasting.

When explosives are used, work shall be executed by persons who are properly licensed to use explosives. Each blast shall be covered with rubber tire or steel mats. Blasting is not permitted within 24 feet of utilities, facilities or structures. Blasting closer than 24 feet must be pre-approved by the Town and County providing the project engineer can demonstrate that the safety or soundness of existing facilities are not in any manner endangered. Blasting shall not occur within 300 feet of any radio transmitter or radio frequency emission equipment. The magazine keeper shall maintain accurate records and inventory for all explosives, detonators and equipment from time of delivery, until used or removed from the site. The contractor/developer shall provide the required security for the site.

210.06 Backfill:

Backfill in areas subject to vehicular traffic or structural loading shall begin at the top of the granular bedding and placed in lifts no greater than 8 inches thick. Compact each lift to 95 percent of the maximum dry density as determined by ASTM D698, AASHTO T99 or VTM-1. Backfill material shall be free of organic materials, frozen clods, highly plastic silts or clays and other unsuitable materials. Rock pieces larger than 1 inch in any dimension shall not be used in the backfill which is within 2 feet of the pipe. Stone or rock larger than 5 inches in any dimension shall not be used in the backfill for sewers or structures.

Backfill in areas not subject to vehicular traffic shall be compacted to 90 percent of the maximum dry density as determined by ASTM 0698, AASHTO T99 or VTM-1. Backfill within existing or proposed rights-of-way that will be accepted into the VDOT system shall be



accomplished in full conformance with all applicable VDOT standards. Dispose of surplus materials in approved areas.

210.07 Pipe Installation:

All sanitary sewer systems under construction shall be plugged as directed by the Town and County on the downstream end until placed in service. No inflatable plugs shall be used for this purpose. Pipe and fittings shall be carefully handled with slings or other devices to prevent damage to protective coatings or joints. Lifting equipment shall be satisfactorily rated to handle the pipe sizes used. Each section of pipe shall be thoroughly inspected for defects before being lowered into the trench. Lay pipe true to line and grade with bells upstream and joint such that the completed pipe will have a smooth invert. Shape bedding to the curvature of both the bell and barrel of the pipe. Keep trench free of water while the work is in progress. Brush the ends of the pipe so that proper joints can be made. As the work progresses, the interior of the pipe shall be cleared of dirt, cement, or other superfluous material. Close the exposed end of pipe and fittings to prevent earth, water or other substances from entering the pipe. During freezing or inclement conditions trench shall be completely backfilled at the end of the day.

210.08 Service Connections:

Extra heavy cast iron soil pipe, SDR 35, and schedule 40 PVC pipe connections to sewers shall be made by means of a commercially manufactured tee, wye branch or approved saddle.

Four-inch sewer clean outs shall be installed at the property line or edge of right-of-way for all service lines. All clean-outs shall have brass caps.

Clean-outs to be installed within areas of possible traffic loading shall have a cast iron (C.I.) sanitary tee, C.I. riser and brass cap.

Saddles used for making the sewer service connection to sewers shall be of the strap-on type with an O-Ring seal and stainless steel strap. Saddles shall be specifically designed to adapt to the type of pipe used.

Secure the saddle to pipe with a 24 gauge by 2.5 inch wide stainless steel strap and silicon bronze or stainless steel T-bolts and nuts. When a saddle is installed on an existing line, it shall be subjected to a 10 foot hydrostatic head (4.3 psi) prior to cutting sewers with a tapping machine.

Sewer service connections shall be plugged with a pipe stopper manufactured for such service. The stopper shall be capable of sustaining, without failure or leakage, an internal pressure head of 10 feet (4.3 psi).

Private Service Connections: Building sewer connections from the property line to the building, except when within a dedicated easement, shall be installed in accordance with VUSBC.



210.09 Manholes:

Sanitary sewer manholes shall consist of precast reinforced concrete sections, an eccentric conical section, and an expanded base section that conform to the details shown in this manual. Manholes shall conform to ASTM-C478 standard. The precast base section shall be installed on a compacted granular foundation prepared similarly to that required for the proper installation of the sanitary sewer.

Manholes shall have lifting lugs or keyways. No lifting holes through the manhole wall are permitted. Joints shall be formed entirely of concrete employing a round rubber gasket, and when assembled, shall be self-centering and make a uniform watertight joint. In addition to the O-Ring gasket, a cold applied joint sealer may also be used to assist in sealing the joint from either internal or external hydrostatic pressure. Other joint systems acceptable to the Town and County may be used. The joint design shall meet the requirements of ASTM C443 and the gaskets shall meet ASTM C-361. No mortar joints will be permitted. The exterior of all precast manhole sections shall have a waterproof coating.

The invert channels of the manhole shall be smooth and semi-circular in shape, conforming to the inside of the adjacent sewer section. Changes in direction of flow shall be made with a smooth curve of as large a radius as the size of the manhole will permit. Changes in the size and grade of the channels shall be made gradually. The invert channels shall be brought to grade and formed with brick and mortar. The bench of the manhole outside of the channels shall be an even float finish and shall slope toward the channels with a minimum slope of one-quarter (0.25) of an inch per foot of run. The invert channel depth will be at least 0.8 times the diameter of the pipe for lines 8 to 12 inches in diameter. The minimum difference in the elevation of the inverts of incoming and outgoing pipes shall be 0.2 feet.

Standard manhole drop connections shall be installed where indicated on the project plans. Drop connections shall conform to the details shown in this manual. The drop pipe and fitting shall be the same type and specification as the sanitary sewer. Encase exterior drop connections entirely with Class A3 concrete. All manholes with an inside drop will have a minimum inside diameter of 5 feet.

Manholes shall be constructed with manhole frames, covers and steps. Adjusting rings may be used to bring the top of the manhole to the final grade when this cannot be accomplished with standard precast sections, upon approval of the Director(s). Adjusting rings shall not be permitted to adjust the grade more than 12 inches. Adjustments larger than 12 inches will be made with the riser sections. Manholes shall have an internal or external manhole chimney seal between the manhole frame, adjusting rings and cone section. The frames and covers shall be of the type and duty shown on the project plans.



210.10 Pipe Connections at Manholes:

Manholes shall be supplied with an approved, flexible pipe connection suitable for the pipes and manholes specified. Flexible gaskets for pipe connections to manholes shall be made with a flexible rubber manhole sleeve with a flanged waterstop cast into the manhole base by the manufacturer or other flexible connectors acceptable to the Town and County. Flexible gasket for pipe connections shall meet the requirements of ASTM C-923. The sleeve shall be secured to the pipe by means of a stainless steel clamp.

Precast manholes shall be manufactured for the specified number and proper location of connections required. Manholes with extra connections or openings which must be bricked up, or otherwise changed in configuration, are not acceptable. Connections to existing manholes, when approved by the Town and County, shall be made by coring the manhole and installing a rubber boot.

210.11 Acceptance Tests:

Sewers will be inspected to determine if any deviation from line and grade has occurred. Sanitary sewer mains will be inspected by Closed Circuit Television camera (CCTV) or the pipe alignment will be checked by illuminating the interior of the pipe. The inspection will be performed by the Town and/or County Field Inspector(s). Any deficiencies, such as: Sags (bellies) in the pipe, rolled joints, leaks, damaged pipe or out of round pipe shall be corrected before acceptance by the Town and County.

An acceptance test is required for all sanitary sewer mains and manholes. The preferred method of testing for mains is air and vacuum testing for manholes. When testing with air, test methods and acceptability criteria shall be in accordance with ASTM-F1417. Vacuum testing methods and acceptability criteria shall be in accordance with ASTM-C1244; with the exception that vacuum testing shall be done after backfill has been placed around structure.

An acceptance test shall be specified for all sanitary sewer mains and manholes. The test may be either a water test or air test. Where water testing is specified (exfiltration), the leakage outward shall not exceed 50 gallons per inch of nominal pipe diameter per mile per day (2400 gpd/mi maximum) for any section of the system including manholes. Where the exfiltration test is employed, a minimum of 4 feet of head at any point in the line and a maximum head of not more than 10 feet shall be used. Where air testing is specified, test methods and acceptability criteria shall be in accordance with ASTM F 1417. Air testing of sewer lines shall generally be acceptable for all types of pipe materials.

If air testing is employed, manholes shall be tested by exfiltration or vacuum test. Use inflatable stoppers to plug all lines into and out of the manhole being tested. The stoppers shall be positioned in the lines far enough from the manhole to insure testing to those portions of the lines not air tested. The manhole shall then be filled to the top with water. A 24 hour soak shall be allowed. Leakage shall not exceed 0.25 gallon per hour for a four hour test period.



The contractors shall furnish weirs, standpipes, pipe plugs, water, pressure gauges, stop watches, air compressor, hose and such materials and assistance as required to perform these tests. All acceptance tests shall be conducted by the contractor in the presence of the Town and/or County. Acceptance tests shall not be made until the sanitary sewer, manholes and required sewer service connections, as shown on the approved project plans, have been installed; sewer trenches backfilled and compacted to finished sub-grade.

Sanitary sewer lines, structures, facilities or appurtenances not meeting the requirements of these standards shall be replaced or repaired in a manner approved by the Town and County. Defective materials, pipe or fittings shall be completely removed and replaced with new materials. Evidence of excessive leakage, unsatisfactory alignment or poor workmanship shall be justification for the Town and County to require complete removal of the entire line between manholes and reconstruction in accordance with the plans and specifications and the standards of this manual.

Whenever it has been necessary to construct underdrains or place gravel under pipelines in order to dewater the trench during construction of the sewers, the acceptance test will not be made until pumps (which have been used in the dewatering process) have been disconnected.

Schedule all acceptance tests with the Town and/or County at least 48 hours in advance. Each section of completed sewer shall be tested. Generally, sewers will be tested from manhole to manhole. The test procedure shall be conducted in the following manner:

1. Low Pressure Air Testing Procedure:
 - a. Equipment:
 - (1) Plugs: Use either mechanical or pneumatic plugs designed to resist internal test pressures without the aid of external bracing or blocking. If pneumatic plugs are used, provide separate, dedicated hoses to inflate from the aboveground control panel.
 - (2) Controls: Employ aboveground air control equipment that includes a shut-off valve, pressure regulating valve, pressure relief valve, input pressure gauge and a continuous monitoring pressure gauge with a range of 0 to 10 psi. Using monitoring gauge with a face diameter of 4-inches, minimum divisions of 0.10 psi and an accuracy of 0.25 percent of full scale. Conduct all air used through the aboveground control equipment.
 - (3) Supply and pressure hoses: Use separate hoses to 1) introduce low-pressure air into the test sections and 2) for continuous monitoring of pressure build-up in the test section.
 - b. Safety: Notwithstanding the testing of plugs described in Paragraph 4, brace every test plug against the manhole wall to further insure no movement during the



test. Do not pressurize test sections above 9 psi except for leak location equipment where the plugs are securely tied together. Allow no one into a manhole adjoining a line being tested until test pressures have been totally relieved.

- c. Line Preparation: Make certain all service laterals, stubs and fittings in the test section have been properly capped or plugged to eliminate any air loss that could produce erroneous test results. Restrain all closures to prevent a blow-off during testing.

Wet the interior surfaces of porous pipe materials to reduce air loss during testing.

- d. Installation of Test Plugs: Seal test the plugs before installation in the pipeline by installing them in the ends of a section of the pipe above-ground and pressurizing the section to 9 psi. No one is allowed along the alignment of the pipe during this procedure until the test pressure has been totally relieved. Plugs shall hold against this pressure without bracing and without any movement out of the pipe.

When placing plug in pipe, inspect visually to determine any possible shear failure at the interface with the manhole wall which may be covered by the plug and not revealed by the air test. Repair any defects so discovered before proceeding.

- e. Line Pressurization: Introduce air into the sealed line until the internal pressure is 4 psi greater than the average back pressure of any groundwater above the pipe, as determined in Section i, Determining Groundwater Impact, but not greater than 9 psi. If no groundwater is present, raise internal pressure to 4.0 psi. Maintain this pressure for a period of at least five minutes, by adjusting the air supply as necessary, to permit air temperature to reach interior ambient temperature.
- f. Timing Pressure Drop: After temperatures have equalized and pressure in the pipe has stabilized, shut off or disconnect the air supply hose and observe the continuous monitoring gauge for a period of ten minutes or until the pressure decreases 0.5 psi, whichever occurs first. At that point, begin timing the test with a quality stopwatch. Continue timing until the pressure has dropped another 0.5 psi, whichever occurs first. At that point, begin timing the test with a quality stopwatch. Continue timing until the pressure has dropped another 0.5 psi or until the time shown on the drawings for the section undergoing the test has elapsed, whichever is the lesser. If test times are not shown on the drawings, extract or calculate correct test times from data contained in Table 210-2, herein. The test may be discontinued only after the prescribed time has elapsed if the 0.5 psi drop has not occurred.
- g. Criteria for Acceptance: If the time shown or calculated according to Table 210-2, herein, for the designated pipe size and length elapses before the air pressure



drops 0.5 psi, the section undergoing the test shall have passed and shall be presumed to be free from defects.

- h. **Criteria for Failure:** If the pressure drops 0.5 psi before the time shown or calculated according to Table 210-2 for the designated pipe size and length has elapsed, the air loss rate shall be considered excessive and the section of pipe has failed the test.

- i. Determining Groundwater Impact:
 - (1) General: This paragraph shall apply only where groundwater is known to exist or is anticipated above the sewer line to be tested. Every manhole need not have a groundwater test pipe installed. The engineer will assist the contractor/developer in selecting key manholes sufficient to establish a groundwater profile for the test area.
 - (2) Groundwater test pipe installation: During the manhole installation, install an 8-inch diameter PVC pipe in the vertical position adjacent to the manhole that extends from the base of the manhole structure to a point approximately 2 feet above finished grade. Once all testing is completed, the contractor/developer will remove the pipe or abandon in place as directed by the Town and/or County(s) field inspector.
 - (3) Establish Groundwater Profile: Immediately before air testing, determine the groundwater level. Measure the difference between the water level in the pipe and the invert of the sewer pipe to be tested in feet. If a test pipe is not adjacent to the section of line to be tested, groundwater height may be estimated based on available information from nearest known test point on the project.
 - (4) Determine Groundwater Back Pressure: Divide the average height of groundwater over the pipe by 2.31. Use the result to increase the test pressure prescribed in Paragraph e, Line Pressurization of this section.

- j. Effect of Connected Laterals: Since the volume of the laterals is normally insignificant when compared to the volume of the main, neglect the lengths of connected laterals when determining the length of pipeline to be tested. If any sections have a total length less than the maximum length for minimum time shown in Table 210-2, Column 4, fails when tested the engineer will re-compute the test time to take into account the additional length of pipe in the laterals. If the test time determined by this calculation is short enough to allow the section to pass, then the section shall be presumed to be free of defects and comply with this section. No such calculation will be made for sections longer than the maximums referred to in Table 210-2.



$$\text{Feet of Pipe} \times A = \text{Seconds for Test}$$

TABLE 210-2

Minimum Specified Time Required
 For a 0.5 psi Pressure Drop
 For
 Size and Length of Pipe Indicated

A

Nominal Pipe Diameter (inches)	Minimum Time		Maximum Length for Minimum Time (feet)	Additional Time For Longer Lengths (seconds per foot)
	Minutes	seconds		
4	1	53	597	0.19
6	2	50	398	0.43
8	3	47	298	0.76
10	4	43	239	1.19
12	5	40	199	1.71
14	6	37	171	2.33
15	7	5	159	2.67
16	7	33	149	3.04
18	8	30	133	3.85
20	9	27	119	4.75
21	9	55	114	5.24
24	11	20	99	6.84
27	12	45	88	8.65
30	14	10	80	10.69
33	15	35	72	12.93
36	17	0	66	15.39
42	19	50	57	20.94
48	22	40	50	27.35

2. Exfiltration Testing:

- a. Service laterals, stub and fittings into sewer lines being tested should be properly capped or plugged, and carefully braced to resist the thrust actions developed by the internal water pressure. In preparing the blocking of plugs or end caps, recognize that the 5 to 10 feet of head in the standpipe will exert considerable thrusts against the plugs or caps. For example, a 10 foot head will generate a total force of 215 pounds against an 8-inch plug. Further considerations must be given

Water & Sewer Utility Standards Manual



to the fact that greater pressures will be developed in the downstream portion of the line, due to lower elevations, than in the upper reaches of the sewer line.

- b. Insert a tapped, plumber's type plug and tighten in the inlet pipe of the downstream manhole to which the water supply connection is made for filling the pipe.
- c. Insert and securely tighten a tapped plumber's type plug in the inlet pipe of the upper manhole for connection to the standpipe. The standpipe is then placed in this manhole and connected to the tapped plug. The standpipe must be capable of handling from 5 to 10 feet of water head to determine the tightness and soundness of the sewer line.
- d. Introduce water into the line at the downstream (lower) manhole until the standpipe in the upstream manhole has been completely filled. By filling the line from the lowest level, the air in the line is easily pushed ahead, and finally expelled through the standpipe at the upper end of the test section. Care should be taken to minimize entrapped air which will give distorted test results. The rate of drop in the standpipe may be quite rapid until the air has been expelled.
- e. After filling with water, allow the line to stand for at least several hours before beginning the test. During this time, some water absorption into the manhole structures will take place. After the water absorption has been stabilized, the water level in the standpipe is checked and water added, if necessary.
- f. The test is now ready to begin. The drop in the standpipe is measured and recorded over a 10 minute period. To verify the first results, a second 10 minute test is required. This will also verify whether a stable condition exists in the line.
- g. Convert the measured drops in the standpipe to leakage in terms of gallons per inch, diameter per mile, per day. (Caution should be taken about conducting exfiltration tests on sewer lines laid on steep grades.)

Consideration must be given to the downstream portion of the system to prevent excessive pressures in these lower lines). For these installations and where the upstream manholes are very deep, it is not advisable to fill the standpipe or manhole to the top when performing the test.

- h. Sewers and house connections that fail to pass this test, shall be replaced by the contractor/developer. A single clamp shall be allowed between manholes to facilitate the replacement of defective materials or workmanship.



3. Manhole Vacuum Testing:

a. Equipment:

(1) Plugs: Use either mechanical or pneumatic plugs capable of resisting test pressures without bracing.

(2) Vacuum Tester: Use vacuum tester as manufactured by P. A. Glazing or acceptable substitute. The tester shall be capable of testing the manhole from the rim of the cover frame to the invert.

b. Safety: Brace every test plug against the manhole wall to insure no movement during the test. Do not draw greater than 10-inch Hg vacuum on the manhole. Allow no one into a manhole under vacuum.

c. Manhole Preparation: Make certain all manhole boots, stubouts, and pipe plugs are secured to prevent movement while vacuum is drawn.

d. Installation of Test Device: Install the vacuum tester according to requirements of tester manufacturer. Install the tester so that the manhole is tested from the rim of the cover frame to the invert.

e. Drawing Vacuum on Manhole: Draw 10 inch Hg vacuum on manhole following tester manufacturer's procedures.

f. Timing Pressure Drop: When 10 inch Hg vacuum has been drawn, isolate and stop vacuum pump. Record time for vacuum to drop to 9 inch Hg.

g. Criteria for Acceptance: If the time shown in Table 210-3, herein, for the designated manhole diameter and height elapses before the vacuum drops 1.0 inch Hg, the manhole undergoing test shall have passed and shall be presumed to be free from defects. For testing purposes, the diameter of the manhole is the diameter of the base section, regardless of reducers.

h. Criteria for Failure: If the vacuum drops 1.0 inch Hg before the time shown in Table 210-3 for the designated manhole diameter and height has elapsed, leakage shall be considered excessive and the manhole has failed the test.



TABLE 210-3

Minimum Specified Time Required
For a 1.0 inch Hg Vacuum Drop
For
Height and Diameter of Manholes shown

Manhole Height, rim to invert (feet)	Times to drop 1 inch Hg, in seconds		
	4 feet diameter	5 feet diameter	6 feet diameter
10 feet or less	60	75	90
>10' but \leq 15'	75	90	105
>15' but \leq 25'	90	105	120
> 25 feet	105	120	135

210.12 Force Main Testing:

Sewer force main testing shall be in accordance with water main leakage tests.

220 ON-SITE SEWAGE DISPOSAL SYSTEMS

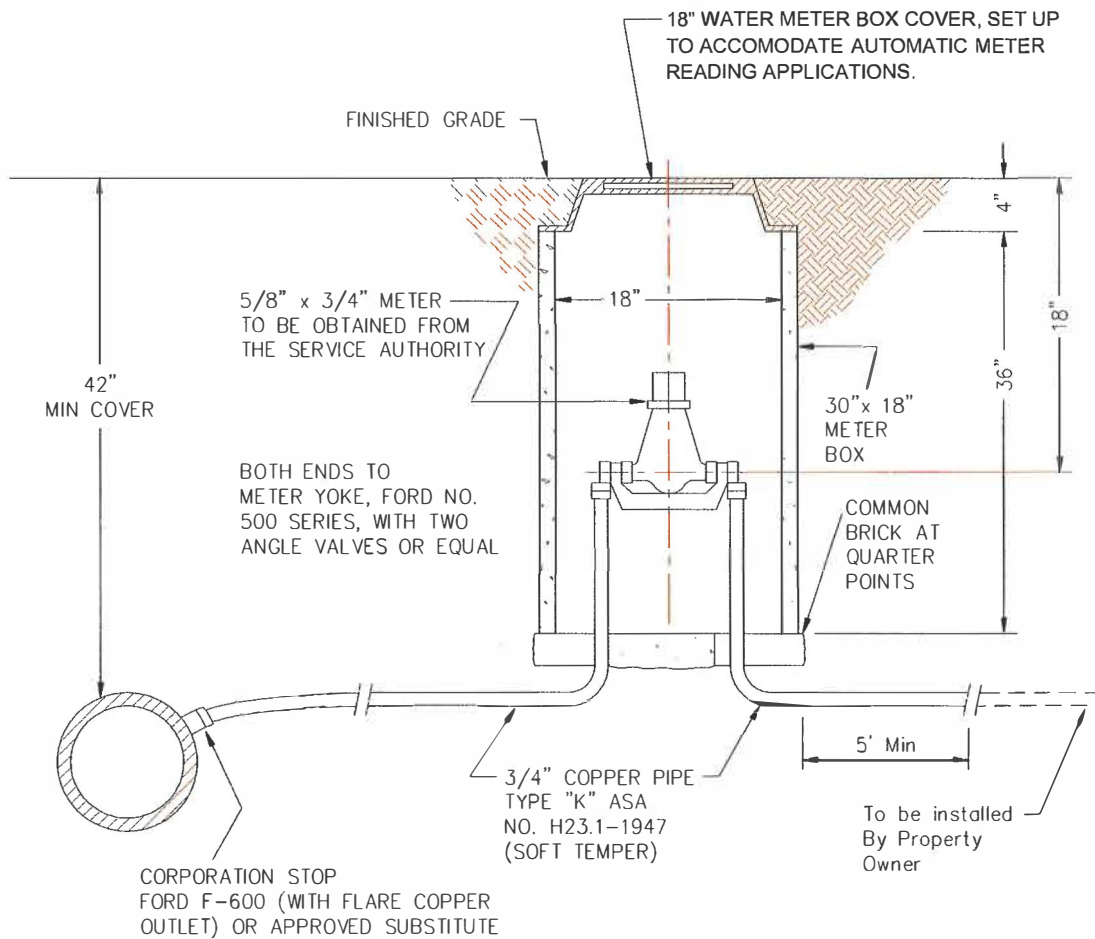
220.01 Applicability:

Developments located in rural areas of Culpeper County, as designated as Service Areas, by the Master Water and Sewer Plan shall be prohibited from having on-site sewage disposal systems. However, on-site disposal systems are allowed to serve individual lots in the development area where a public sewer system cannot be made available. The County shall make the decision whether or not public sewer system can be made available.



Water Distribution System Details & Sewage Collection System Details





NOTES:

1. ALL WATER METERS SHALL REGISTER IN GALLONS.
2. 36" OF COVER SHALL BE REQUIRED ON COPPER SERVICE FROM DISTRIBUTION MAIN TO METER BOX.
3. METER BOX SHALL BE ONE PIECE CONSTRUCTION OF CONCRETE, PVC OR RIGID FIBERGLASS (NOT ORANGEBURG).
4. METER YOKE SHALL INCLUDE TWO 3/4" FORD ANGLE VALVES. ALL FITTINGS SHALL BE FLARED. SOLDERED FITTINGS WILL NOT BE PERMITTED.
5. SERVICE LINE LEAVING METER BOX SHALL BE STUBBED OUT AT LEAST 5' WITH TYPE "K" COPPER.

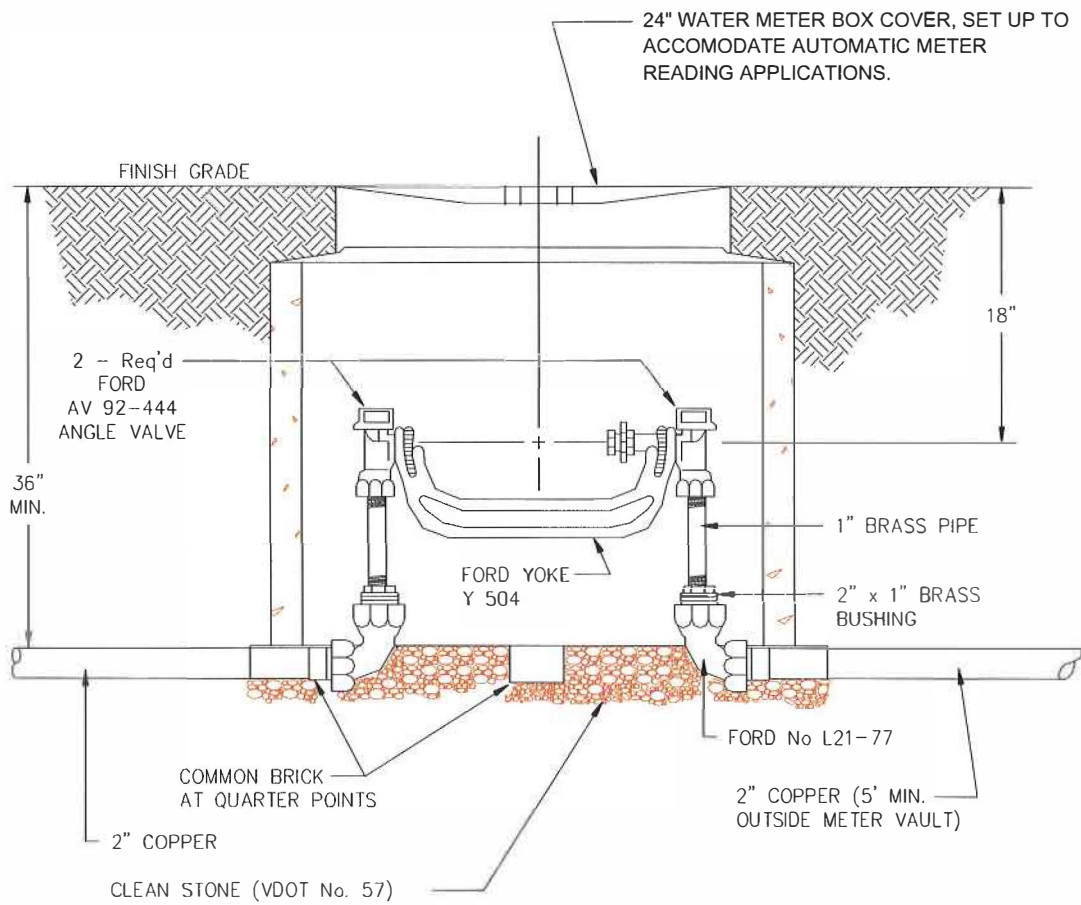
Special Note:

The service line between the main and the meter will be one continuous piece of pipe. (No joints will be permitted)

1

**Town of Culpeper &
Culpeper County**

WATER DISTRIBUTION SYSTEM
5/8" X 3/4" METER



NOTES:

1. ONE PIECE BOX 24" x 30" (1" METER) MUST BE USED.
2. INSTALLER MAY SUBSTITUTE TYPE "K" SOFT COPPER FOR BRASS SHOWN, PROVIDED APPROPRIATE FITTINGS AND VALVES ARE USED.
3. METER BOX MATERIAL: CONCRETE, PVC, OR RIGID FRP.

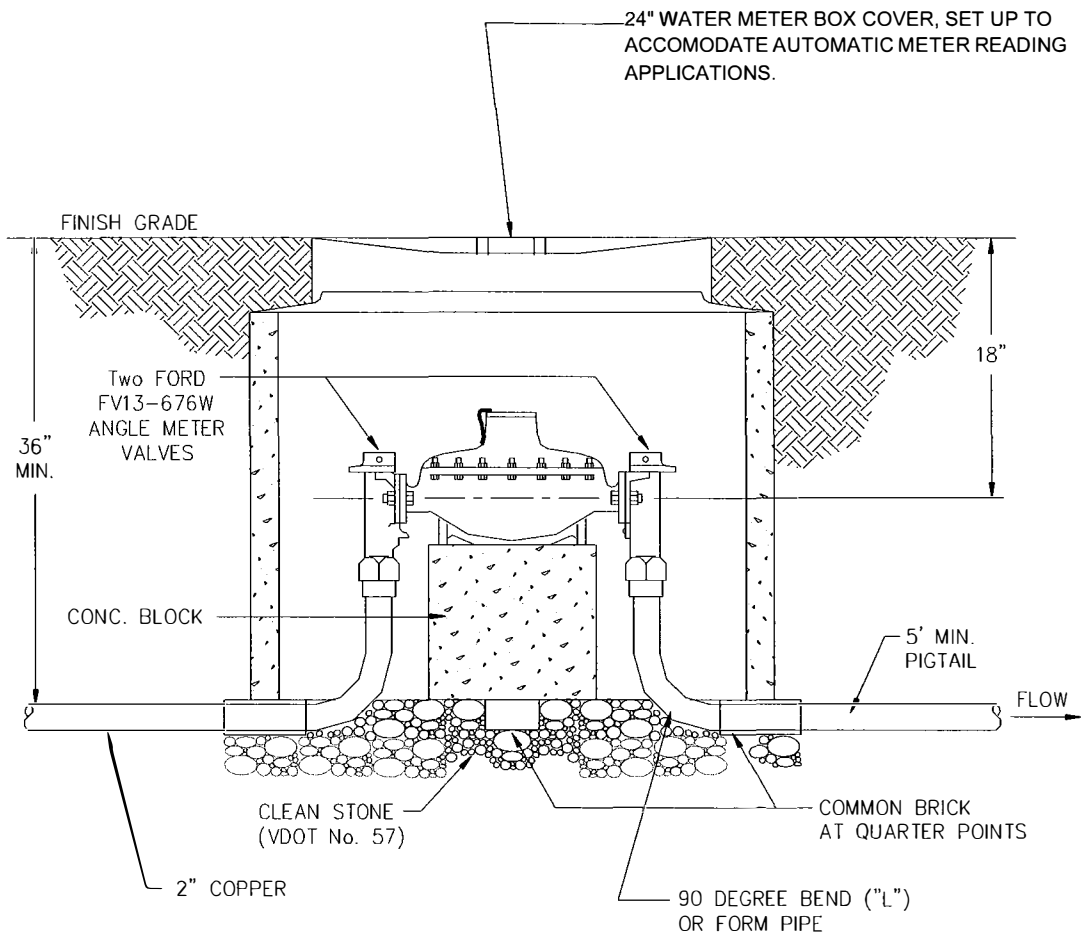
Special Note:

The service line between the main and the meter will be one continuous piece of pipe. (No joints will be permitted)

2

**Town of Culpeper &
Culpeper County**

WATER DISTRIBUTION SYSTEM
1" METER IN 2" COPPER TUBE SERVICE



NOTES:

1. 36" x 30" ONE PIECE BOX MUST BE USED.
2. COPPER SERVICE LINE SHALL BE TYPE "K" A.S.A. No H 23.1 1947. (SOFT TEMPER)
3. LINE LEAVING BOX SHALL BE TYPE "K" COPPER AT LEAST 5' PAST BOX
4. METER BOX MATERIAL: CONCRETE, PVC, OR RIGID FRP.

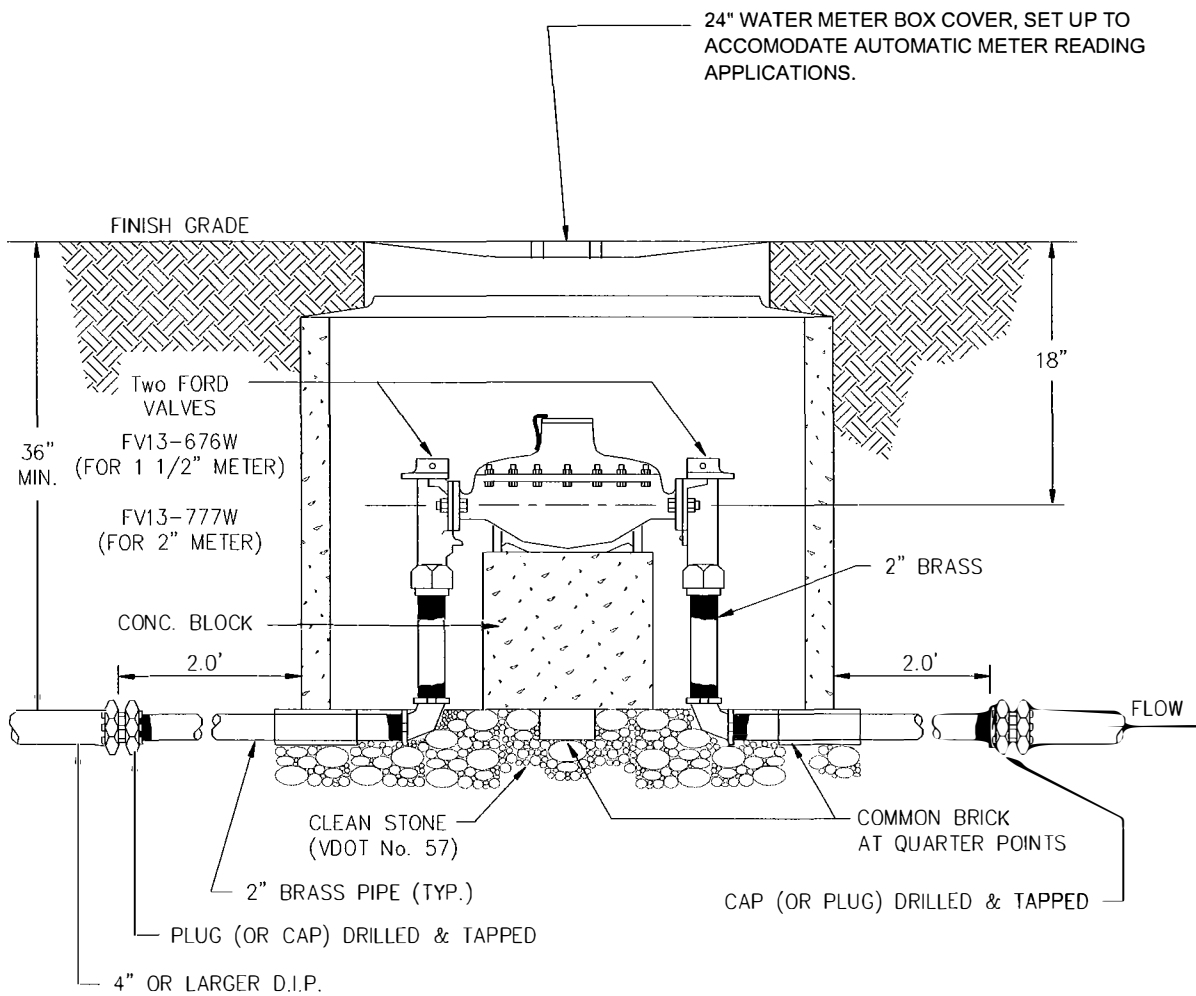
Special Note:

The service line between the main and the meter will be one continuous piece of pipe. (No joints will be permitted)

3

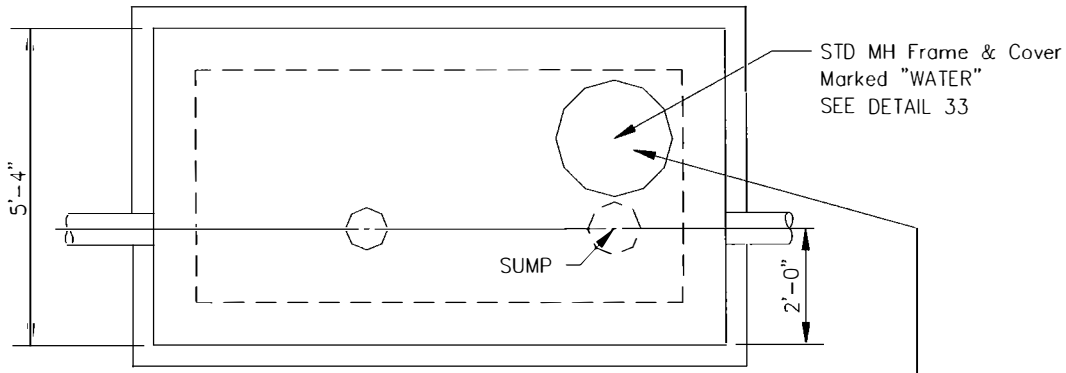
**Town of Culpeper &
Culpeper County**

WATER DISTRIBUTION SYSTEM 1
1/2" METER



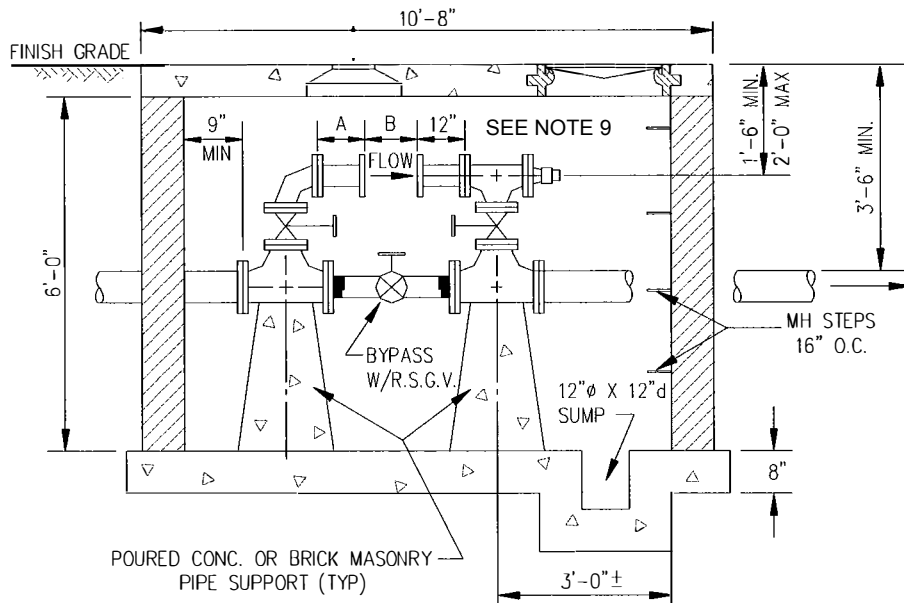
NOTES:

1. 36" x 30" ONE PIECE BOX MUST BE USED.
2. INSTALLER MAY SUBSTITUTE TYPE "K" SOFT COPPER FOR BRASS SHOWN, PROVIDED APPROPRIATE FITTINGS AND VALVES ARE USED.
3. METER BOX MATERIAL: CONCRETE, PVC, OR RIGID FRP.



TOP PLAN

May Use 30" X 30" Hatch Cover
With Locking Hasp (Bilco J4AL
or Equal)



NOTES:

1. DIM. "A" EQUALS 8 TIMES NOMINAL METER SIZE.
2. DIM. "B" TO ACCOMMODATE METER & STRAINER.
3. BYPASS DIAMETER ONE SIZE SMALLER THAN METER.
4. BYPASS OF BRASS OR DUCTILE IRON PIPE W/MATCHING VALVE.
5. PIPE JOINTS SHALL BE SCREWED (UNDER 3" ϕ) OR FLANGED (3" ϕ AND OVER.)
6. SHOP DRAWINGS SHALL BE SUBMITTED TO **CCWSA** FOR APPROVAL.
7. SUMP MUST BE DRAINED TO DAYLIGHT OR PROVIDE ELECTRICITY AND A PUMP.
8. METER MUST BE READABLE BY **AUTOMATIC METER READER** OR TOUCH-READ PAD ON METER LID OR OTHER LOCATION APPROVED BY **CCWSA**.
9. PROVIDE BLIND FLANGE WITH 1" TAPPED CONNECTION AND 1" \square CORPORATION STOP WITH THREADED END TO FACILITATE IN \square PLACE TESTING OF METER.

5

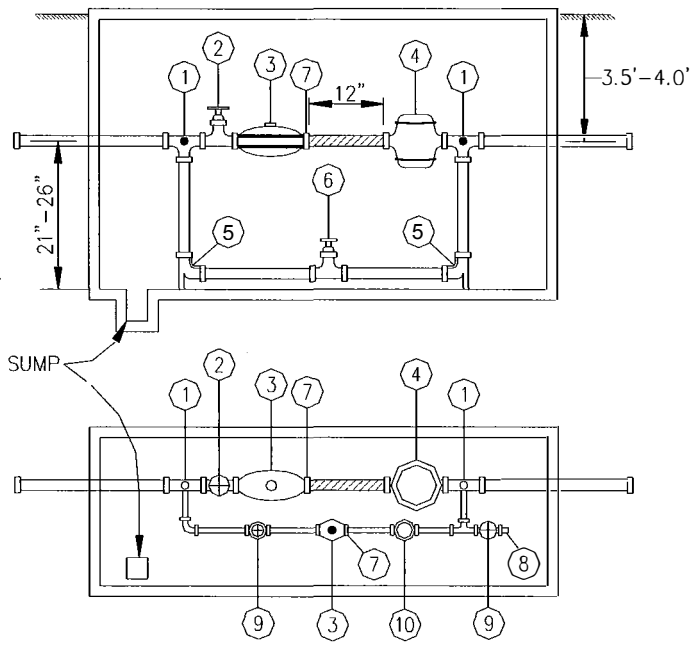
**Town of Culpeper &
Culpeper County**

WATER DISTRIBUTION SYSTEM 3"
AND LARGER METER

DISC.	SIZE			
MAIN METER	4"	6"	8"	10"
BY-PASS METER	1-1/2"	1-1/2"	2"	2"
ASSEMBLY BY-PASS	3"	3"	4"	6"

LEGEND

- ① TEE TAPPED - 2 INCH - AT POSITION "G".
- ② R.W. GATE VALVE.
- ③ ROCKWELL TURBO METER W/IMPULSE CONTACTOR.
- ④ DETECTOR CHECK VALVE
- ⑤ FLANGED BASE ELBOW
- ⑥ BUTTERFLY VALVE
- ⑦ FLANGE ADAPTER. USE DRESSER STYLE 128.
- ⑧ IRON PIPE BY NATIONAL FIRE STANDARDS NIPPLE W/CAP.
- ⑨ GATE VALVE
- ⑩ SWING CHECK VALVE



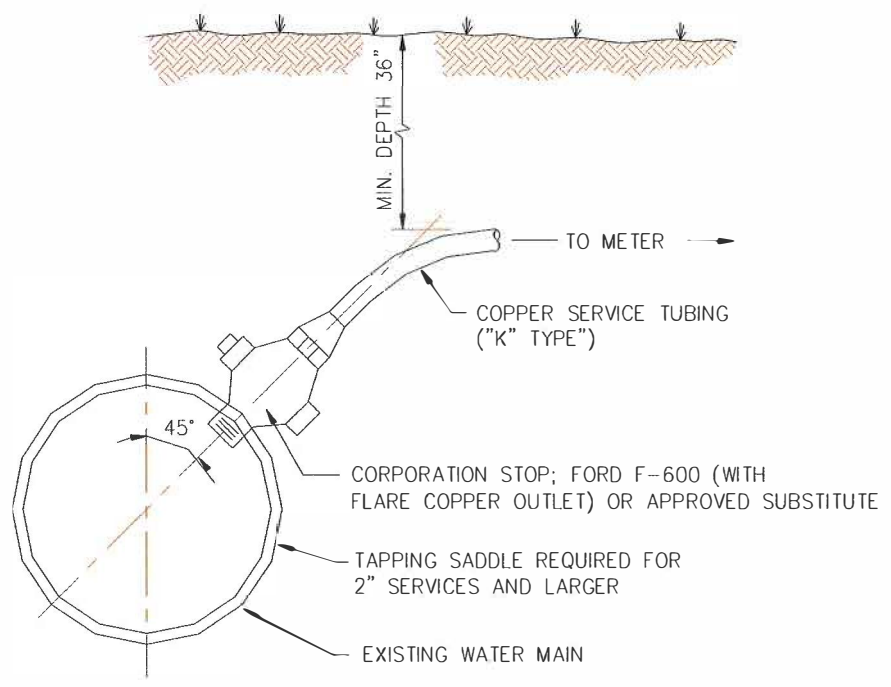
GENERAL NOTES

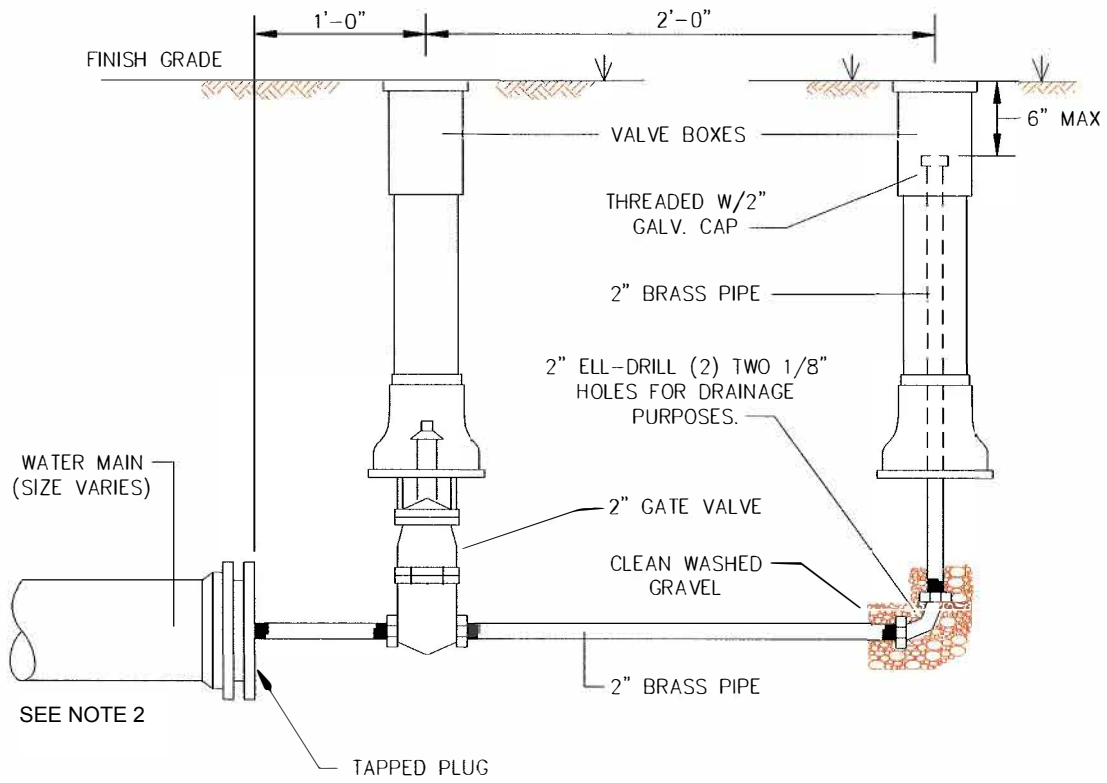
- A.) ACCESS DOOR = 30" X 30" HATCH COVER W/LOCKING HASP. (BILCO J4AL OR EQUAL)
- B.) VAULT DIM. = MIN. DIM = 10'L X 7'W X 6'D - WALL THICKNESS = 6" MIN.
- C.) METERS WILL BE PROVIDED BY THE SERVICE AUTHORITY.
- D.) ALL BY-PASS METER PIPING WILL BE 2" BRASS, (NO GALV. STEEL)
- E.) SHOP DRAWINGS SHALL BE SUBMITTED TO THE **CCWSA** FOR APPROVAL.
- F.) SUMP AREA MUST BE DAY LIGHTED OR PROVIDE A PUMP.

6

**Town of Culpeper &
Culpeper County**

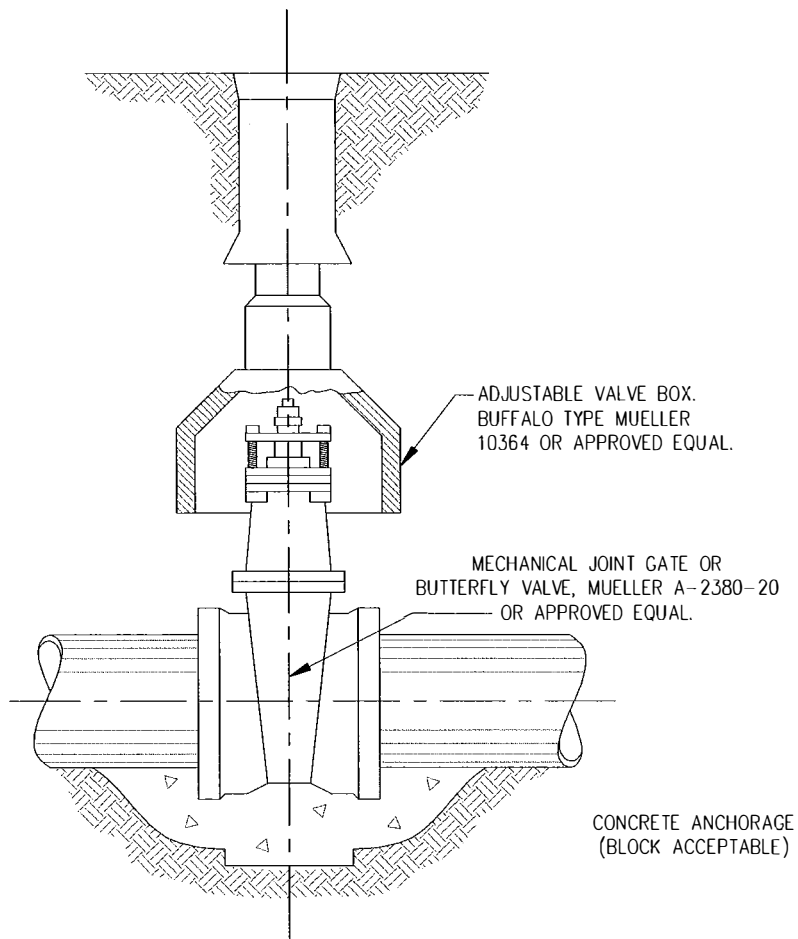
MAIN LINE
METER VAULT



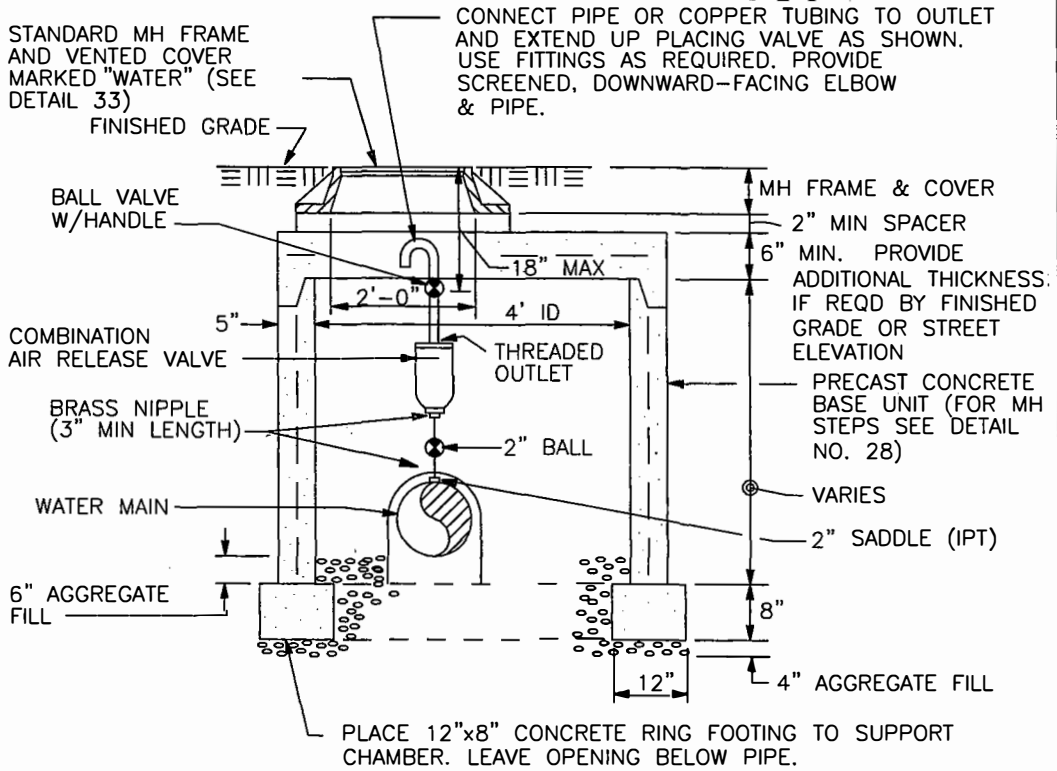


NOTES:

1. ALL 2" PIPE AND FITTINGS TO BE BRASS OR TYPE "K" COPPER.
2. PROVIDE PIPE JOINT RESTRAINTS AS REQUIRED.

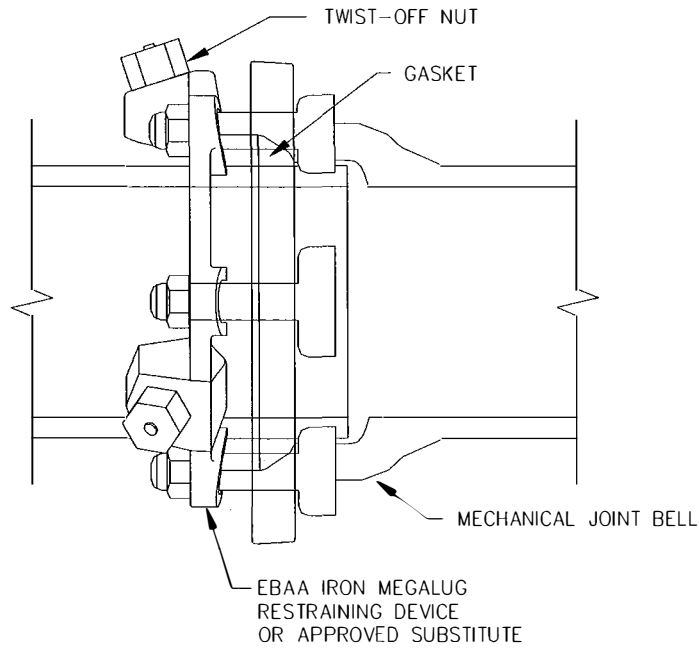


VALVE AND PIPE SHALL HAVE SAME NOMINAL DIAMETER



NOTE:

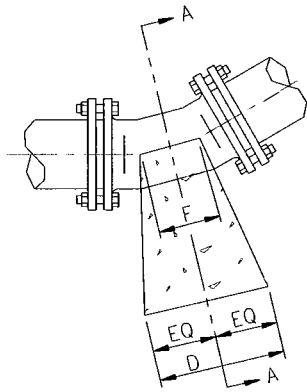
1. COMBINATION AIR RELEASE VALVES SHALL BE CONSTRUCTED WITH CAST IRON BODIES, STAINLESS STEEL FLOATS, BRONZE TRIM, AND BUNA-N SEALS. VALVES SHALL BE OF THE COMBINATION TYPE TO RELIEVE LARGE VOLUMES OF AIR AS THE LINES ARE FILLED, RELIEVE VACUUM AS THE LINES ARE EMPTIED, AND ALSO RELEASE SMALL QUANTITIES OF ENTRAINED AIR UNDER PRESSURE. MANUFACTURERS SHALL BE "VALVE AND PRIMER CORPORATION", "EMPIRE SPECIALTY VALVE", OR "VALVEMATIC VALVE & MANUFACTURING COMPANY".
2. MANHOLE MATERIALS AND FABRICATION SHALL BE IN ACCORDANCE WITH ASTM C478. SIZE OF AIR RELEASE VALVE, GATE VALVE, FITTINGS AND WORKING PRESSURES AS SHOWN ON THE DRAWINGS.



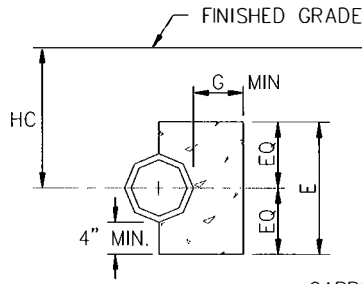
NOMINAL PIPE SIZE (INCHES)	NUMBER OF TWIST-OFF NUTS	NUMBER OF T-BOLTS	RATED PRESSURE
3	2	4	350 PSI
4	2	4	350 PSI
6	3	6	350 PSI
8	4	6	350 PSI
10	6	8	350 PSI
12	8	8	350 PSI
16	12	12	350 PSI
18	12	12	250 PSI
24	16	16	250 PSI
30	20	20	250 PSI
36	24	24	250 PSI
42	28	28	250 PSI

NOTES:

1. Make any joint deflection necessary before torquing the T-head bolts.
2. Tighten T-head bolts, bottom first, then top, sides and remainder.
3. Repeat Note 1. until all T-bolts are properly torqued.
4. Tighten twist-off nuts so that all wedges firmly contact pipe.
5. Tighten twist-off nuts in alternating manner, shearing off nuts.
6. MEGALUG may be reset or reused by assembly as described above and torquing wedge bolts to 90 ft-lbs.



PLAN



SECTION A-A

CARRY CONCRETE TO UNDISTURBED EARTH OR FIRM SUBGRADE

SOIL PROPERTIES	SIZE	Concrete Block Dimensions At 150 PSI Pressure				Add To Dimension D For Each Add 50 PSI Pressure Up To 300 PSI	Adjustment For Conc. Area For Different Height HC To Be Measured From Grade to ϕ Of Pipe			
		D	E	F	G		Up To 8'	8'-1" To 12'	12'-1" To 16'	16'-1" To 20'
CS = 1000 PSF $\phi = 15'$ SOFT SILTY CLAY & BETTER	3"	4"	1'	4"	6"	2"	CONC. BLOCK AREA 1.0 X D X E	CONC. BLOCK AREA 0.875 X D X E	CONC. BLOCK AREA 0.75 X D X E	CONC. BLOCK AREA 0.625 X D X E
	4"	4"	1'	4"	6"	2"				
	6"	6"	1'-2"	6"	7"	2"				
	8"	8"	1'-4"	8"	7"	2"				
	10"	9"	1'-6"	8"	8"	4"				
	12"	1'	1'-8"	1'	9"	4"				
	16"	1'-3"	2'	1'	9"	6"				
	20"	1'-3"	2'-6"	1'	10"	6"				
	24"	1'-6"	3'	1'	1'	6"				
30"	2'	3'-6"	1'-4"	1'-2"	9"					
CS = 0 $\phi = 15'$ LOOSE SILTY SAND	3"	10"	1'-6"	6"	9"	2"	CONC. BLOCK AREA 1.0 X D X E	CONC. BLOCK AREA 0.5 X D X E	CONC. BLOCK AREA 0.375 X D X E	CONC. BLOCK AREA 0.25 X D X E
	4"	1'	2'	6"	9"	2"				
	6"	1'-6"	2'	6"	1'	2"				
	8"	2'-4"	2'	8"	1'	2"				
	10"	2'-6"	2'-3"	8"	1'	4"				
	12"	3'-4"	2'-6"	1'	1'	4"				
	16"	4'-2"	3'	1'	1'-6"	6"				
	20"	4'-6"	3'-6"	1'	1'-6"	6"				
	24"	5'-8"	4'	1'-6"	1'-6"	6"				
	30"	7'	5'	2'	1'-6"	9"				

DIMENSION D & E SHALL BE ADJUSTED FOR REQUIRED AREA.
 DIMENSION F & G SHALL REMAIN SAME.
 DIMENSION D SHALL BE ADJUSTED FOR REQUIRED PRESSURE IN EXCESS OF 150 PSI BEFORE MAKING ADJUSTMENT FOR HEIGHT.

SOIL PROPERTIES	SIZE	CONCRETE BLOCK DIMENSIONS AT 150 PSI PRESSURE				ADD TO DIMENSION D FOR EACH ADD 50 PSI PRESSURE UP TO 300 PSI	Adjustment For Conc. Area For Different Height HC To Be Measured From Grade to ϕ Of Pipe			
		D	E	F	G		Up To 8'	8'-1" To 12'	12'-1" To 16'	16'-1" To 20'
CS = 1000 PSF $\phi = 15^\circ$ SOFT SILTY CLAY OR BETTER	3"	6"	1'-0"	6"	7"	2"	CONC. BLOCK AREA = 1.0 X D X E	CONC. BLOCK AREA = 0.875 X D X E	CONC. BLOCK AREA = 0.75 X D X E	CONC. BLOCK AREA = 0.625 X D X E
	4"	6"	1'-0"	6"	7"	2"				
	6"	8"	1'-2"	6"	8"	2"				
	8"	1'-0"	1'-4"	8"	8"	4"				
	10"	1'-3"	1'-6"	8"	10"	4"				
	12"	1'-6"	1'-8"	1'-0"	1'-0"	6"				
	16"	2'-0"	2'-0"	1'-0"	1'-3"	6"				
	20"	2'-6"	2'-6"	1'-0"	1'-6"	9"				
	24"	3'-0"	3'-0"	1'-0"	1'-6"	9"				
	30"	4'-0"	3'-6"	1'-4"	1'-9"	1'-0"				
CS = 0 $\phi = 15^\circ$ LOOSE SILTY SAND	3"	1'-0"	1'-6"	6"	9"	2"	CONC. BLOCK AREA = 1.0 X D X E	CONC. BLOCK AREA = 0.5 X D X E	CONC. BLOCK AREA = 0.375 X D X E	CONC. BLOCK AREA = 0.25 X D X E
	4"	1'-6"	2'-0"	6"	9"	2"				
	6"	2'-0"	2'-0"	6"	1'-0"	2"				
	8"	3'-4"	2'-0"	8"	1'-0"	4"				
	10"	4'-2"	2'-3"	8"	1'-0"	4"				
	12"	4'-8"	2'-9"	1'-0"	1'-6"	6"				
	16"	5'-9"	3'-6"	1'-0"	1'-6"	6"				
	20"	7'-10"	4'-0"	1'-0"	2'-0"	9"				
	24"	9'-10"	5'-0"	1'-6"	2'-0"	9"				
	30"	11'-8"	6'-0"	2'-0"	2'-0"	1'-0"				

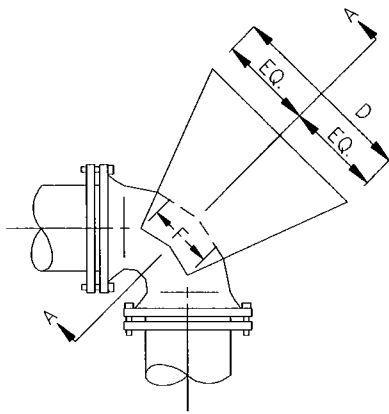
DIMENSION D & E SHALL BE ADJUSTED FOR REQUIRED AREA.
 DIMENSION F & G SHALL REMAIN SAME.
 DIMENSION D SHALL BE ADJUSTED FOR REQUIRED PRESSURE IN EXCESS OF 150 PSI BEFORE MAKING ADJUSTMENT FOR HEIGHT.

NOTES:

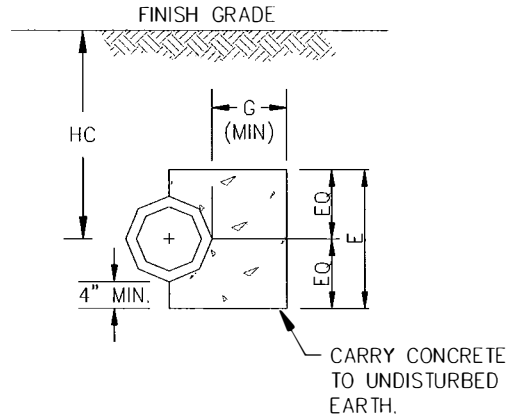
1. FC = 3000 PSI AT 28 DAYS.
2. CS = SOIL COHESION IN PSF AND ϕ = ANGLE OF INTERNAL FRICTION.
3. CARRY ALL BEARING SURFACES TO UNDISTURBED GROUND OR FIRM SUBGRADE.

SOIL PROPERTIES	SIZE	Concrete Block Dimensions At 150 PSI Pressure				Add To Dimension D For Each Add 50 PSI Pressure Up To 300 PSI	Adjustment For Conc. Area For Different Height HC To Be Measured From Grade to ϕ Of Pipe			
		D	E	F	G		Up To 8'	8'-1" To 12'	12'-1" To 16'	16'-1" To 20'
CS = 1000 PSF $\phi = 15'$ SOFT SILTY CLAY OR BETTER	3"	9"	1'-0"	6"	6"	4"	CONC. BLOCK AREA 1.0 X D X E	CONC. BLOCK AREA 0.875 X D X E	CONC. BLOCK AREA 0.75 X D X E	CONC. BLOCK AREA 0.625 X D X E
	4"	9"	1'-0"	6"	6"	4"				
	6"	1'-0"	1'-2"	6"	8"	4"				
	8"	1'-6"	1'-4"	8"	9"	6"				
	10"	2'-0"	1'-6"	8"	10"	6"				
	12"	2'-6"	1'-8"	1'-0"	1'-0"	9"				
	16"	3'-6"	2'-6"	1'-0"	1'-3"	9"				
	20"	4'-8"	2'-6"	1'-0"	1'-4"	1'-4"				
24"	5'-0"	3'-0"	1'-0"	1'-9"	2'-0"					
30"	6'-0"	4'-0"	1'-4"	2'-3"	2'-0"					
CS = 0 $\phi = 15'$ LOOSE SILTY SAND	3"	1'-6"	1'-6"	6"	1'-0"	4"	CONC. BLOCK AREA 1.0 X D X E	CONC. BLOCK AREA 0.5 X D X E	CONC. BLOCK AREA 0.375 X D X E	CONC. BLOCK AREA 0.25 X D X E
	4"	2'-0"	2'-0"	6"	1'-0"	4"				
	6"	3'-0"	2'-0"	6"	1'-0"	4"				
	8"	4'-0"	2'-6"	8"	1'-0"	6"				
	10"	6'-0"	2'-6"	8"	1'-0"	6"				
	12"	7'-0"	3'-0"	1'-0"	1'-6"	9"				
	16"	11'-0"	4'-0"	1'-0"	1'-6"	9"				
	20"	11'-8"	5'-0"	1'-0"	2'-0"	1'-4"				
24"	12'-6"	6'-0"	1'-6"	2'-0"	2'-0"					
30"	20'-0"	6'-0"	2'-0"	2'-6"	2'-0"					

DIMENSION D & E SHALL BE ADJUSTED FOR REQUIRED AREA.
 DIMENSION F & G SHALL REMAIN SAME.
 DIMENSION D SHALL BE ADJUSTED FOR REQUIRED PRESSURE IN EXCESS OF 150 PSI BEFORE MAKING ADJUSTMENT FOR HEIGHT.



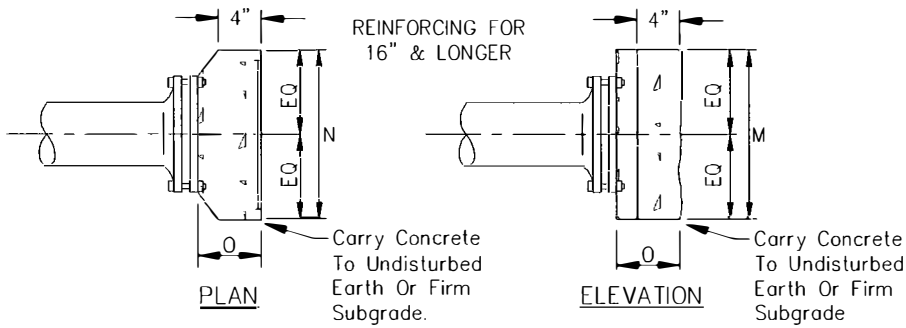
PLAN



SECTION A-A

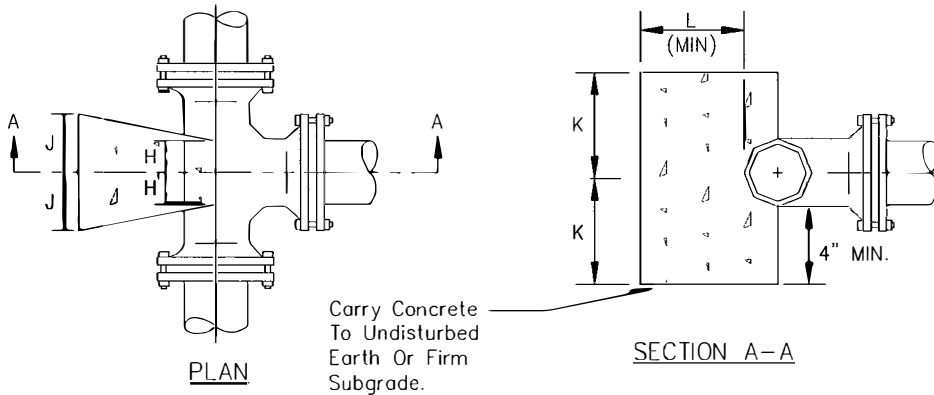
SIZE	Concrete Block Dimensions At 150 PSI Pressure				Add to Dimension "D" For Each Add'l 50 PSI Pressure Up To 300 PSI	Adjustment for Conc. Area For Different Height (HC) To Be Measured From Grade To C of Pipe			
	D	E	F	G		Up To 8'-0"	8'-1" To 12'	12'-1" To 16'	16'-1" To 20'
3"	2'-6"	2'-0"	8"	1'-0"	6"	CONC. BLOCK AREA 1.0 X D X E	C. B. A. 0.5 X D X E	C. B. A. 0.375 X D X E	C. B. A. 0.25 X D X E
4"	3'-4"	2'-0"	8"	1'-0"	6"				
6"	5'-2"	2'-0"	1'-0"	1'-6"	6"				
8"	6'-8"	2'-6"	1'-0"	1'-6"	9"				
10"	10'-0"	3'-0"	1'-6"	1'-6"	9"				
12"	10'-0"	4'-0"	1'-6"	2'-0"	1'-0"				
16"	12'-6"	5'-0"	2'-0"	2'-0"	1'-0"				
20"	15'-10"	6'-0"	2'-0"	2'-0"	2'-0"				

DIMENSION D & E SHALL BE ADJUSTED FOR REQUIRED AREA.
 DIMENSION F & G SHALL REMAIN SAME.
 DIMENSION D SHALL BE ADJUSTED FOR REQUIRED PRESSURE IN EXCESS
 OF 150 PSI BEFORE MAKING ADJUSTMENT FOR HEIGHT.
 SPECIAL DESIGN REQUIRED FOR LINES 24" OR GREATER IN DIAMETER.



BUTTRESS FOR PLUGS & CAPS										
	SIZE									
	3"	4"	6"	8"	10"	12"	16"	20"	24"	30"
M	*	*	*	2'-6"	2'-8"	3'-6"	4'-8"	6'-0"	6'-8"	8'-0"
N	*	*	*	1'-6"	2'-2"	2'-6"	3'-4"	4'-0"	5'-0"	6'-8"
O	*	*	*	10"	1'-0"	1'-2"	1'-4"	1'-6"	1'-8"	2'-0"

REINFORCE WITH 66" EW



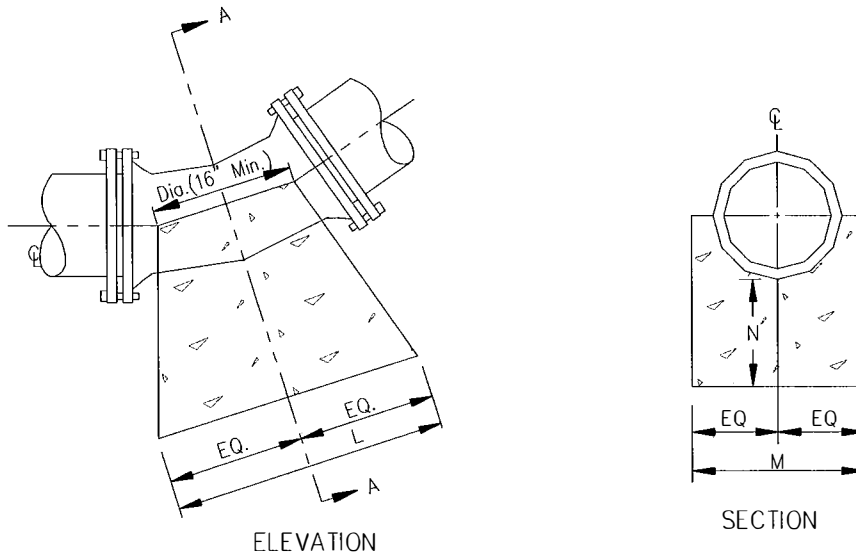
BUTTRESS FOR TEES										
	SIZE OF BRANCH									
	3"	4"	6"	8"	10"	12"	16"	20"	24"	30"
J	6"	6"	8"	9"	1'-1"	1'-3"	1'-8"	2'-0"	2'-6"	3'-4"
K	6"	8"	10"	1'-3"	1'-4"	1'-9"	2'-4"	3'-0"	3'-4"	4'-0"
L	6"	6"	8"	9"	10"	12"	1'-2"	1'-6"	1'-8"	2'-0"
H	4"	4"	6"	6"	6"	6"	8"	1'-0"	1'-0"	1'-0"

AREA OF BLOCK = 2J X 2K

NOTE: TAPPING ASSEMBLIES & SLEEVES TO BE CONCRETE BLOCKED AS COMPARABLE SIZED TEES

NOTES:

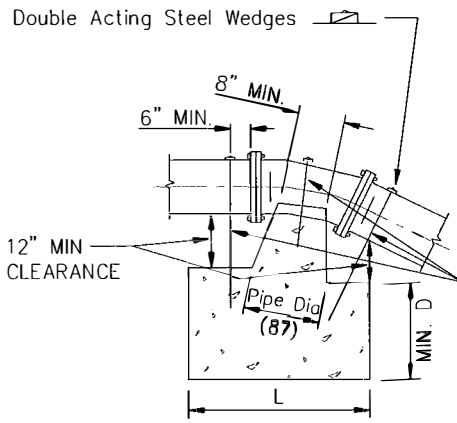
1. $F_c = 3000$ PSI AT 28 DAYS.
2. THE BUTTRESS DIMENSIONS ARE BASED ON THE WATER PRESSURE OF 150 PSI WHERE THE PRESSURE IS DIFFERENT, THE AREA OF BLOCK SHALL BE PROPORTIONED TO REQUIRED PRESSURE
3. CARRY ALL BEARING SURFACES TO UNDISTURBED GROUND OR FIRM SUBGRADE



BUTTRESS FOR LOWER VERTICAL BENDS											
BEND	SIZE										
	3"	4"	6"	8"	10"	12"	16"	20"	24"	30"	
11-1/4'	L	6"	6"	6"	8"	8"	8"	1'-1"	1'-5"	1'-10"	2'-8"
	M	1'-0"	1'-0"	1'-2"	1'-4"	1'-6"	2'-0"	2'-4"	2'-8"	3'-0"	3'-4"
	N	8"	8"	8"	8"	8"	8"	9"	10"	12"	1'-2"
22-1/2'	L	6"	6"	10"	11"	1'-3"	1'-4"	2'-1"	2'-9"	3'-7"	3'-3"
	M	1'-0"	1'-0"	1'-2"	1'-4"	1'-6"	2'-0"	2'-4"	2'-8"	3'-0"	3'-2"
	N	8"	8"	8"	8"	9"	9"	12"	1'-2"	1'-4"	1'-6"
45'	L	10"	1'-0"	1'-2"	1'-9"	2'-5"	2'-8"	4'-0"	5'-6"	6'-0"	8'-2"
	M	1'-0"	1'-0"	1'-2"	1'-4"	1'-6"	2'-0"	2'-4"	2'-8"	3'-6"	4'-0"
	N	8"	8"	8"	8"	12"	1'-2"	1'-6"	2'-0"	2'-6"	3'-0"

NOTES:

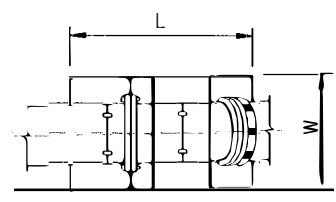
1. $F_c = 3000$ PSI AT 28 DAYS.
2. CARRY ALL BEARING SURFACES TO UNDISTURBED EARTH OR FIRM SUBGRADE.
3. THE BUTTRESS DIMENSIONS ARE BASED ON THE WATER PRESSURE OF 150 PSI AND SOIL BEARING PRESSURE OF 2500 PSI. WHERE THE WATER PRESSURE AND SOIL BEARING PRESSURE ARE DIFFERENT, THE AREA OF CONCRETE BLOCK (I.E. L & M) SHALL BE PROPORTIONED ACCORDINGLY. AREA ADJUSTMENT FOR REQUIRED PRESSURE SHALL BE MADE FIRST BEFORE MAKING ADJUSTMENT FOR SOIL BEARING PRESSURE.



ELEVATION

Embed Reinforcing Bars Minimum 36" Diameters Including The Hook
 Paint Exposed Bars With Two Coats Of Bituminous Paint.

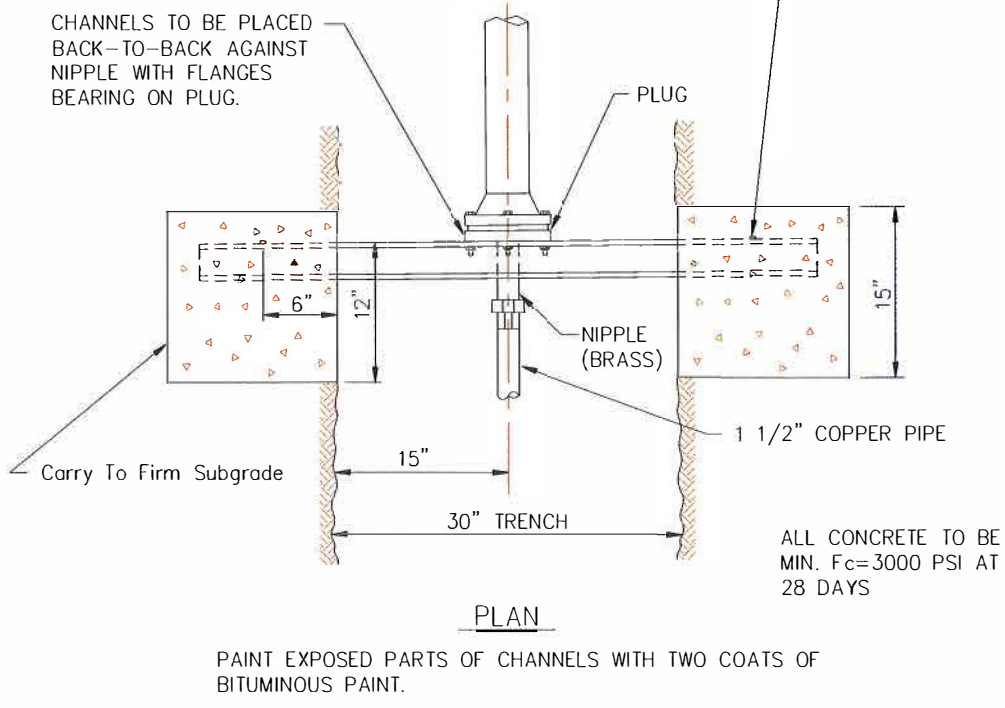
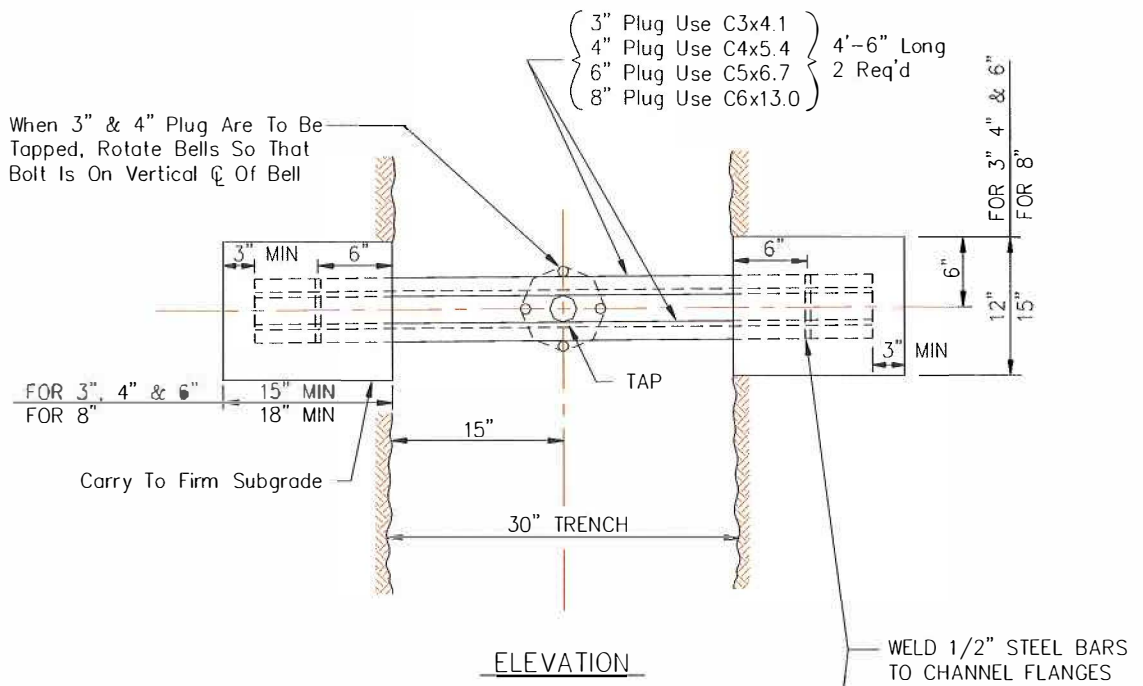
Reinforcing Bars Where 4 Reinforcing Bars Used, Place 2 Symmetrically Placed Reinf Bars At Bends And Other 2 Bars As Shown In Detail.



PLAN

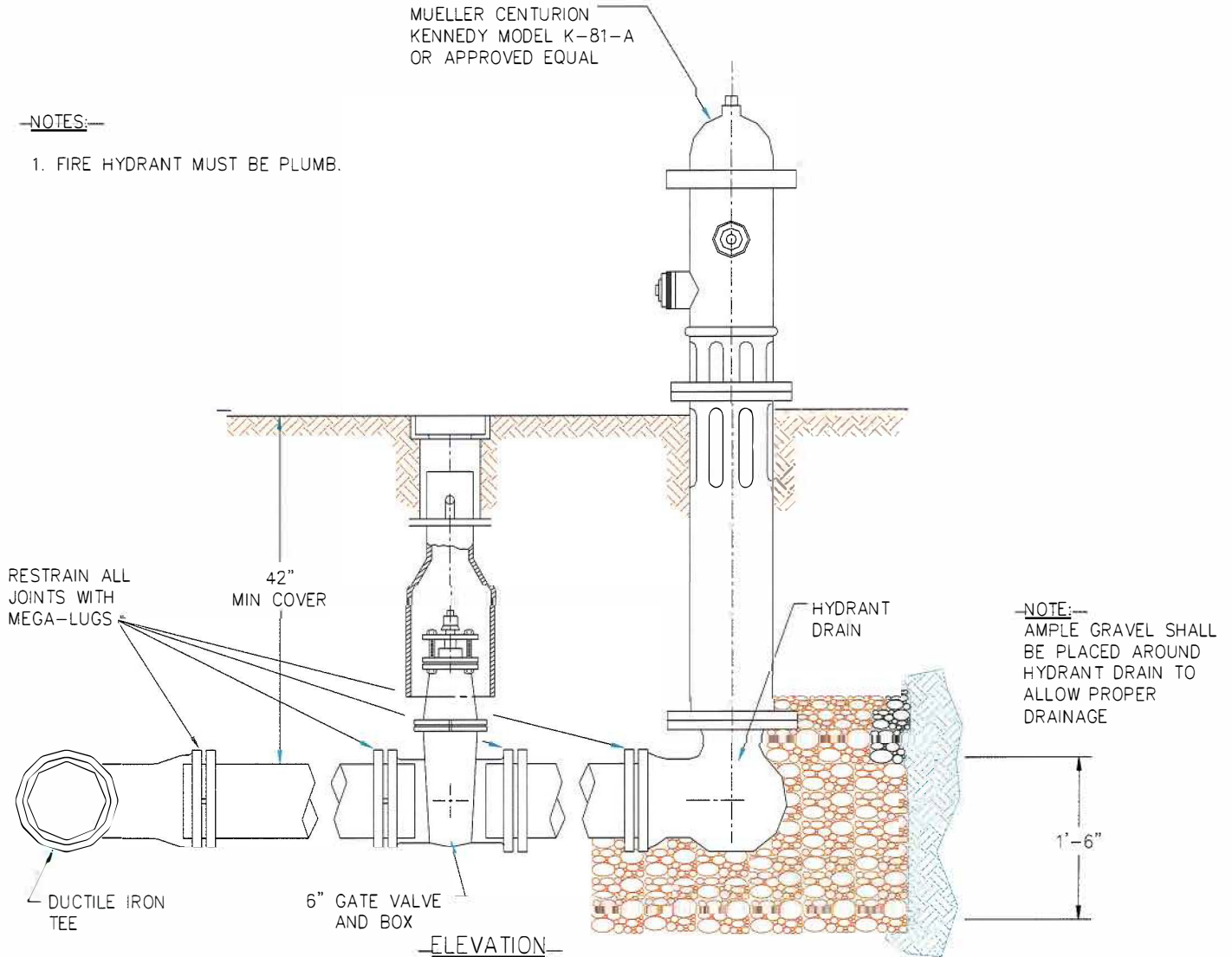
BEND		SIZE									
		3"	4"	6"	8"	10"	12"	16"	20"	24"	30"
11-1/4'	L	1'-6"	1'-6"	2'-0"	2'-0"	2'-3"	2'-6"	3'-3"	4'-0"	4'-6"	5'-0"
	W	1'-6"	1'-6"	2'-0"	2'-0"	2'-3"	2'-6"	3'-3"	4'-0"	4'-6"	5'-0"
	D	1'-6"	1'-6"	1'-6"	2'-0"	2'-0"	2'-3"	2'-6"	2'-6"	3'-0"	3'-0"
	Reinf Bars No & Size	3 #5	3 #5	3 #5	3 #6	3 #6	3 #6	3 #6	3 #8	3 #8	3 #8
22-1/2'	L	1'-6"	2'-0"	2'-6"	2'-9"	3'-6"	4'-0"	4'-6"	5'-6"	6'-0"	7'-0"
	W	1'-6"	2'-0"	2'-6"	2'-9"	3'-6"	4'-0"	4'-6"	5'-6"	6'-0"	7'-0"
	D	1'-6"	1'-6"	2'-0"	2'-3"	2'-3"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"
	Reinf Bars No & Size	3 #5	3 #5	3 #5	3 #6	3 #6	4 #6	4 #6	3 #8	4 #8	4 #8
45°	L	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	6'-0"	7'-6"	8'-6"	10'-0"
	W	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	6'-0"	7'-6"	8'-6"	10'-0"
	D	1'-6"	2'-0"	2'-0"	2'-6"	2'-9"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"
	Reinf Bars No & Size	3 #5	3 #5	3 #5	3 #6	4 #6	4 #6	4 #8	4 #8	4 #8	4 #9

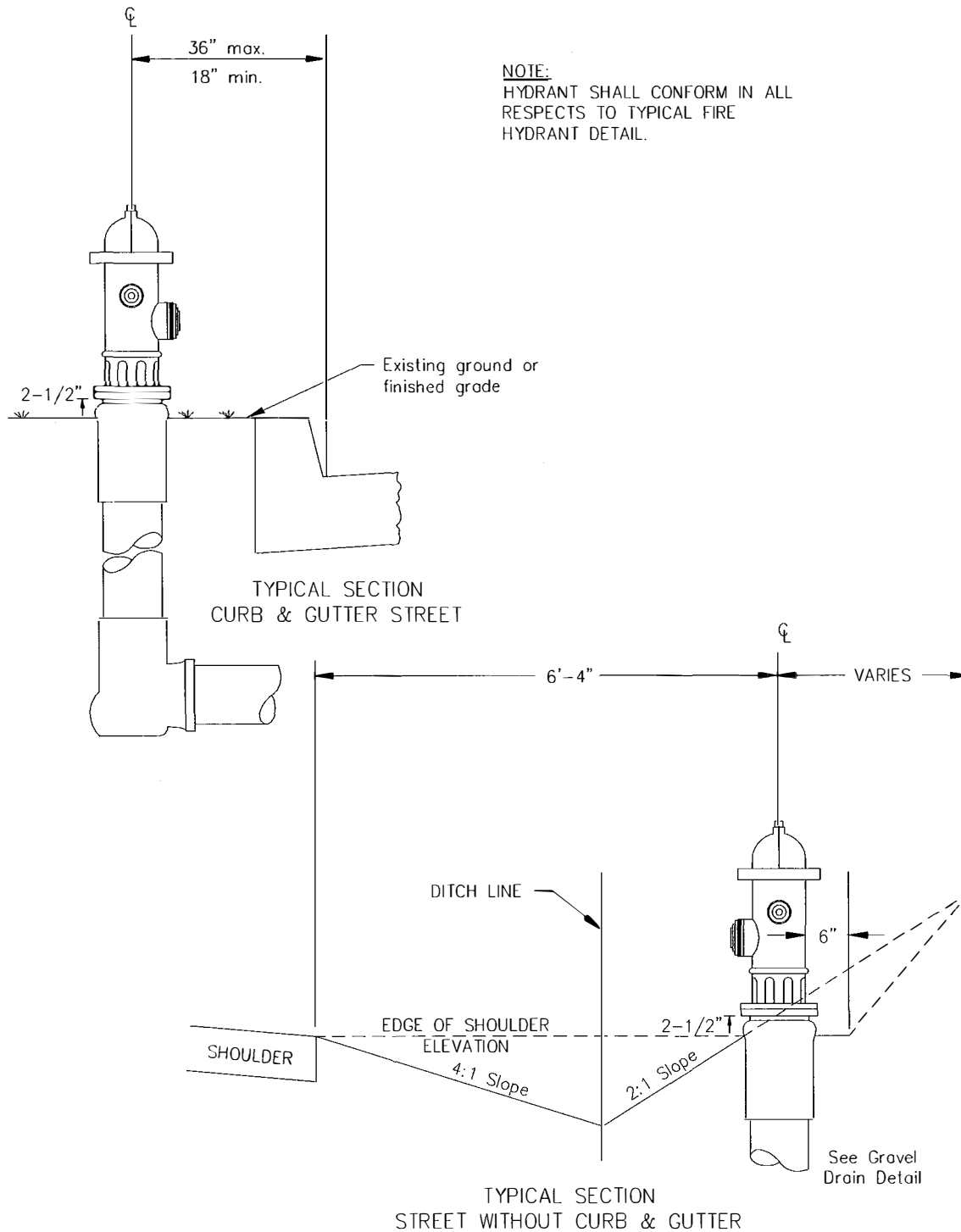
- NOTES: 1. Fc=3000 PSI AT 28 DAYS.
 2. Carry All Bearing Surfaces To Undisturbed Earth Or Firm Subgrade.
 3. The Anchorage Dimensions Are Based On The Water Pressure Of 150 PSI. Where The Pressure Is Different, The Volume Of The Concrete (I.E. L x W x D) Shall Be Proportioned To Required Pressure.

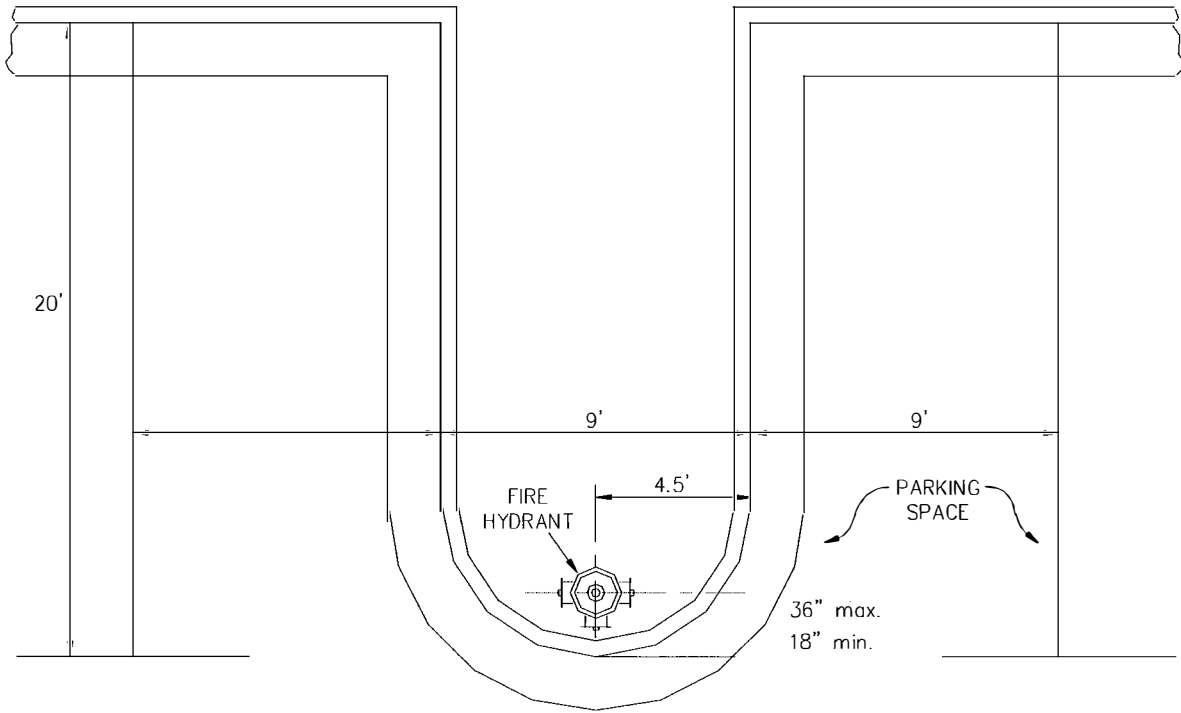


NOTES:

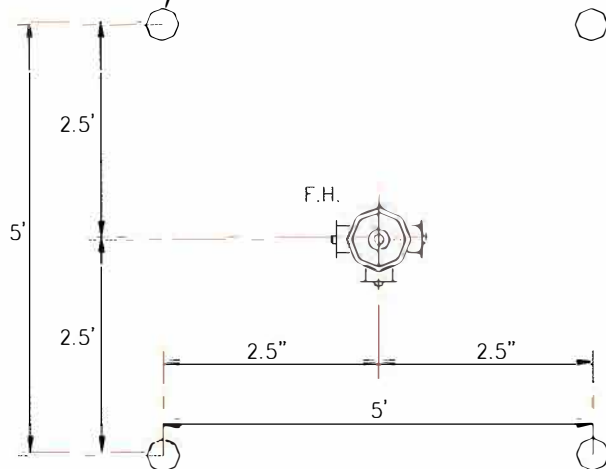
- 1. FIRE HYDRANT MUST BE PLUMB.







4" ϕ STEEL POSTS, PAINTED YELLOW
6' LONG, FILLED WITH CONCRETE
SET IN 3' OF CONCRETE

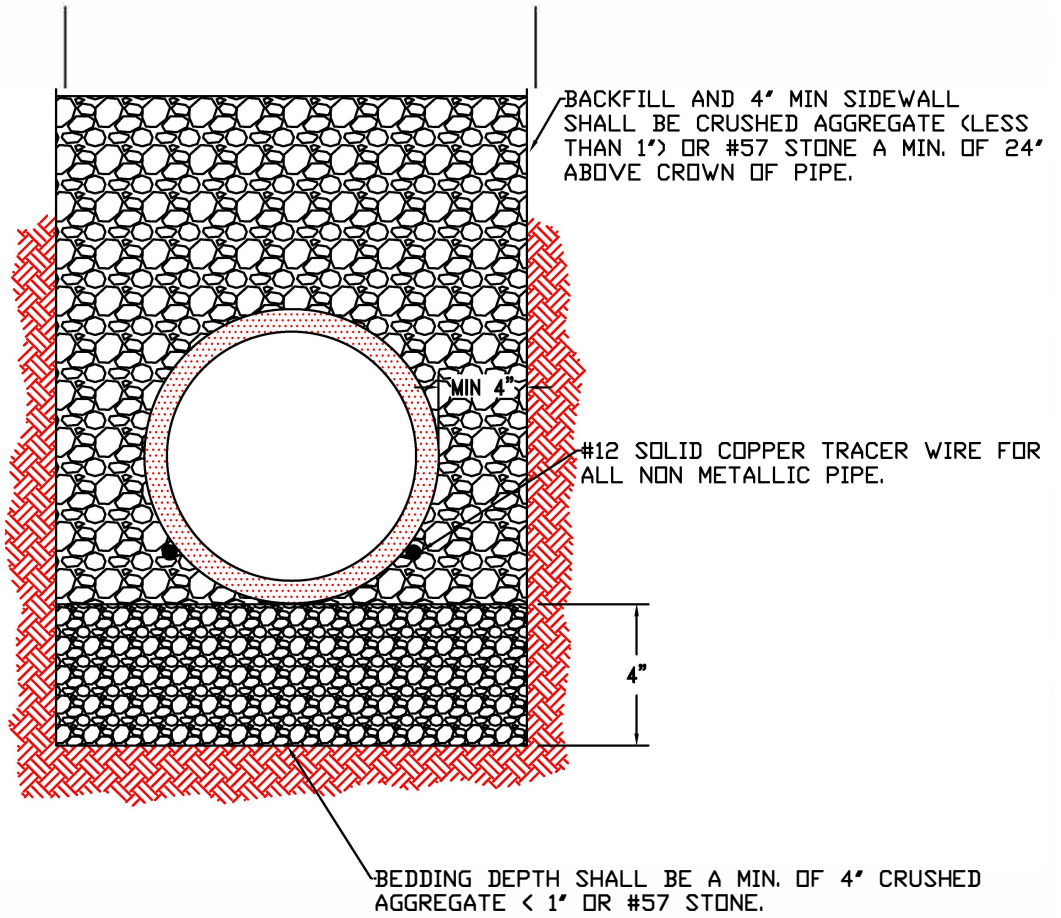


30'

23

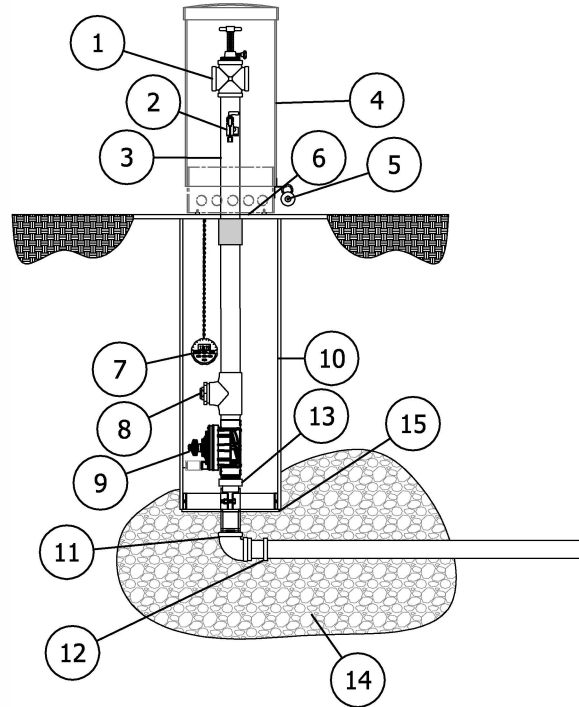
**Town of Culpeper &
Culpeper County**

TYPICAL FIRE HYDRANT
POST PROTECTION



#9400 AUTOMATIC FLUSHING DEVICE

#9400 Automatic Flushing device shall be installed in the following locations:

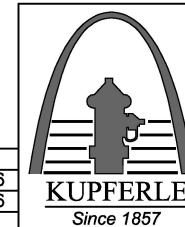


ITEM	ITEM / DESCRIPTION	OPTIONAL	BY OTHERS
1	2" WATER FLOW RESTRICTOR		
2	SAMPLING POINT		
3	2" PVC PIPE		
4	UV RESISTANT LOCKABLE DOME ENCLOSURE		
5	LOCKING POINT		
6	REMOVABLE ACCESS PLATE		
7	CONTROLLER		
8	AUTOMATIC DRAIN		
9	2" AUTOMATIC VALVE		
10	SDR 35 SEWER PIPE		
11	2" SS MIP INLET	X	X
12	2" MIP x COMPRESSION ADAPTER		X
13	O-RING CONNECTOR		
14	1" CLEAN ROCK		X
15	DEBRIS PLATE		

Automatic flushing device shall have a 2" Stainless Steel MIP inlet, that will lead vertically to the bottom into a 2" automatic flushing valve. The flushing valve shall control the flow of water through the hydrant and its diaphragm with the extension and retraction of a DC latching solenoid and have a 220 PSI rating. Each unit shall be furnished with a stand-alone valve controller. Valve controller will not require a second hand-held device for programming. Controller must have minimum of 12 possible flushing cycles per day. Shall be submersible to 12 feet, operate with a 9 volt battery and have resin-seated electrical components. Solenoid shall have no loose parts when removed from valve. Removal of 2" solenoid valve shall be possible via an o-ring connector located under the valve after removal of stainless steel access plate. Valve assembly shall be contained within a UV-resistant locking cover.

Unit model # shall be 9400 as manufactured by Kupferle Foundry Company. Model #9400 St. Louis, MO. 1-800-231-3990, or approved equal.

NOTE: Flush water lines free of debris before installation

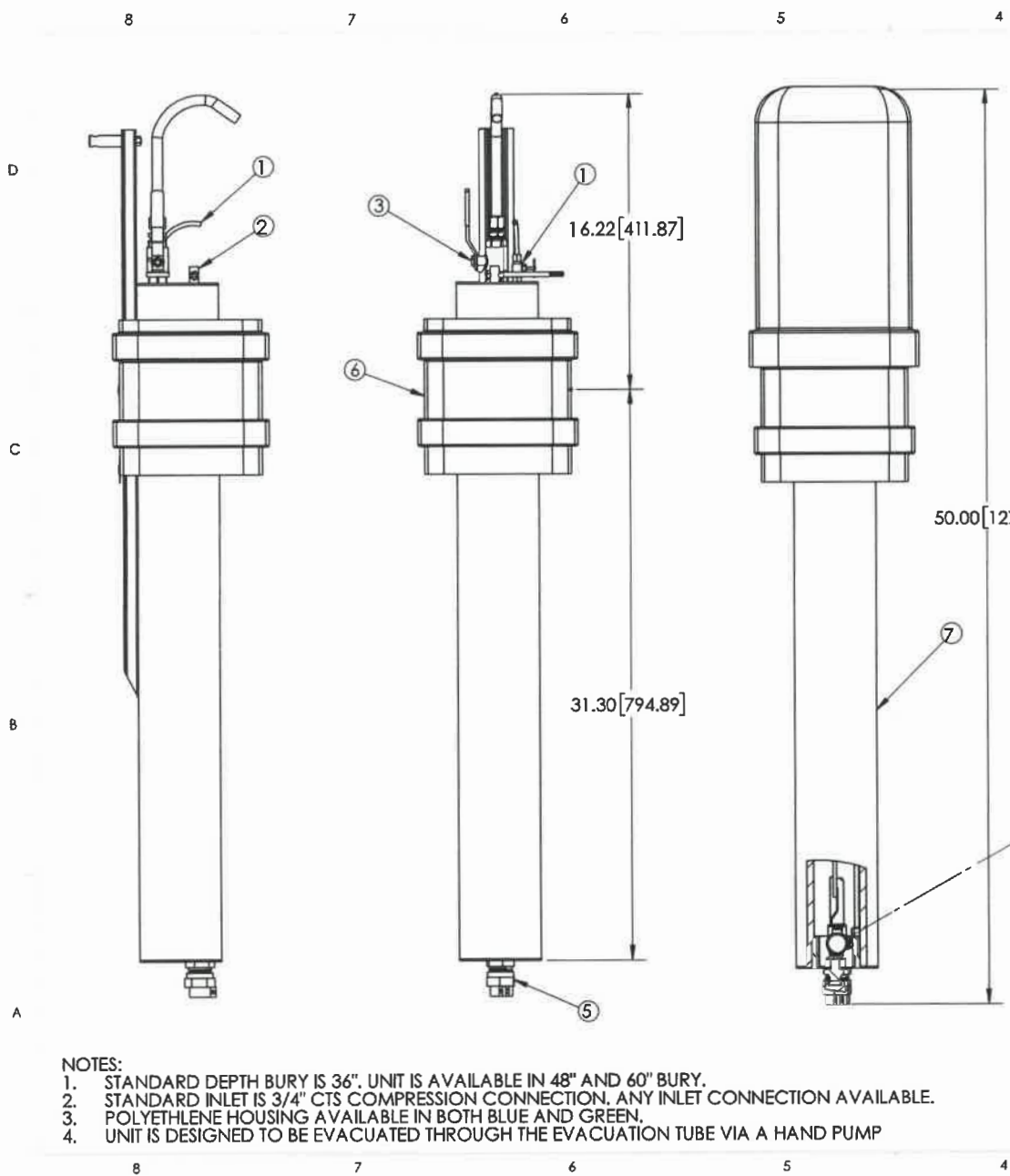


2511 NORTH 9TH STREET
ST. LOUIS, MO 63102
1-800-231-3990
FAX 314-231-2820
www.hydrants.com

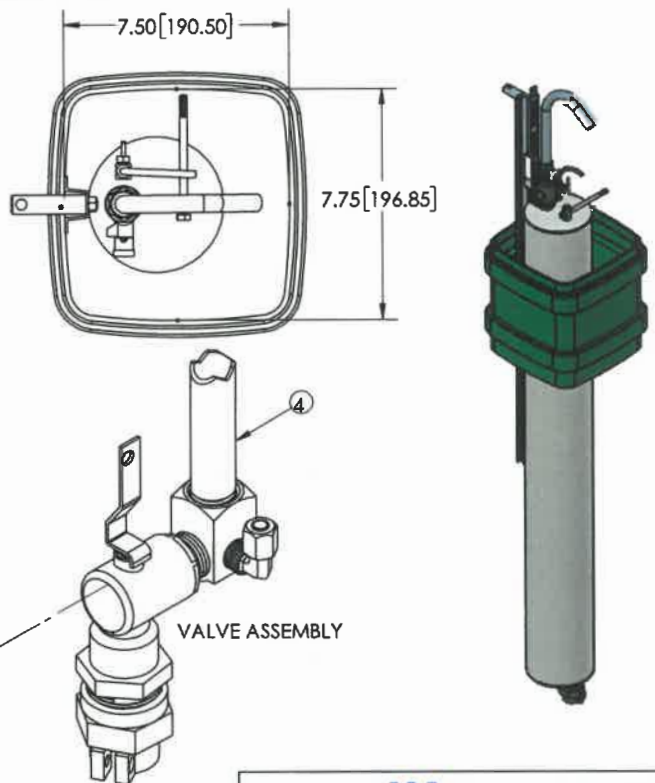
DATE	STATUS / REVISION		

25

SHEET OF	SCALE: 1/2"=1'	DRAWN	INITIALS	DATE
#9400 SPEC SHEET		APPROVED	SMS	10/4/16
		MODIFIED	DCL	10/4/16



ITEM #	DESCRIPTION	QTY.
1	1/4" EVACUATION TUBE AND NEEDLE VALVE	1
2	LEVER-MAIN VALVE OPERATION	1
3	1/2" BRONZE THROTTLING BALL VALVE WITH LOCKING SS HANDLE	1
4	1/2" BRASS BARREL	1
5	3/4" CTS (COPPER TUBE SIZE) COMPRESSION CONNECTION	1
6G	POLYETHYLENE HOUSING WITH HASP LOCK	1
7	4" PVC HOUSING	1



- NOTES:
- STANDARD DEPTH BURY IS 36". UNIT IS AVAILABLE IN 48" AND 60" BURY.
 - STANDARD INLET IS 3/4" CTS COMPRESSION CONNECTION. ANY INLET CONNECTION AVAILABLE.
 - POLYETHYLENE HOUSING AVAILABLE IN BOTH BLUE AND GREEN.
 - UNIT IS DESIGNED TO BE EVACUATED THROUGH THE EVACUATION TUBE VIA A HAND PUMP

REVISED:	DATE: 11/22/16
DRAWING DATE:	11/22/16
DRAWN BY:	MDP
SHEET:	1 OF 1
NOTE:	DO NOT SCALE DRAWING
<small>PROPRIETARY AND CONFIDENTIAL: THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF WATER PLUS CORPORATION. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF WATER PLUS CORPORATION IS STRICTLY PROHIBITED.</small>	

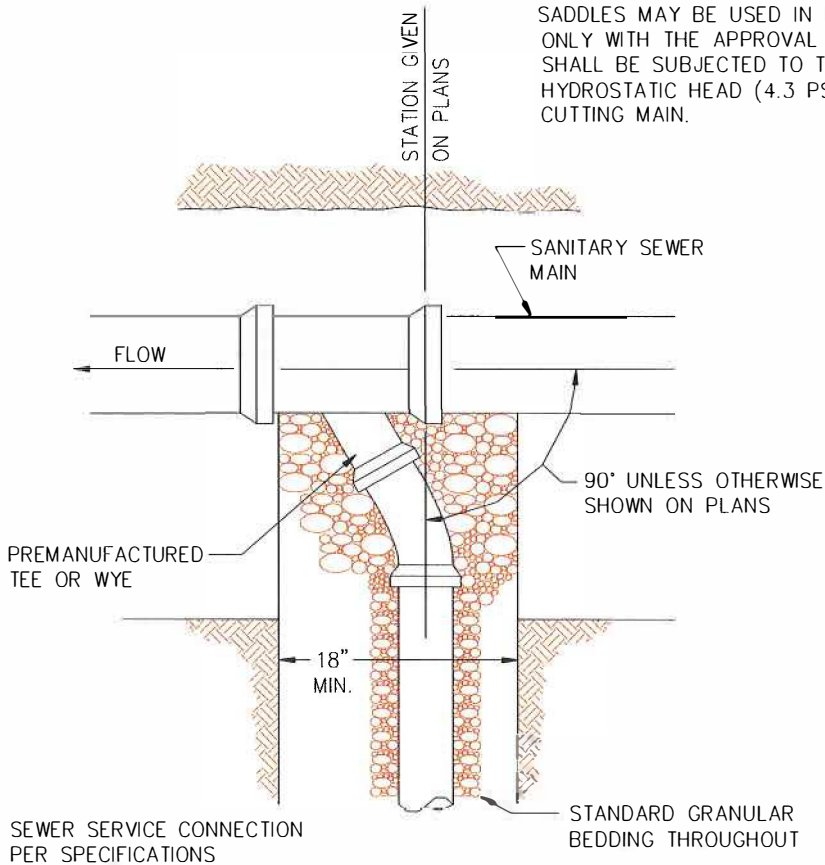
WATER PLUS CORPORATION

www.waterpluscorp.com
 11245 Lillian Highway, Pensacola, Florida 32506
 Phone: 800.842.9879 Fax: 850.455.5200

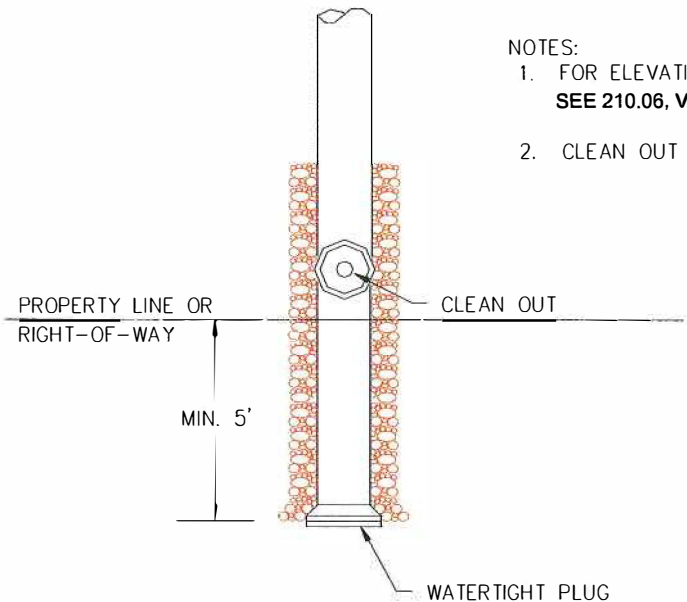
DESCRIPTION: MODEL 301-D-NL ABOVE GRADE SAMPLING STATION

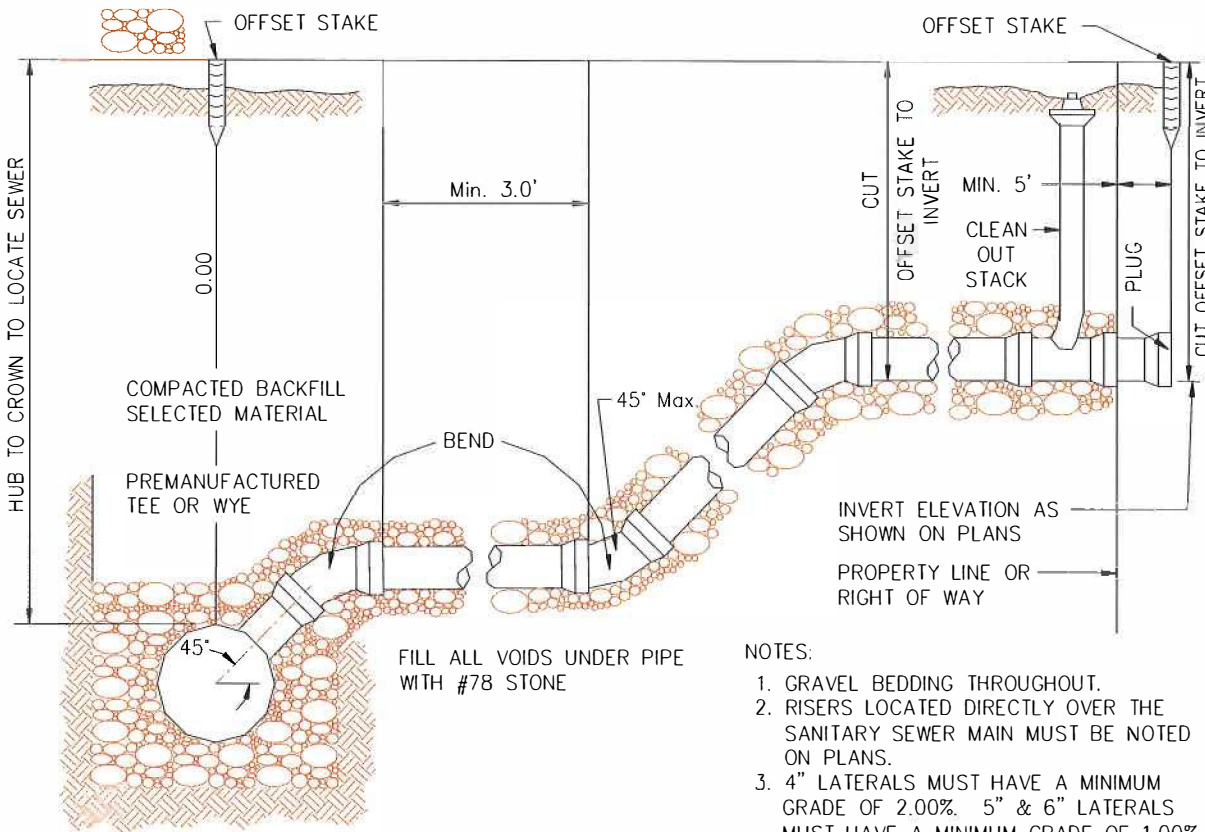
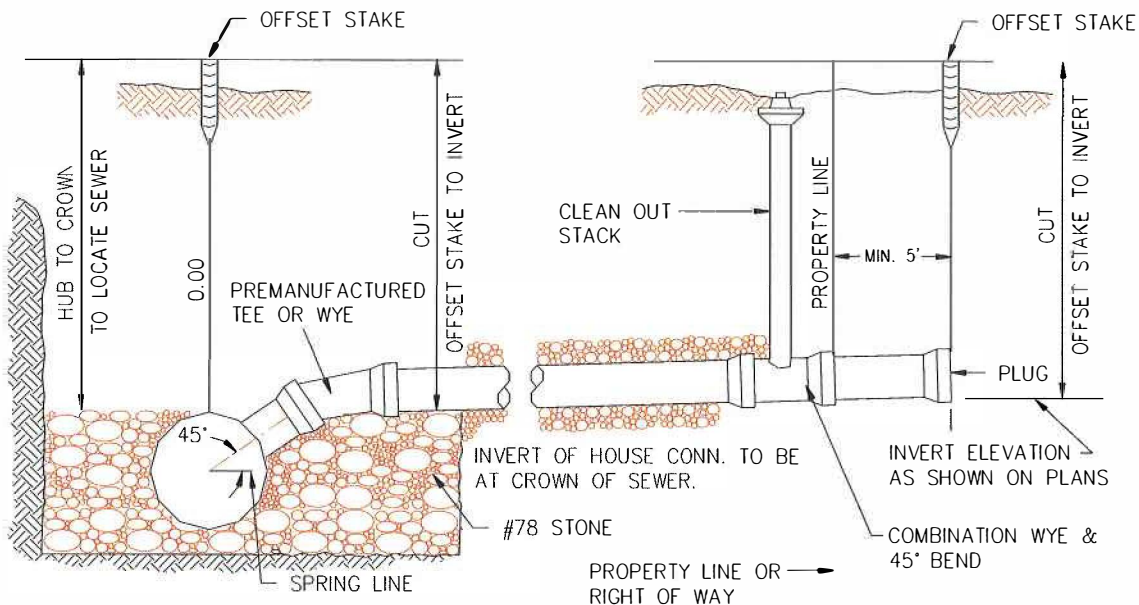
DWG. NO. 301-D-NL

SADDLES MAY BE USED IN NEW CONSTRUCTION ONLY WITH THE APPROVAL OF THE **CCWSA** AND SHALL BE SUBJECTED TO TEN FEET OF HYDROSTATIC HEAD (4.3 PSI) PRIOR TO CUTTING MAIN.



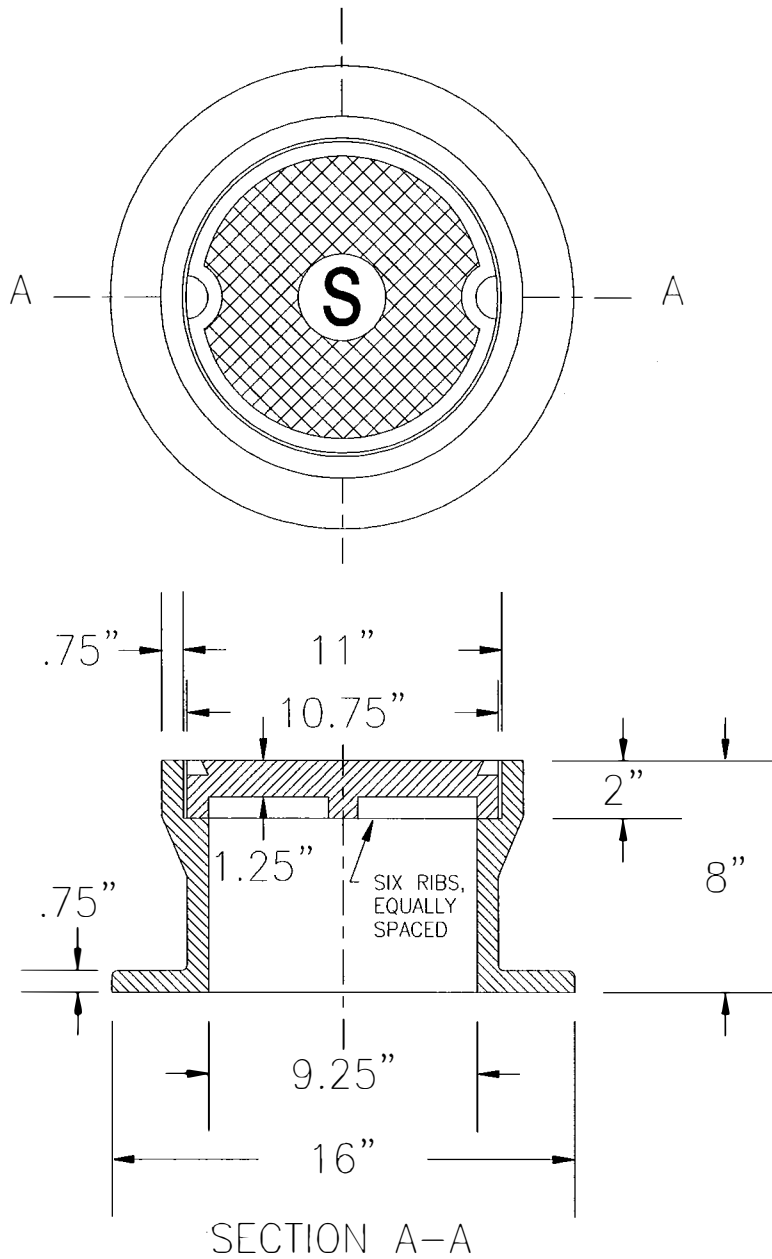
- NOTES:
1. FOR ELEVATIONS AND FURTHER DETAILS, SEE 210.06, Vol B.
 2. CLEAN OUT CAP MUST BE BRASS



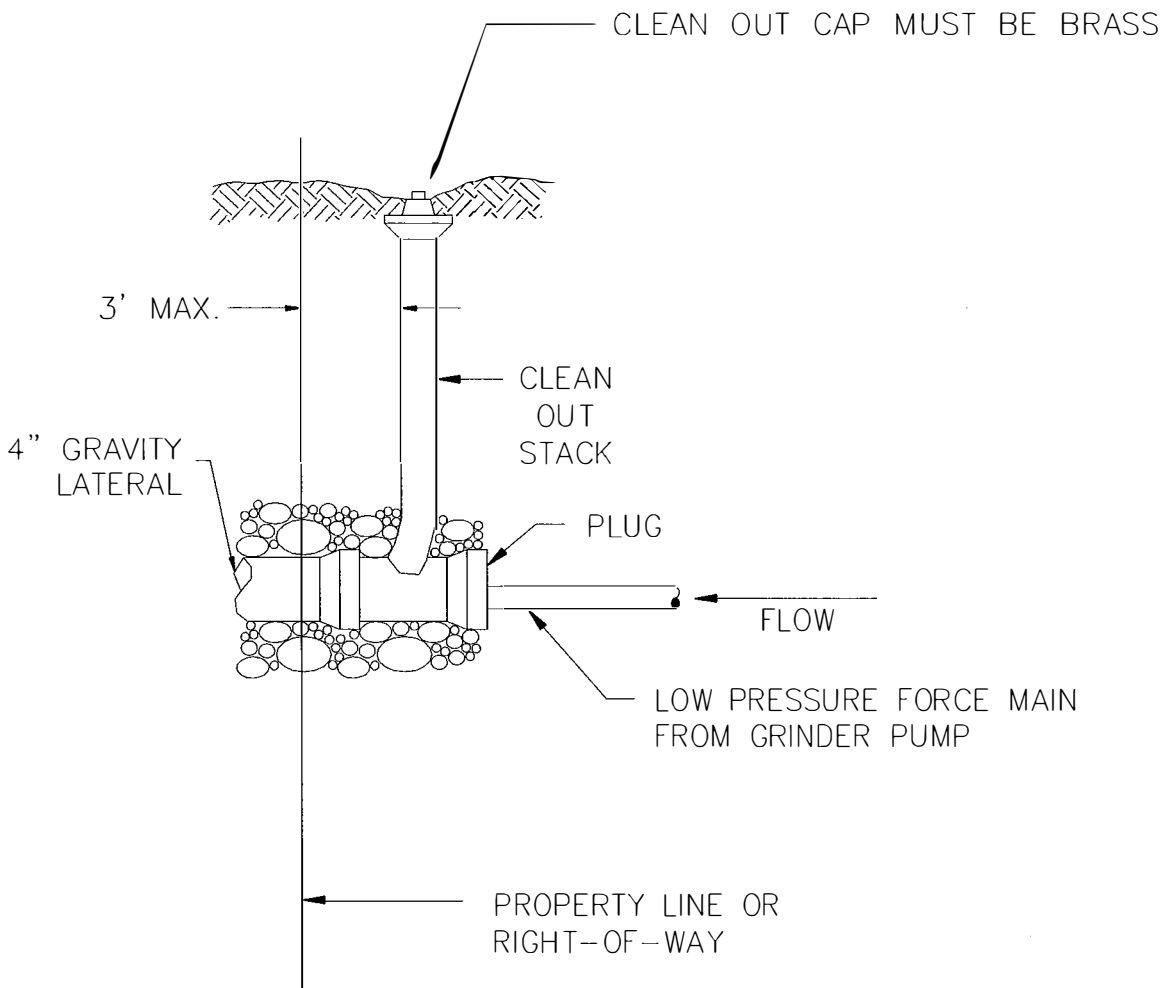


NOTES:

1. GRAVEL BEDDING THROUGHOUT.
2. RISERS LOCATED DIRECTLY OVER THE SANITARY SEWER MAIN MUST BE NOTED ON PLANS.
3. 4" LATERALS MUST HAVE A MINIMUM GRADE OF 2.00%. 5" & 6" LATERALS MUST HAVE A MINIMUM GRADE OF 1.00%.
4. CLEAN OUT CAP MUST BE BRASS.



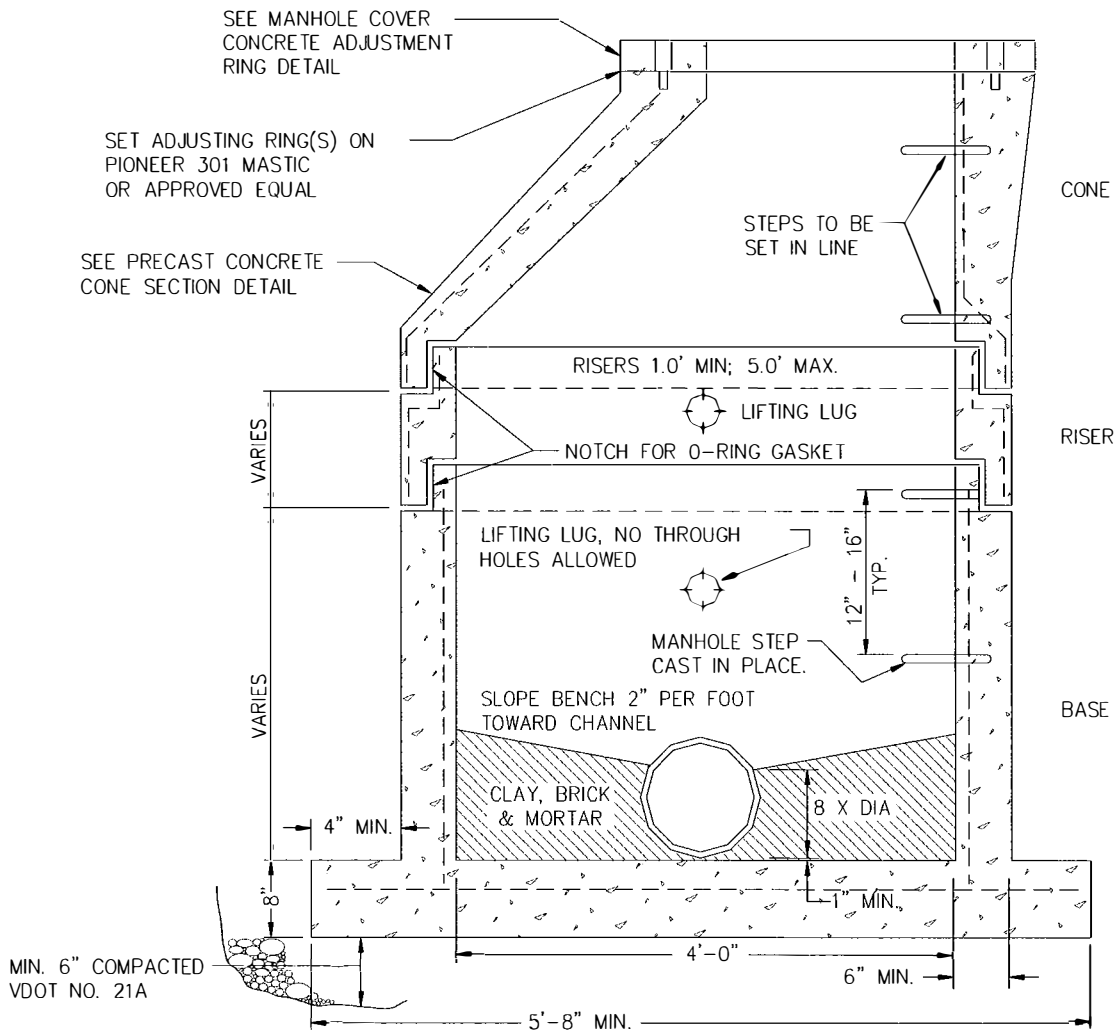
NOTE
 ALL PARTS SHALL BE ASPHALTUM PAINT
 COATED ASTM A-48, CLASS 25 CAST IRON.



NOTE
 GRAVITY LATERAL SHALL CONFORM TO SEWER SERVICE CONNECTION DETAIL EXCEPT FOR LOCATION RELATIVE TO PROPERTY LINE.

NOTES:

1. MANHOLE TO MEET CURRENT REQUIREMENTS OF ASTM SPEC. C-476.
2. ALL REINFORCING STEEL TO MEET CURRENT REQUIREMENTS OF ASTM SPEC. A-615.
3. CONCRETE TO BE 4000 PSI MINIMUM COMPRESSIVE STRENGTH.
4. TAPERED JOINT WITH O-RING GASKET TO MEET CURRENT REQUIREMENTS OF ASTM SPEC. C-361 & C-443.
5. 301 MASTIC OR APPROVED EQUAL SHALL BE USED IN ADDITION TO THE JOINT SPECIFIED.
6. APPROVED FLEXIBLE JOINT REQUIRED ON ALL PIPE CONNECTIONS TO MANHOLES. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. STUB MAY BE USED AT THE APPROVAL OF THE INSPECTOR.
7. MANUFACTURER'S NAME TO BE ON THE INSIDE FACE OF ALL SECTIONS.
8. SET COVER FRAME ON PIONEER 301 MASTIC OR APPROVED SUBSTITUTE.
9. FASTEN WATERTIGHT FRAME TO 3/4" ANCHOR BOLTS (SET ACCORDING TO CONE SECTION DETAIL) WITH NUT AND 2" WASHER. CUT ANCHOR BOLTS OFF 1" ABOVE NUT.
10. KEYWAYS MAY BE SUBSTITUTED FOR LIFTING LUGS.



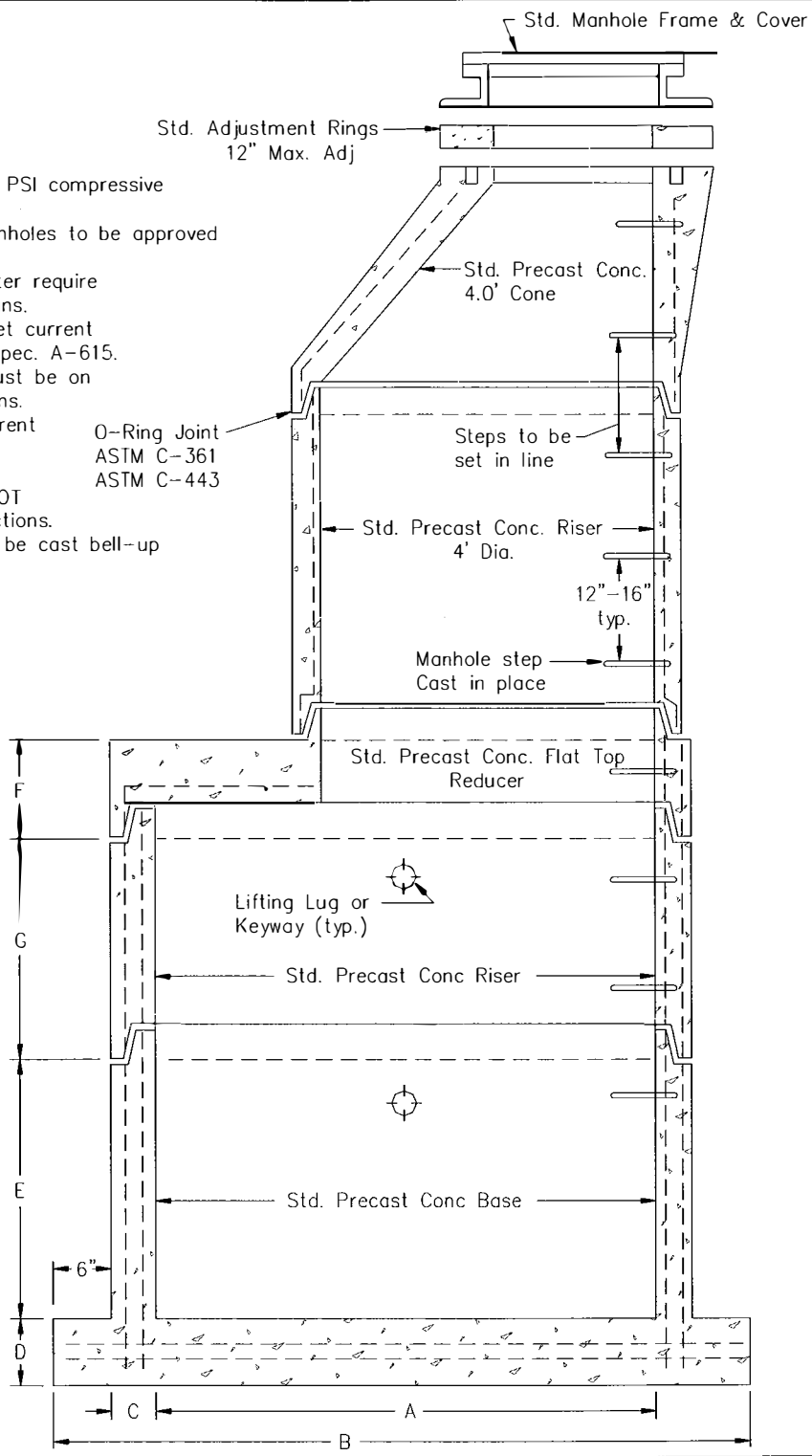
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Town of Culpeper &
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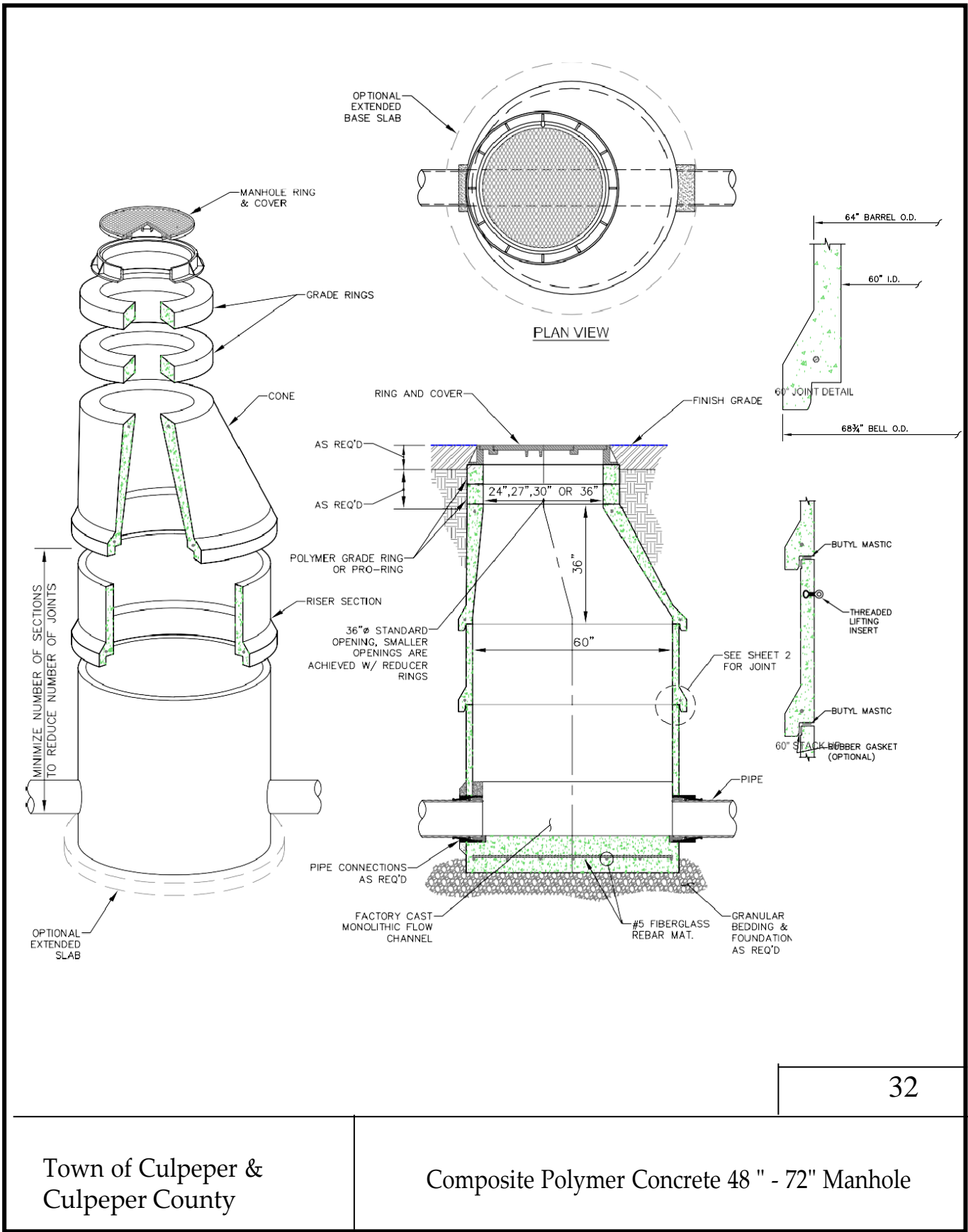
PRECAST CONCRETE
4' DIAMETER MANHOLE

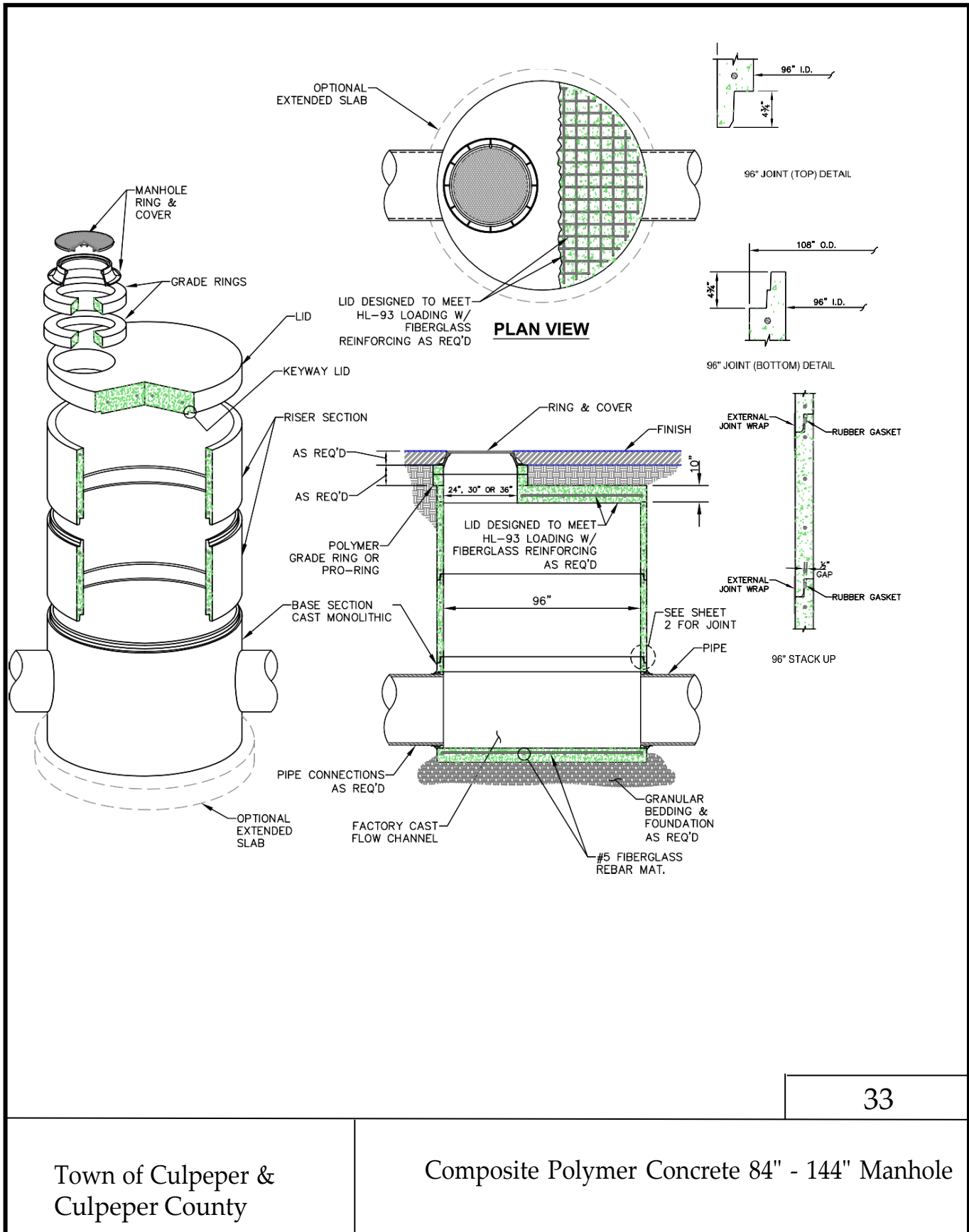
NOTES:

1. Concrete must be 4000 PSI compressive strength, minimum.
2. Pipe connections to manholes to be approved flexible sleeves.
3. Manholes over 6' diameter require detailed drawings on plans.
4. All reinforcing must meet current requirements of ASTM Spec. A-615.
5. Manufacturer's name must be on inside face of all sections.
6. Manhole must meet current requirements of ASTM Spec. C-478.
7. Place 6" compacted VDOT No. 21A under base sections.
8. Joint configuration may be cast bell-up or spigot-up.



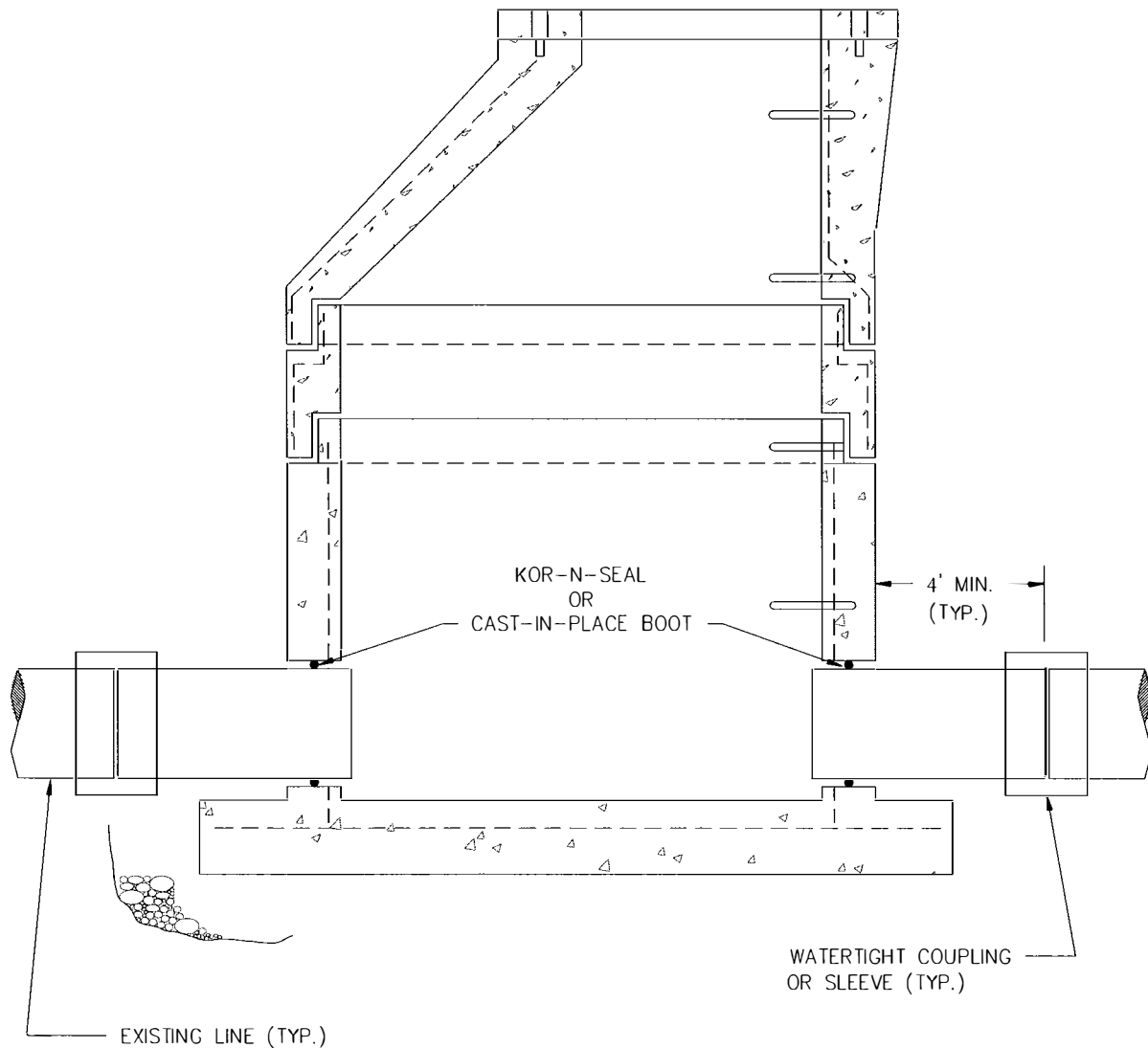
		Manhole Diameter In Feet	
		5'	6'
Dimensions	A	60"	72"
	B	84"	98"
	C	6"	7"
	D	8"	8"
	E	Varies	
	F	13" min. 13" min.	
	G	Varies	





NOTES:

1. CONTRACTOR MUST HAVE ADEQUATE EQUIPMENT TO PUMP AROUND EXISTING LINE WHILE MANHOLE IS CUT IN.
2. PRECAST CONCRETE MANHOLE SHALL CONFORM IN ALL OTHER RESPECTS TO STANDARD PRECAST CONCRETE MANHOLES.



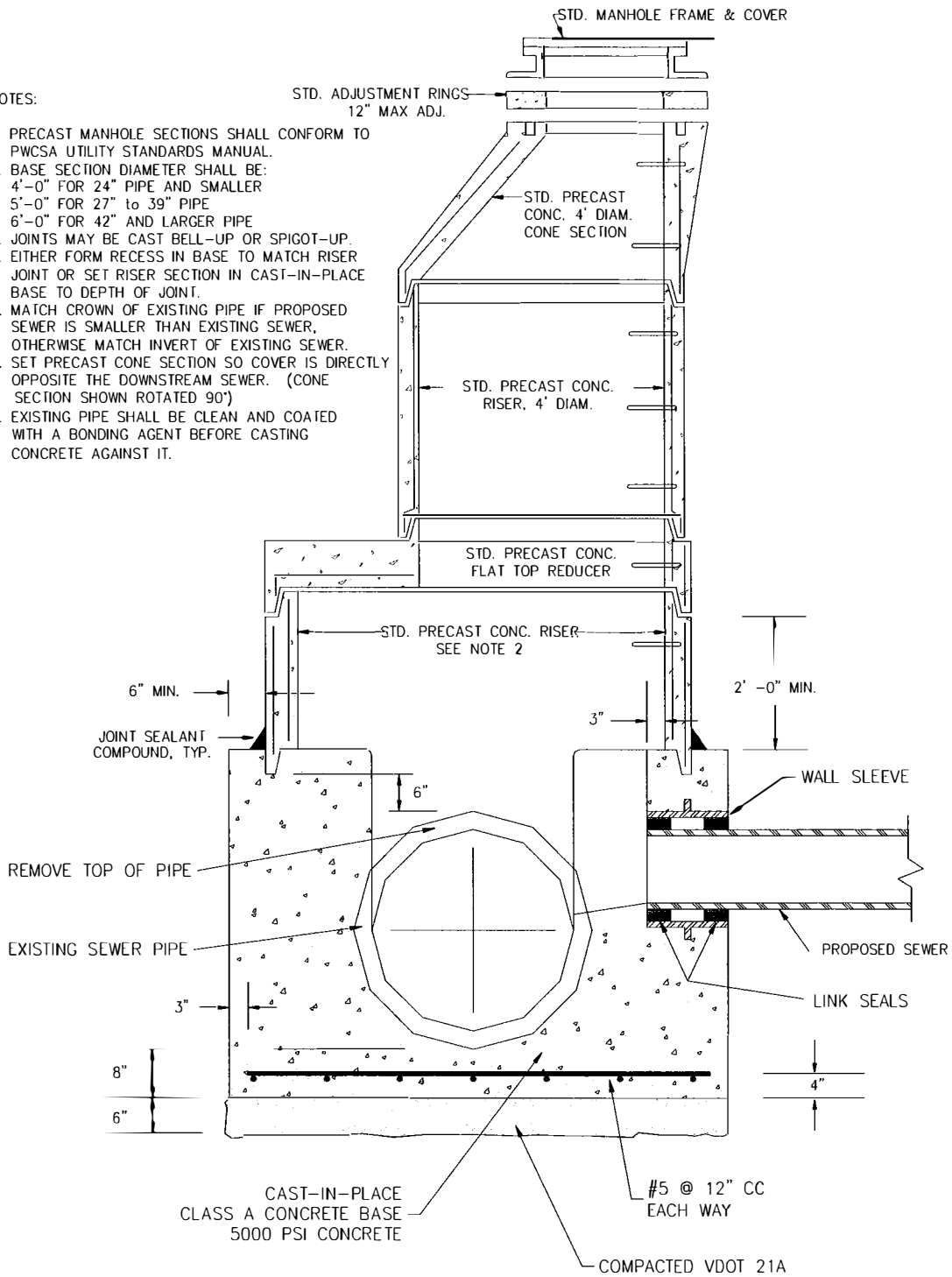
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PRECAST CONCRETE
CUT-IN MANHOLE

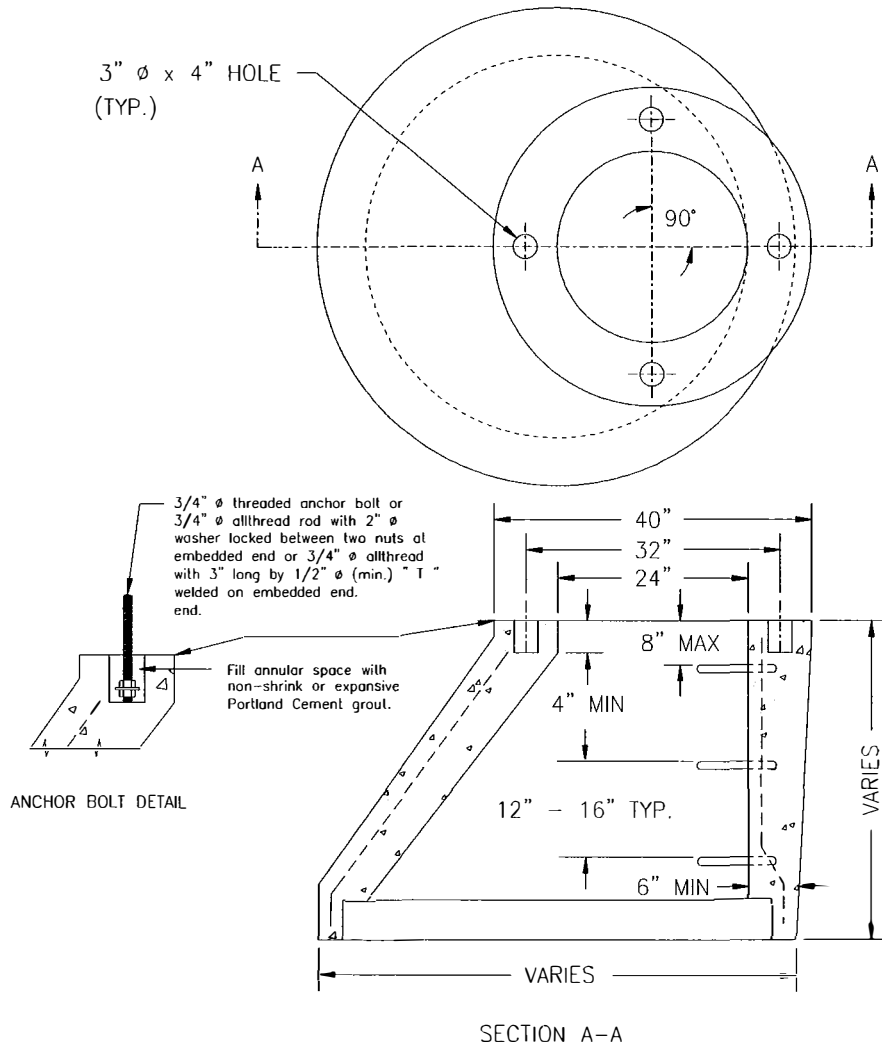
NOTES:

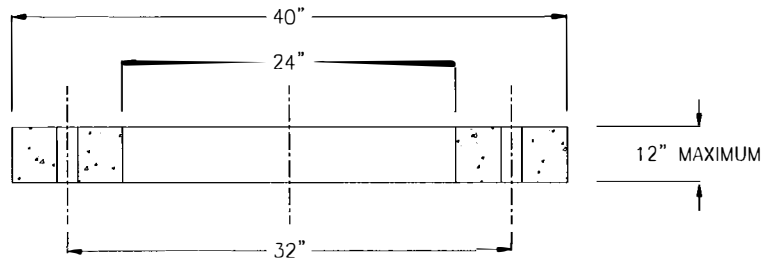
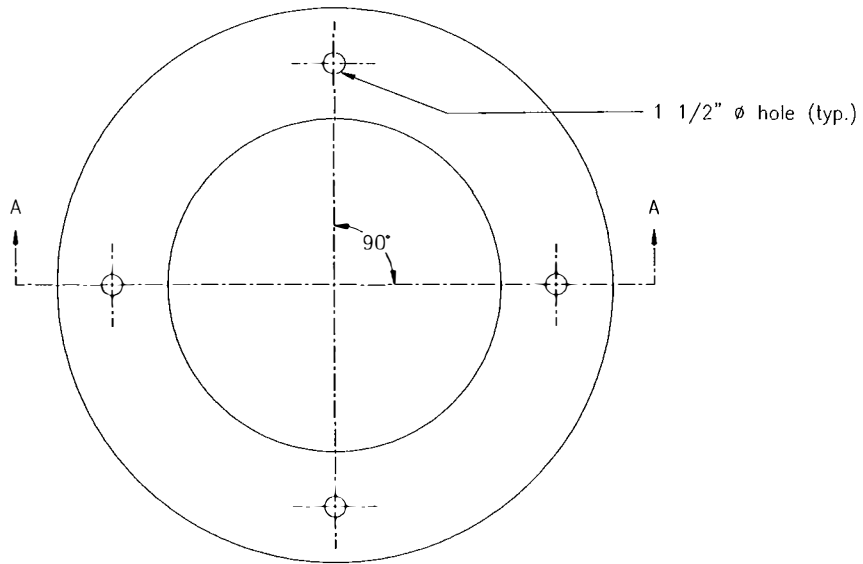
1. PRECAST MANHOLE SECTIONS SHALL CONFORM TO PWCSA UTILITY STANDARDS MANUAL.
2. BASE SECTION DIAMETER SHALL BE:
4'-0" FOR 24" PIPE AND SMALLER
5'-0" FOR 27" to 39" PIPE
6'-0" FOR 42" AND LARGER PIPE
3. JOINTS MAY BE CAST BELL-UP OR SPIGOT-UP.
4. EITHER FORM RECESS IN BASE TO MATCH RISER JOINT OR SET RISER SECTION IN CAST-IN-PLACE BASE TO DEPTH OF JOINT.
5. MATCH CROWN OF EXISTING PIPE IF PROPOSED SEWER IS SMALLER THAN EXISTING SEWER, OTHERWISE MATCH INVERT OF EXISTING SEWER.
6. SET PRECAST CONE SECTION SO COVER IS DIRECTLY OPPOSITE THE DOWNSTREAM SEWER. (CONE SECTION SHOWN ROTATED 90°)
7. EXISTING PIPE SHALL BE CLEAN AND COATED WITH A BONDING AGENT BEFORE CASTING CONCRETE AGAINST IT.



NOTES:

1. MANHOLE TO MEET CURRENT REQUIREMENTS OF ASTM SPEC. C-476.
2. ALL REINFORCING STEEL TO MEET CURRENT REQUIREMENTS OF ASTM SPEC. A-615.
3. CONCRETE TO BE 4000 PSI MINIMUM COMPRESSIVE STRENGTH.
4. TAPERED JOINT WITH O-RING GASKET TO MEET CURRENT REQUIREMENTS OF ASTM SPEC. C-361 & C-443.
5. 301 MASTIC OR APPROVED EQUAL SHALL BE USED IN ADDITION TO THE JOINT SPECIFIED.
6. PROVIDE LIFTING LUGS OR KEYWAYS, NO THROUGH LIFTING HOLES ARE ALLOWED.
7. MANUFACTURER'S NAME TO BE ON THE INSIDE FACE OF CONE SECTION.



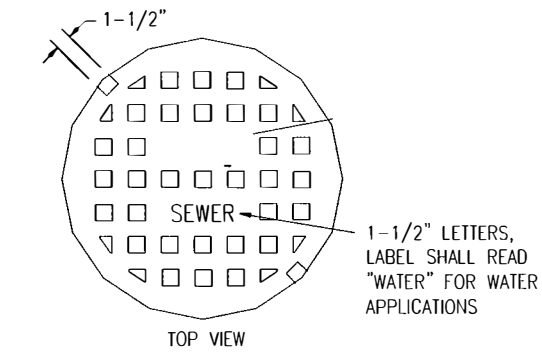


SECTION A-A

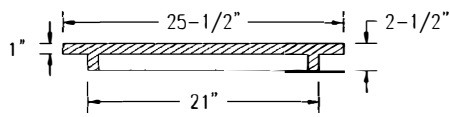
NOTES

1. Concrete shall be 4000 psi minimum compressive strength.
2. All surfaces shall be smooth and even.
3. Top and bottom surfaces shall be flat within 1/8" when tested across major diameter with a straight edge.
4. Manufacturer's name shall be on top of ring.

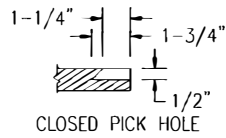
COVER



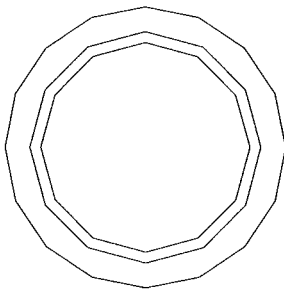
TOP VIEW



SECTION

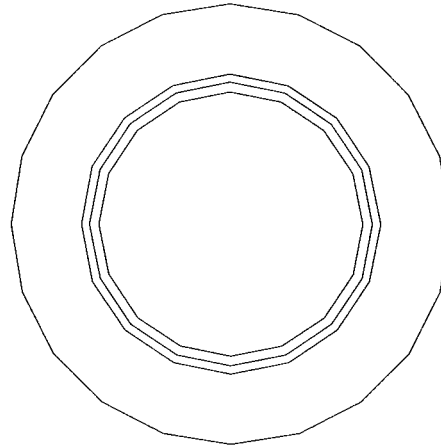


CLOSED PICK HOLE

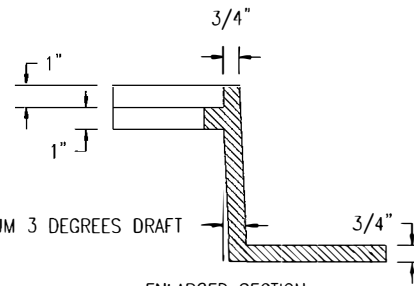


BOTTOM VIEW

FRAME

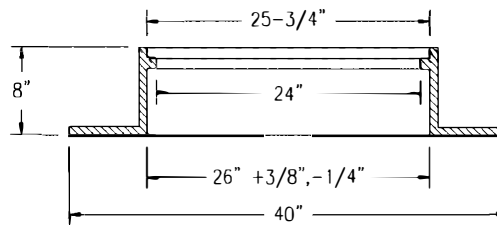


TOP VIEW



MAXIMUM 3 DEGREES DRAFT

ENLARGED SECTION

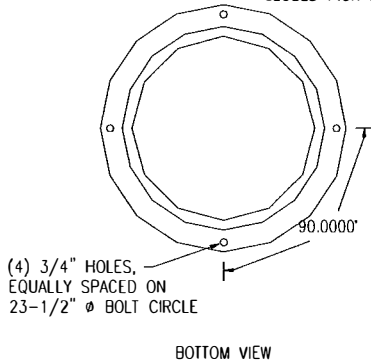
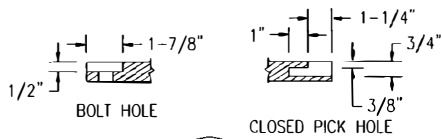
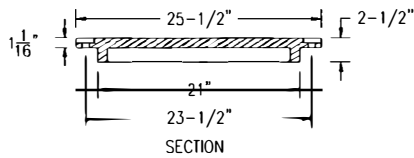
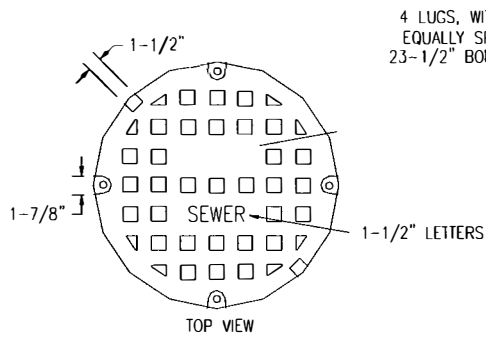


SECTION

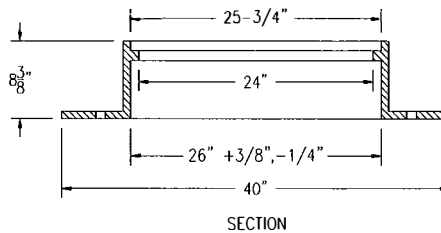
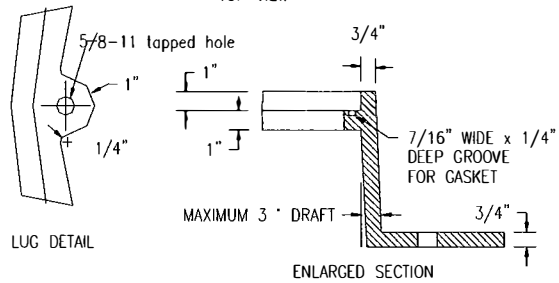
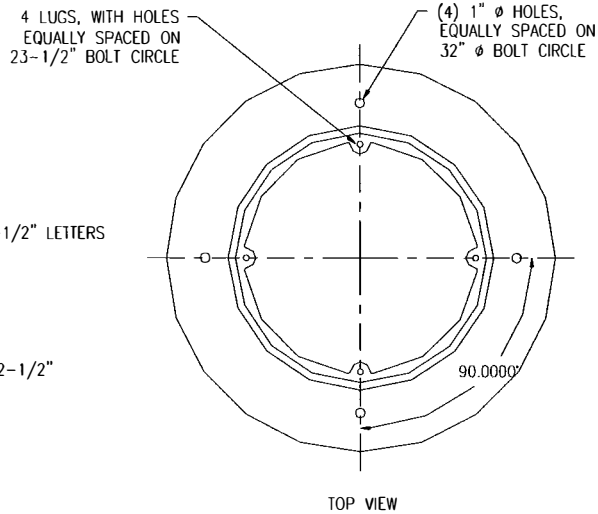
NOTES

1. MACHINE ALL BEARING SURFACES TO TRUE AND LEVEL.
2. MANHOLE FRAME MAY BE GUSSETED.
3. USE ASTM A48 CLASS 30B GRAY IRON OR BETTER.
4. CERTIFY FRAME AND COVER FOR AASHTO H20 LOADING OR BETTER.
5. RECESS LABEL LETTERING AND LOGO.

COVER

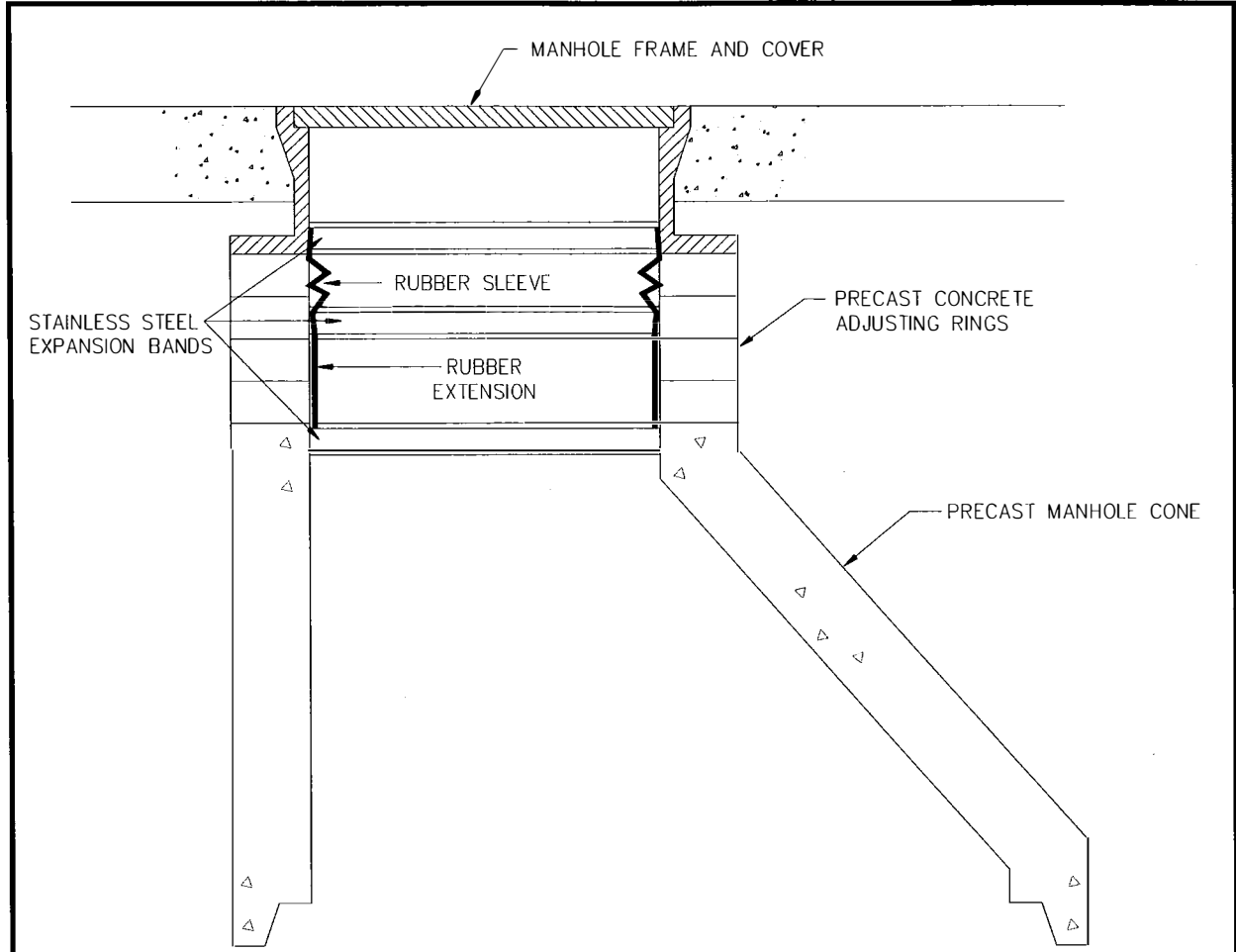


FRAME



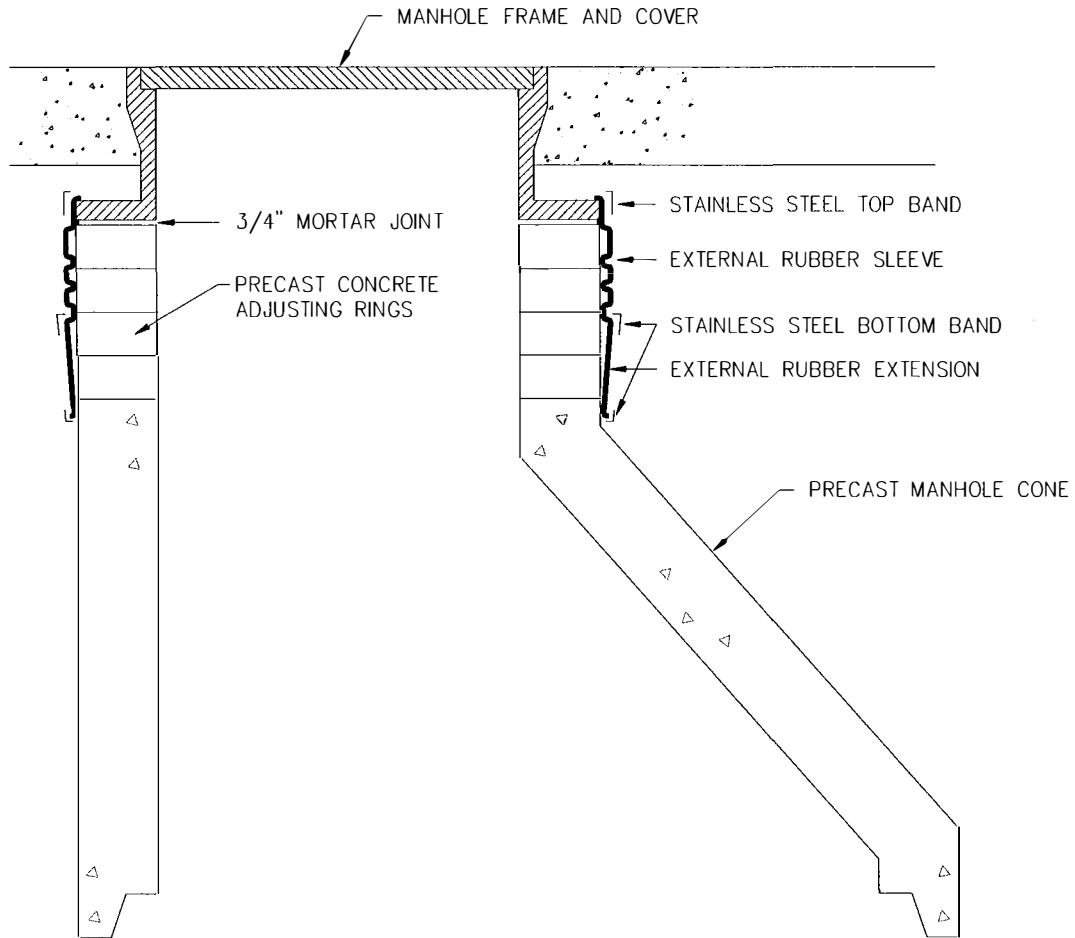
NOTES

1. MACHINE ALL BEARING SURFACES TO TRUE AND LEVEL.
2. MANHOLE FRAME MAY BE GUSSETED.
3. USE ASTM A48 CLASS 30B GRAY IRON OR BETTER.
4. CERTIFY FRAME AND COVER FOR AASHTO H20 LOADING OR BETTER.
5. RECESS LABEL LETTERING AND LOGO.
6. PROVIDE 3/8" Ø RUBBER O-RING GASKET FOR MANHOLE SEAT.
7. PROVIDE FOUR 5/8-11 x 1-1/2" STAINLESS STEEL HEX HEAD BOLTS.

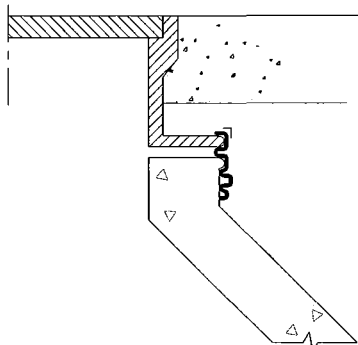


To Span Chimney Heights of:	
0 - 4 1/2"	— Chimney Seal Only
Over 4 1/2" - 9"	— Seal + 7" Extension
Over 9" - 12"	— Seal + 10" Extension
Over 12"	— Seal + Mult. Extensions

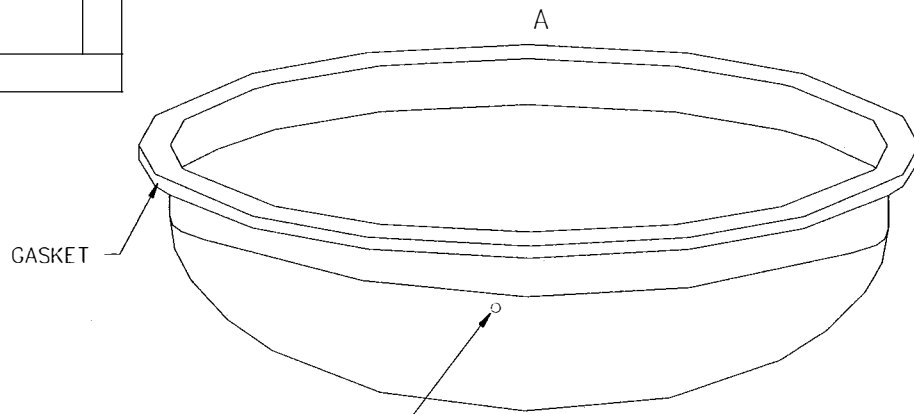
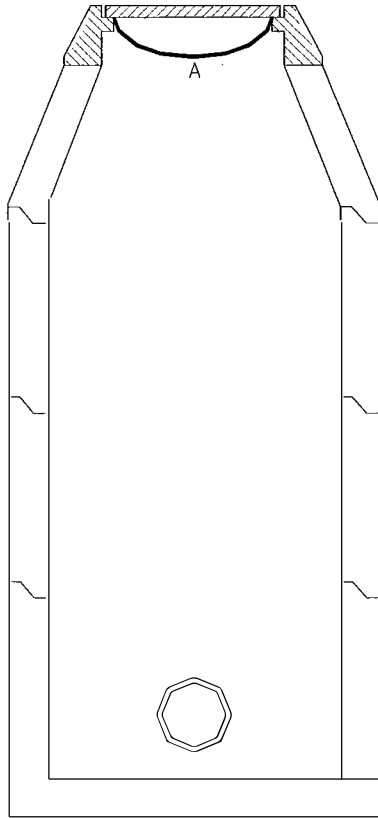
40



NARROW EXTERNAL RUBBER SEAL



To Span Chimney Heights of:	
0 - 3"	— Narrow (6") Seal only
Over 3" - 6 1/2"	— Standard (9") Seal only
Over 6 1/2" - 12"	— Std. Seal + Extension
Over 12"	— Seal + Mult. Extensions

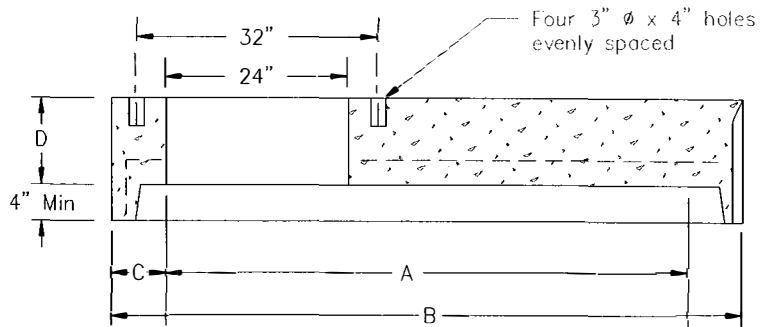


1/8" DIAMETER HOLE (FOR PRESSURE RELIEF)
LOCATE HOLE NEAR TOP OF INSERT

NOTE:

1. The manhole insert will be made of non-corrodable materials and will not be damaged by sewer gases or road oil.
2. The insert shall have two nylon straps for lifting the insert. The straps shall be attached to the insert with stainless steel rivets.
3. The bowl shall be one-eighth of an inch (1/8") ± thick and shall be between six inches (6") and eight inches (8") deep.
4. The insert shall have a gasket to seal between the insert and the lip of the manhole frame.

SECTION A-A

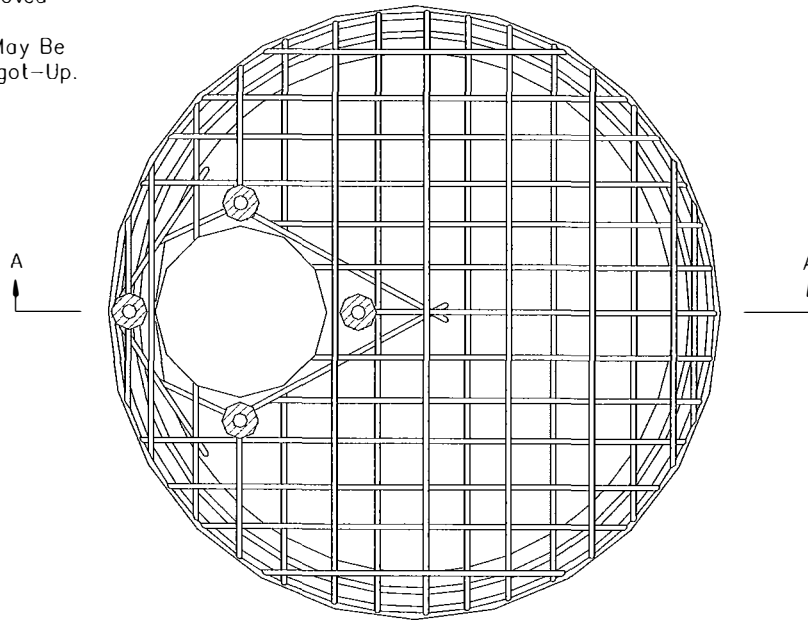


NOTES:

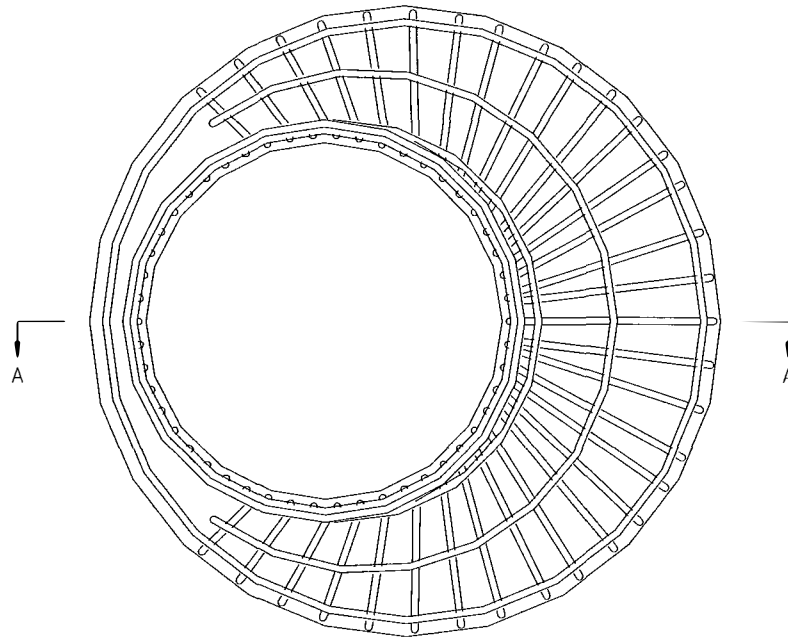
1. Concrete To Be 4000 PSI Compressive Strength, Min.
2. All Reinforcing Steel To Meet Current Requirements Of ASTM Spec. A-615.
3. Manhole Sections To Meet Current Requirements Of ASTM Spec. C-478.
4. Flat Top Shall Be Used Only When Specifically Required By The Plans Or Where There Is Height Or Invert Conflict As Determined By The Contractor And Approved By The Inspector.
5. Joint Configuration May Be Cast Bell-Up Or Spigot-Up.

MANHOLE SIZE

	4'	5'	6'
A	48"	60"	72"
B	58"	72"	86"
C	6"	6"	7"
D	6"	8"	8"



TOP VIEW



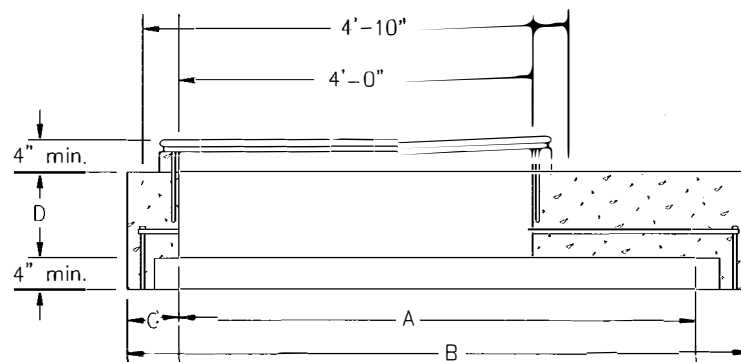
TOP VIEW

NOTES:

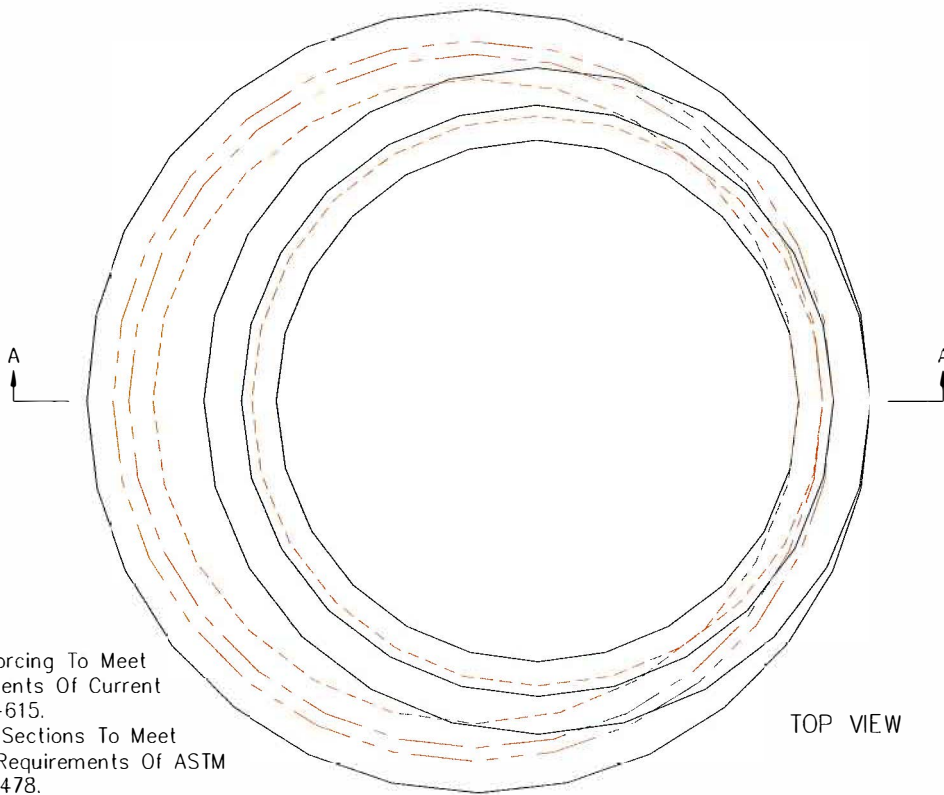
1. Concrete To Be 4000 PSI Compressive Strength, Min.
2. All Reinforcing Steel To Meet Current Requirements Of ASTM Spec. A-615.
3. Manhole Section To Meet Current Requirements Of ASTM Spec. C-478.
4. Joint Configuration May Be Cast Bell-Up Or Spigot-Up.

DIMENSIONS

	5'-4"	6'-4"
A	60"	72"
B	72"	86"
C	6"	7"
D	8"	8"



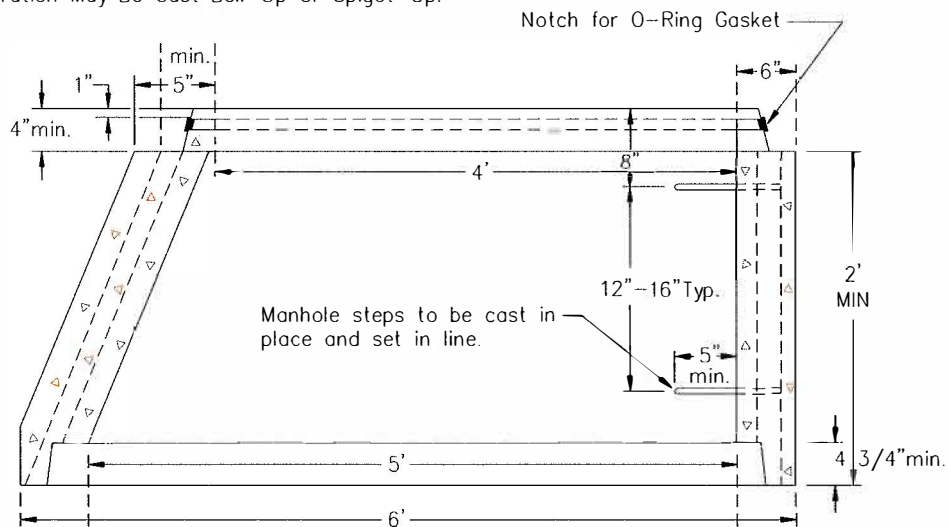
SECTION A-A



TOP VIEW

NOTES:

1. All Reinforcing To Meet Requirements Of Current ASTM A-615.
2. Manhole Sections To Meet Current Requirements Of ASTM Spec C-478.
3. Tapered Joint With O-Ring Gasket To Meet Current Requirements Of ASTM Spec. C-361
4. Joint Configuration May Be Cast Bell-Up Or Spigot-Up.



SECTION A-A

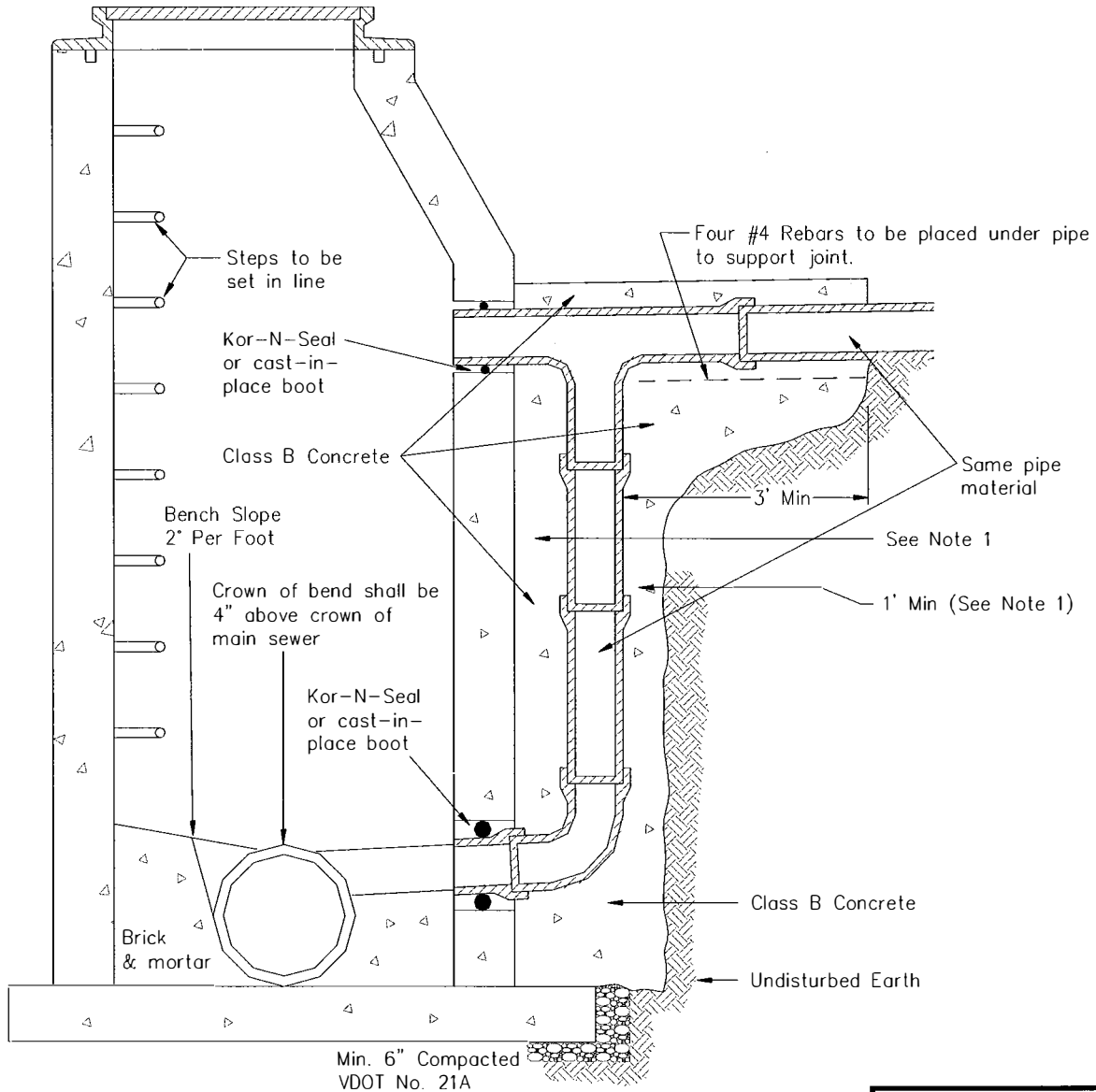
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Town of Culpeper &
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PRECAST CONCRETE
MANHOLE CONICAL REDUCER - 5' TO 4'

NOTES:

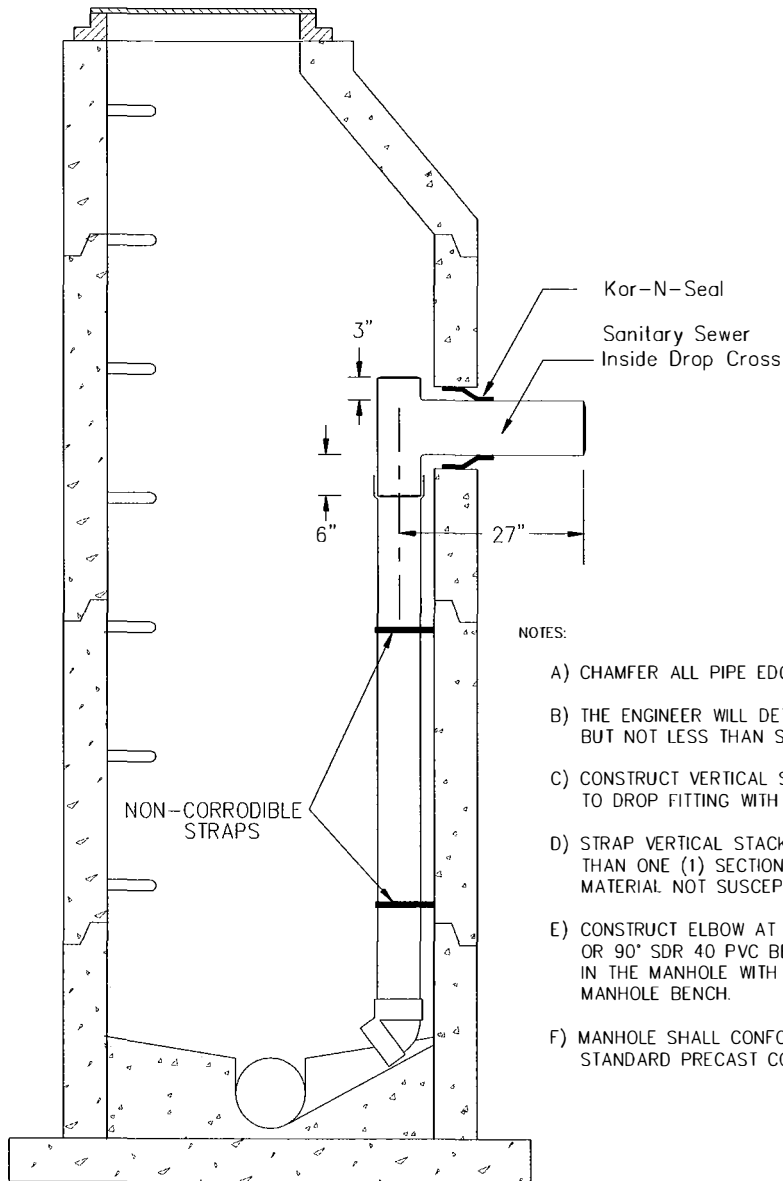
1. Fill drop connection trench with Class B concrete. Drop connection trench width to be same as approach trench.
2. Manhole shall conform in all other respects to STANDARD 4' I.D. PRECAST CONCRETE MANHOLE and CONE SECTION details.
3. Keep annular space between manhole and pipes free of concrete, mortar and grout.



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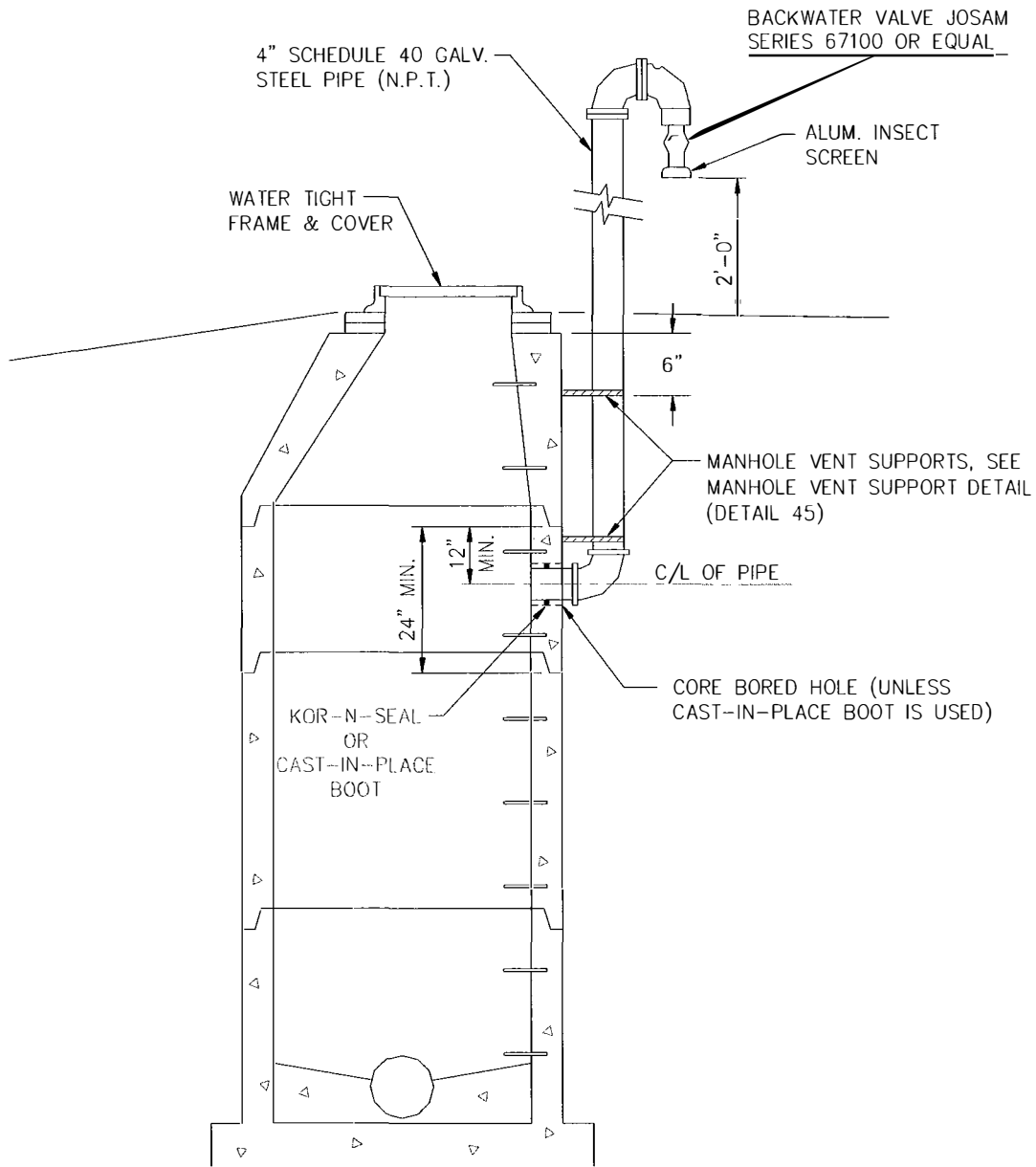
Town of Culpeper &
Culpeper County

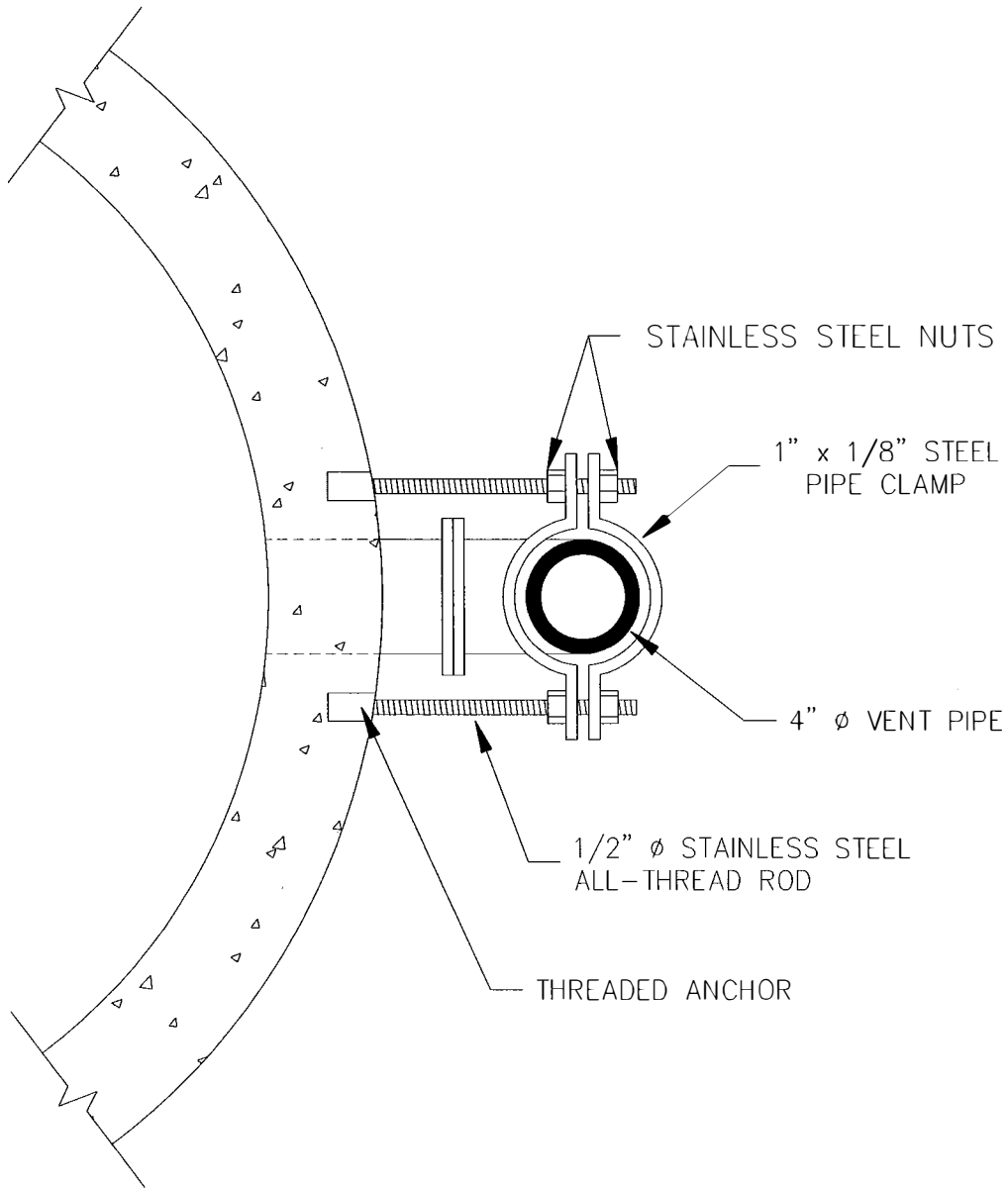
4' MANHOLE WITH
OUTSIDE DROP CONNECTION



NOTES:

- A) CHAMFER ALL PIPE EDGES AT A 15° ANGLE.
- B) THE ENGINEER WILL DETERMINE THE SIZE OF THE VERTICAL STACK, BUT NOT LESS THAN SIX (6) INCHES IN DIAMETER.
- C) CONSTRUCT VERTICAL STACK OF SDR 40 PVC PIPE CONNECTED TO DROP FITTING WITH STANDARD COUPLING BY SOLVENT WELD.
- D) STRAP VERTICAL STACK TO MANHOLE WALL AT JOINT WHEN MORE THAN ONE (1) SECTION OF PIPE IS USED. USE STRAP AND ANCHOR MATERIAL NOT SUSCEPTIBLE TO SEWER GAS CORROSION.
- E) CONSTRUCT ELBOW AT BOTTOM OF THE STACK FROM EITHER 45° OR 90° SDR 40 PVC BEND TURNED IN THE DIRECTION OF FLOW IN THE MANHOLE WITH BENCH CONSTRUCTED TO CONFORM TO MANHOLE BENCH.
- F) MANHOLE SHALL CONFORM IN ALL OTHER RESPECTS TO THE STANDARD PRECAST CONCRETE MANHOLE

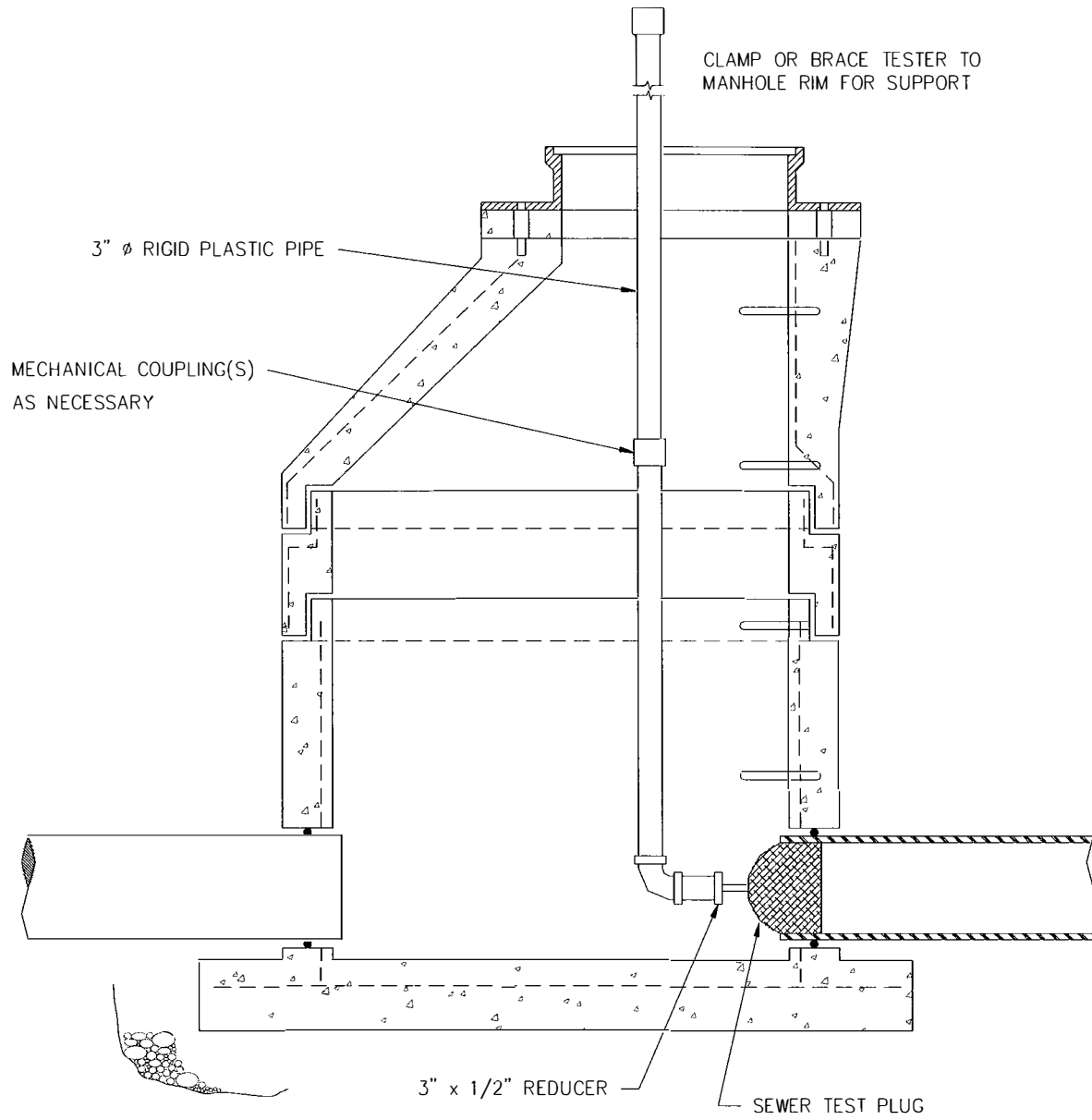




NOTES

1. ANCHOR HOLES SHALL NOT EXTEND THROUGH MANHOLE WALL
2. COAT PIPE CLAMP WITH BITUMASTIC SEALANT

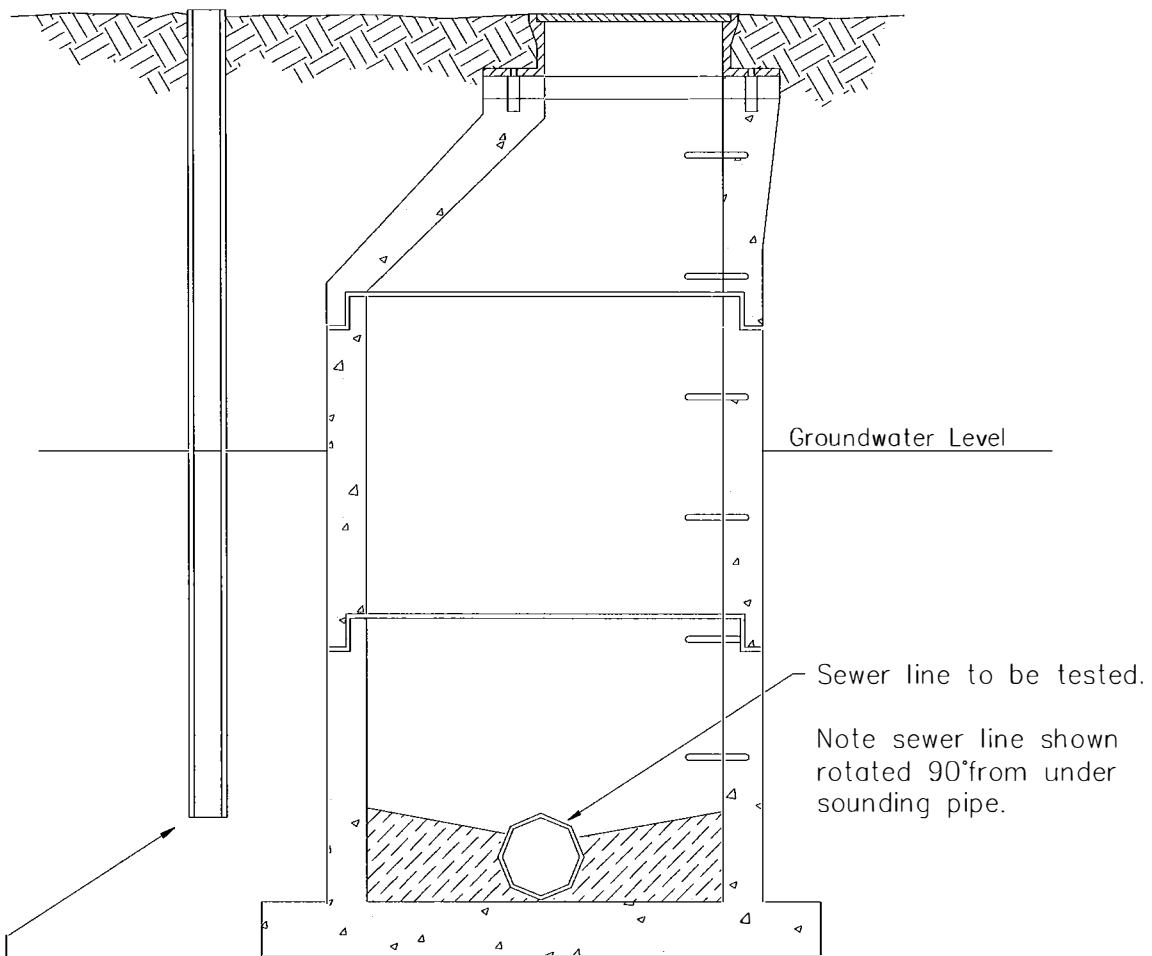
NOTE
LEVEL IN STANDPIPE MUST BE FOUR FEET MINIMUM AND
TEN FEET MAXIMUM ABOVE ANY POINT IN PIPE.



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EXFILTRATION TEST ASSEMBLY



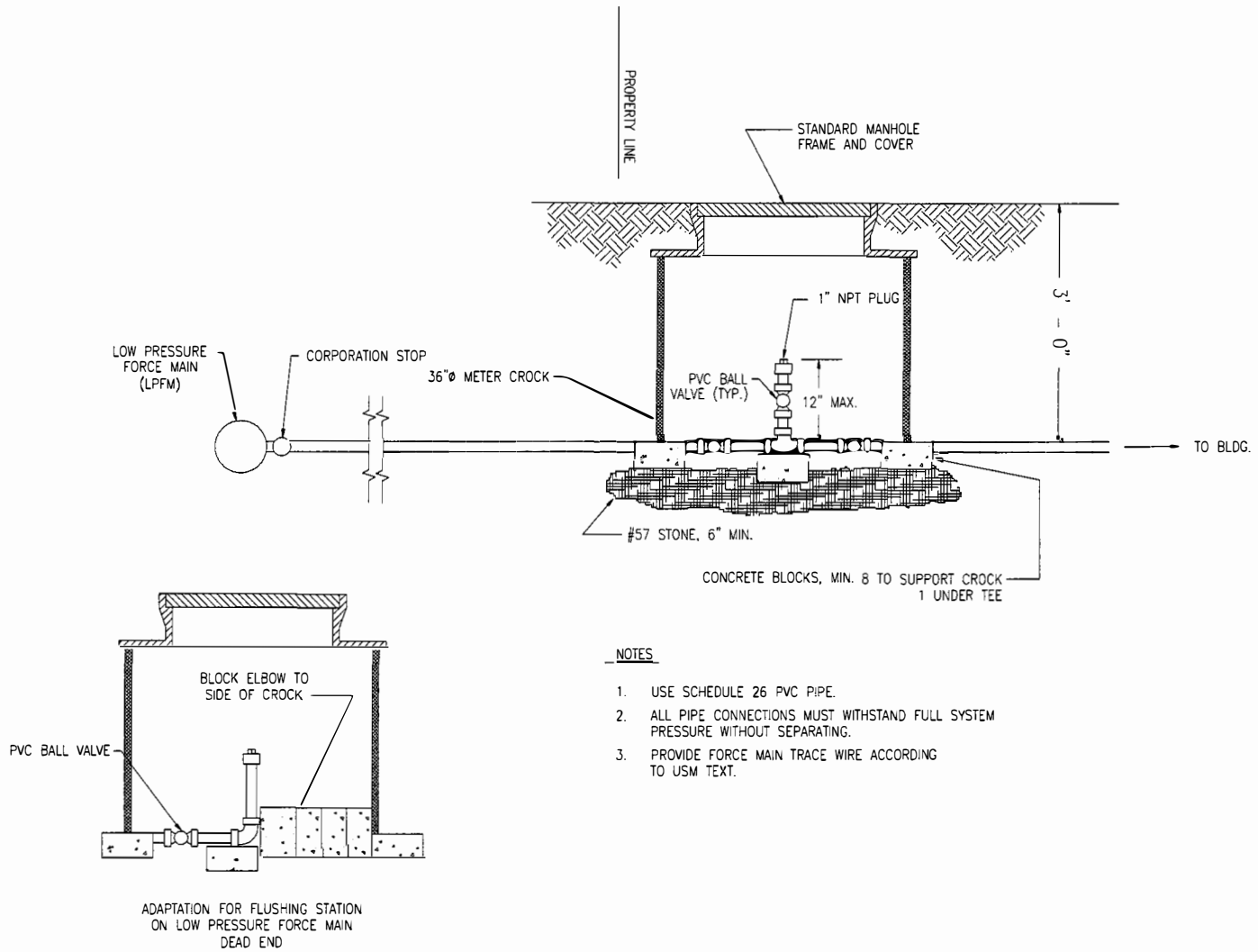
PVC Pipe; set bottom of pipe, into pipe bedding, level with crown of sewer line to be tested.

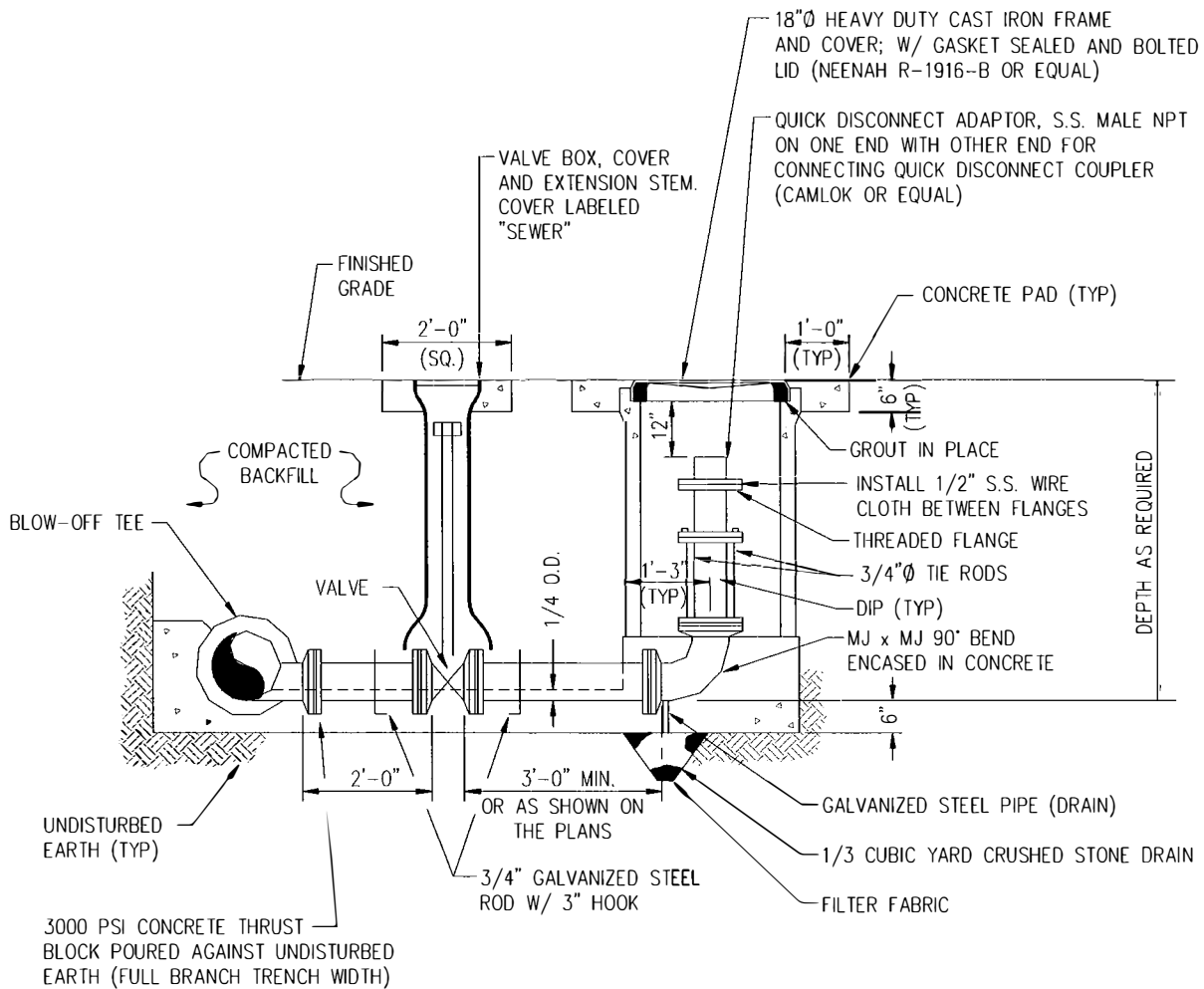
Measure water level in pipe with sounding tape or stick.

Groundwater Level

Sewer line to be tested.

Note sewer line shown rotated 90° from under sounding pipe.



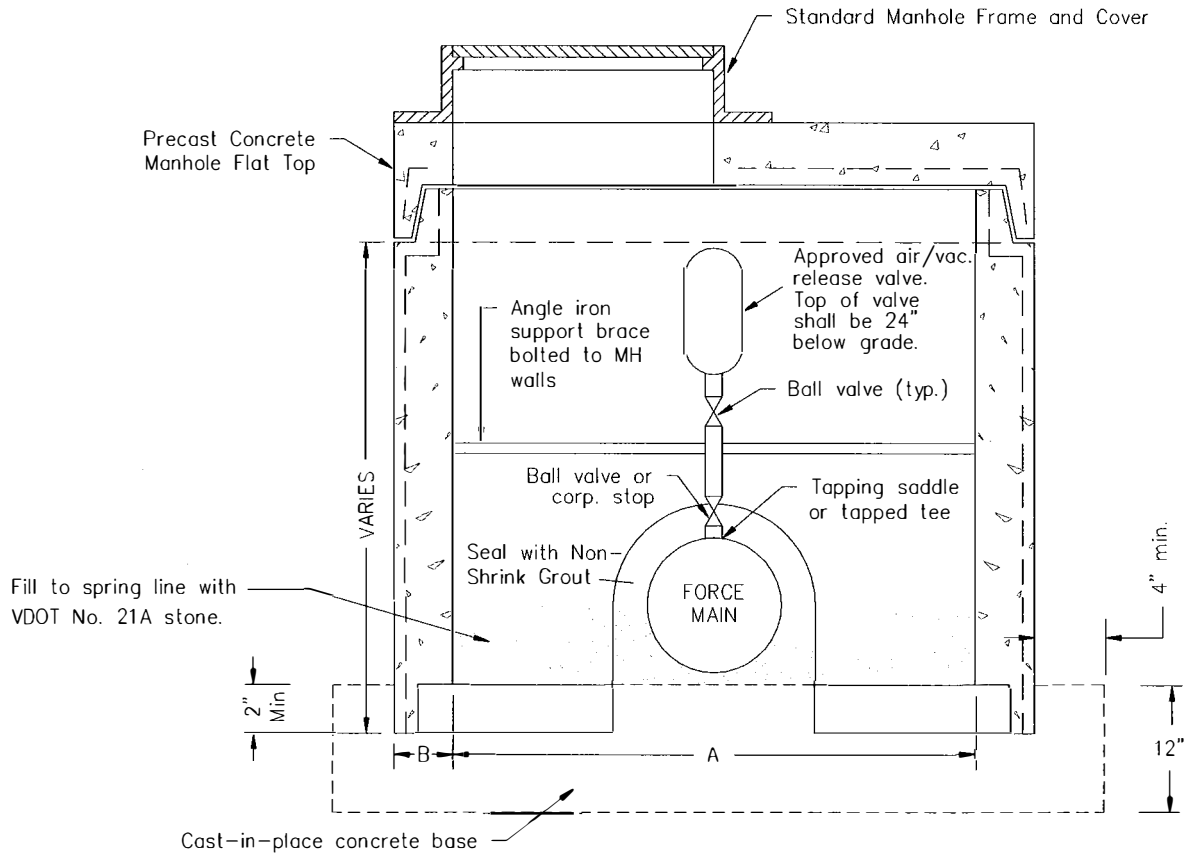


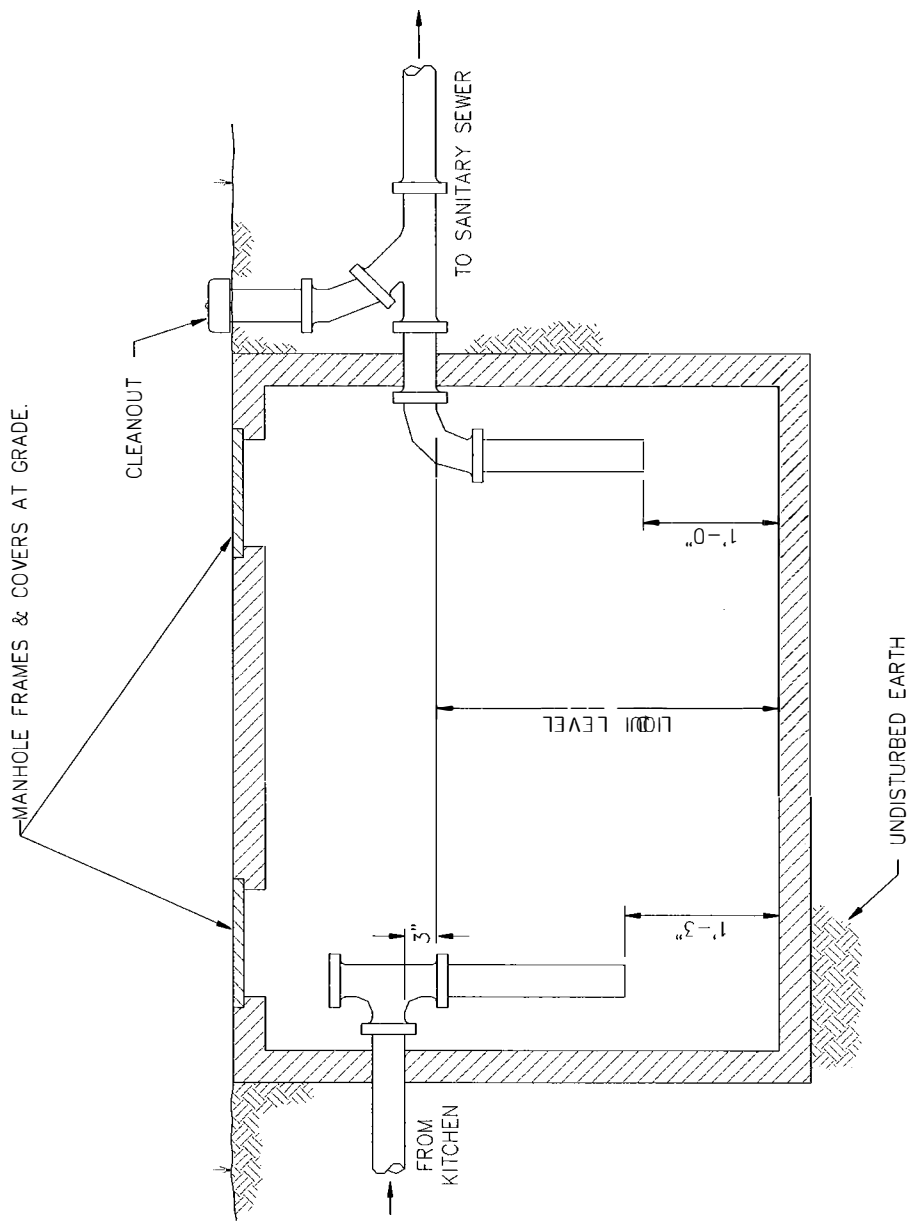
NOTES:

1. Concrete shall be 4000 PSI compressive strength, min.
2. All reinforcing shall meet requirements of current ASTM Spec A-615.
3. Manhole sections shall meet requirements of current ASTM Spec C-478.
4. Tapered joint with O-ring gasket shall meet requirements ASTM Specs C-361 & C-443.
5. Cast manhole section into base 2" or depth of joint, whichever is deeper.
6. Joint configuration may be cast bell-up or spigot-up.
7. Size doghouse openings 4" min. and 8" max. larger than pipe O.D.
8. All air release piping shall be stainless steel.
9. For force mains smaller than 6" diameter, except for ductile iron, clamp the air/vacuum release valve to the angle iron support brace.
10. Cast base on firm, undisturbed soil.
11. Standard precast base section may be used for new force main construction. Bed standard base on min. 6" VDOT No. 21A. Core holes for pipe min. 4" larger than pipe O.D. Conform to this detail in all other respects.

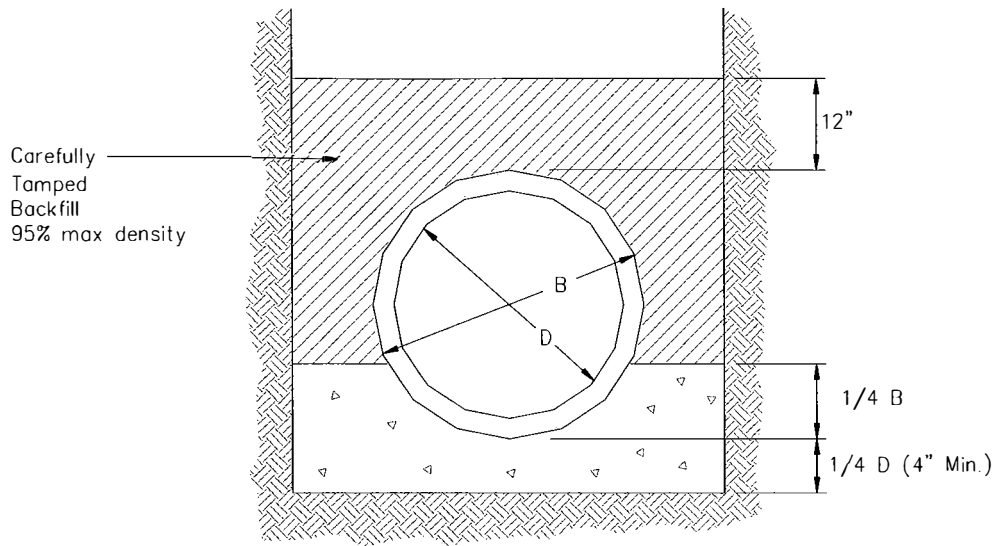
CHART A

	Min Dimensions		
FM	to 16"	to 20"	to 36"
MH	4'	5'	6'
A	48"	60"	72"
B	6"	6"	7"

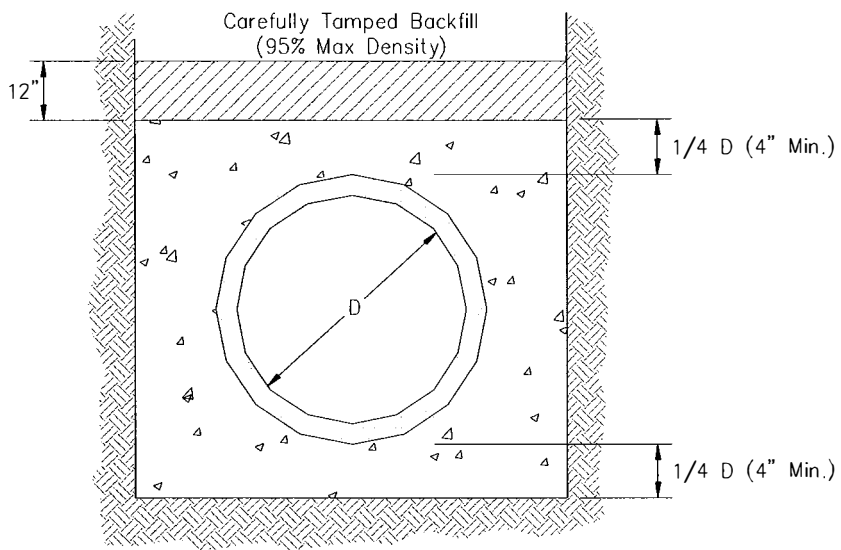




NOTES:
 DESIGN BASED ON COMMERCIALY AVAILABLE PRE-CAST SEPTIC TANK.
 MINIMUM STORAGE 500 GALLONS.



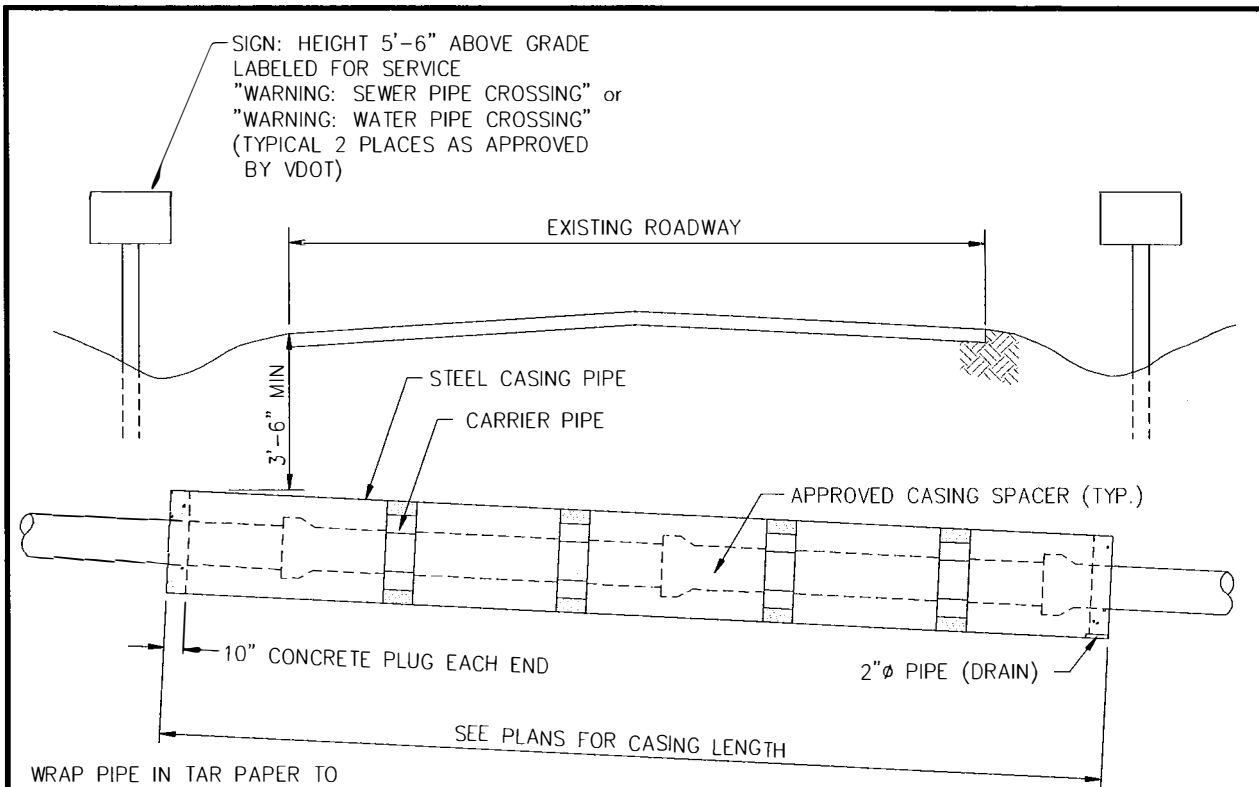
STANDARD CONCRETE CRADLE



STANDARD CONCRETE ENCASEMENT

NOTES:

1. Concrete To Be Class "B" Unless Otherwise Specified.
2. Trench Width Shall Be As Specified Or As Shown On Plans.



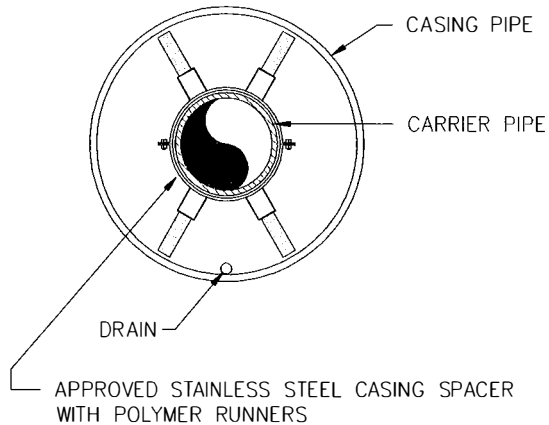
WRAP PIPE IN TAR PAPER TO
 BREAK BOND AT PLUGS

SPACE CASING SPACERS ACCORDING TO PIPE OR SPACER MANUFACTURERS' RECOMMENDATIONS OR
 2 PER SECTION OF PIPE, WHICHEVER IS GREATEST, PLUS 1 WITHIN 2 FEET OF EACH END OF CASING.

FOR GRAVITY SEWER PIPE - PUMP NEAT
 GROUT TO THE SPRING LINE OF THE CARRIER PIPE.

PUSH OR PULL THE CARRIER PIPE THROUGH THE CASING SO
 THAT THE CARRIER PIPE JOINTS ARE ALWAYS COMPRESSED.

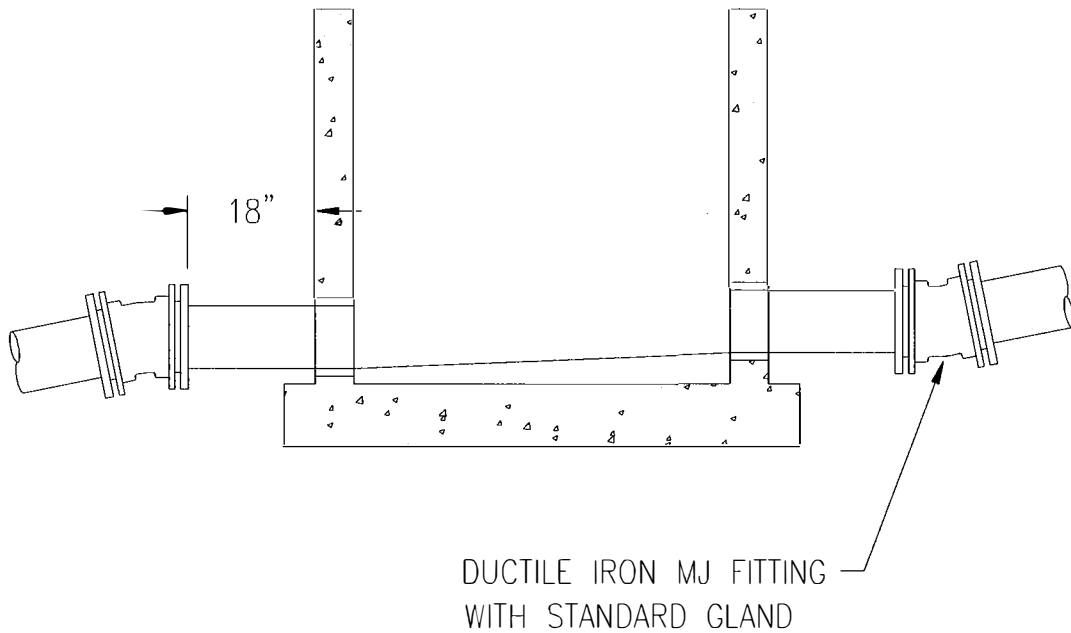
CARRIER PIPE	CASING PIPE		
	MINIMUM CASING PIPE O.D.	MINIMUM CASING THICKNESS	
		COVER TO 15'	COVER 15' & OVER
4	14	1/4"	5/16"
6	16	1/4"	5/16"
8	18	1/4"	5/16"
10	18	1/4"	5/16"
12	24	1/4"	5/16"
14	24	1/4"	5/16"
16	30	3/8"	3/8"
18	30	3/8"	3/8"
20	30	3/8"	3/8"
24	36	3/8"	3/8"
30	42	7/16"	7/16"
36	48	7/16"	7/16"
42	54	7/16"	7/16"
48	60	7/16"	7/16"
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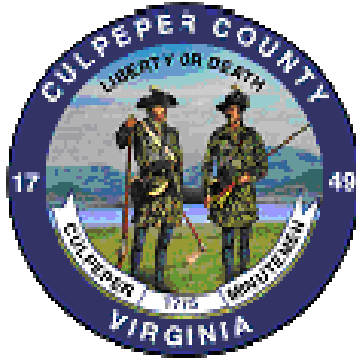


PIPE IN CASING END VIEW

NOTES

1. VERTICAL BENDS SHALL ONLY BE USED ON DUCTILE IRON PIPE.
2. MANHOLE SHALL CONFORM IN ALL RESPECTS TO STANDARD MANHOLE.
3. PIPE BEDDING AND BACKFILL SHALL CONFORM TO ALL USM REQUIREMENTS.
4. BENDS GREATER THAN $11\frac{1}{4}^\circ$ MUST BE APPROVED ON A CASE BY CASE BASIS.
5. BENDS DO NOT REQUIRE REACTION (THRUST) BLOCKING.





Volume D

CULPEPER COUNTY WATER AND SEWER AUTHORITY

WATER TREATMENT FACILITIES DESIGN STANDARDS

October 6, 2005

This Volume represents a portion of the water and sewer system standards, rules, rates, and procedures as approved by the Culpeper County Water and Sewer Authority (Authority) on October 6, 2005 and effective October 6, 2005. As such, this Volume must be used for all service areas under the jurisdiction of the Authority. Comments and inquiries are to be directed to the Authority.

CULPEPER COUNTY WATER AND SEWER AUTHORITY

**VOLUME D
WATER TREATMENT FACILITIES STANDARDS
CULPEPER COUNTY WATER AND SEWER AUTHORITY**

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**VOLUME D
WATER TREATMENT STANDARDS
CULPEPER COUNTY WATER & SEWER AUTHORITY**

100 BACKGROUND

These Water Treatment Standards establish requirements and standards for those treatment facilities that are connected to the Culpeper County Water and Sewer Authority's (CCWSA's) central water systems, as well as free-standing Community Water treatment facilities designed and constructed within Culpeper County. These standards are not intended to be all-inclusive. The Authority will consider alternative means and methods to accomplish its objectives, based upon good engineering practice and demonstrated technical effectiveness, reliability, and cost effectiveness.

The Water Treatment Standards presented herein shall supplement the latest edition of the "Waterworks Regulations" as published by the Commonwealth of Virginia, Virginia Department of Health (VDH) (12 VAC 5-590-10 et seq.), i.e., the Waterworks Regulations. The Waterworks Regulations represent the minimum design requirements set forth by VDH. All requirements of the Waterworks Regulations shall be adhered to unless specifically excluded by this document. As the owner, the Authority may identify and determine the need for standards and requirements that are more stringent than those contained in the Waterworks Regulations. The headings and sub-headings of this document, Section 300 PART I GENERAL FRAMEWORK, follow the general format of the State Waterworks Regulations.

The CCWSA reserves the right to identify and determine the need for standards and requirements that are more stringent than those contained in Part III of the VDH Regulations. These additional standards and requirements are introduced by the phrase, "Comply with VDH Regulations and the following". In instances where no additional requirements are specified, headings and sub-headings have been deleted to promote clarity. In any case, all the provisions of Water Regulations apply unless specifically exempted.

In addition, waterworks infrastructure shall meet the latest edition of the Authority's "Design and Construction Standards," (DCS Manual) Volume B. The Authority will grant no exceptions to the requirements of these distribution system standards.

200 INTRODUCTION - Statement of Design, Standards, and Performance

The Developer's submittals for drinking water treatment designs shall conform to the most current version of the Virginia Department of Health, Drinking Water Standards, Chapter 590 Waterworks Regulations, Parts I, II, III, and IV, as applicable, and also to the most current version of the applicable provisions of the National Primary and Secondary Drinking Water Regulations as issued by the USEPA under authority of the Safe Drinking Water Act as amended. The more stringent regulations will govern.

The following unit processes are required for Developers proposing water treatment systems to be installed in Culpeper County. Units shall be sized based on results of well sampling and testing. Units shall be installed to treat constituents identified by Virginia Department of Health (VDH) and the Safe Drinking Water Act (SDWA) to levels required by VDH and the SDWA, unless otherwise indicated by the County.

Article 1 Summary of Procedures

- a. Developers proposing to design and construct water treatment facilities in Culpeper County shall first submit a preliminary engineering report (PER) signed and stamped by an engineer currently registered in the Commonwealth of Virginia. The project development shall be within one of the designated Service Areas given in the Culpeper County Master Water and Sewer Plan Report. The PER shall conform to the general engineering parameters established for the Service Area. The PER shall include all calculations and support data necessary to evaluate the submittal. (See Volume A.)
- b. Upon approval of the PER by the Authority and the VDH, the Developer shall submit their preliminary plans and specifications to the Authority for review, comment, and approval. A list of processes and equipment to be used, complete with cut sheets, shall be included in the submittal.
- c. Upon approval of the preliminary design, the Developer shall submit the complete set of final bid documents to the Authority for approval. After approval, it shall be sent to the Virginia Department of Health for review, comment, and approval. The Developer is responsible for satisfactorily responding to and satisfying all comments.

Article 2 Water Treatment Unit Processes Standards of Performance

Water treatment unit processes shall be designed in accordance with the latest version of the Waterworks Regulations. Treatment unit processes shall be designed to meet Primary Maximum Contaminant Level (MCL) and Secondary Maximum Contaminant Level (SMCL) required by VDH.

The design guidelines set forth in the Waterworks Regulations Manual of Practice (Part III) specify general criteria for the design and construction of waterworks. VDH may impose standards or requirements which are more stringent than those contained in the Manual of Practice when required for critical areas or special conditions. Any such special standards or requirements with a federal mandate shall take precedence over the criteria in the manual and will be items which warrant careful consideration at the preliminary engineering conference, referenced in 12VAC5-590-200 B.

Water treatment processes must adequately safeguard public health. Design of water treatment processes shall be based on contaminants present. The VDH may require changes in designs which are not in substantial compliance with the manual.

Final, complete, and detailed plans and specifications submitted in accordance with the provisions of 12VAC5-590-200 and 12VAC5-590-210 will be reviewed by the VDH. Such plans and specifications will be approved if they demonstrate substantial compliance with the design criteria set forth in the Manual of Practice and if the waterworks as constructed or modified, will be able to function in compliance with the operating regulations set forth in Part II.

Treatment for these MCL and SMCL constituents may include, but not be limited to the following processes:

- a. Hypochlorite Feed
 - For disinfection and oxidation of iron and manganese
- b. Reaction Tank/Raw Water Storage
 - To allow Cl contact time for disinfection and oxidation of iron and manganese
- c. Aeration of Raw Water
 - For radon removal by air stripping
 - For oxidation of iron and manganese
- d. GAC (Granular Activated Carbon) filter
 - To remove excess chlorine that may be carried over to the ion exchange resin
 - To filter out oxidized iron and manganese
 - To catalyze the oxidation of iron
 - To absorb Radon
- e. Hydrous Manganous Oxide (HMO) Process (including Sodium Permanganate and Manganese Sulfate)
 - For radium reduction
- f. Sand filters
 - To filter out oxidized iron and manganese
 - To filter out other radium absorbed by the HMO process chemicals
 - To filter out other solid particles in the raw water
- g. Granular Ferric Hydroxide (GFH) System
 - To remove arsenic
- h. IX (Ion Exchange) System with SAC (Strong Acid Cation resin)

- To remove arsenic
- i. IX System with SBA (Strong Base Anion resin)
 - To remove iron, manganese, and radium
- j. Hypochlorite Feed
 - To maintain distribution system residual
- k. pH Control Chemical Feed
 - To adjust distribution system pH as required
- l. Corrosion Control Chemical Feed
 - To control lead and copper in distribution system
- m. Fluoride Feed
 - To maintain VDH recommended distribution system concentration to reduce dental caries.
- n. If the level of a constituent present in the water sample is found to be 75% of the capacity of the unit process or processes designed to treat that constituent, the next larger unit process or processes shall be incorporated into the initial design.

Article 3 Non-Process Related Standards of Performance for CCWSA Water Treatment Facilities

- a. General guidelines for Water Treatment Plant Site Layout and Building Layout (Architectural Standards) are discussed in paragraphs 12VAC, 5—590-710 and 720, respectively.
- b. Painting systems shall be as directed by the Authority.
- c. All tanks housing treatment processes shall be constructed of steel reinforced concrete.
- d. The following should be provided for all well sites:
 1. Wellhead protection
 2. Fenced site
 3. Alarms to be transmitted to the control center.

Article 4 Water System "Supervisory Control And Data Acquisition," (SCADA) Generalized Standards of Performance

- a. All water treatment facilities, water pump stations, water tanks, remote flowmeters, remote motorized valves, etc will be monitored by the

Authority's Supervisory Control and Data Acquisition (SCADA) system. This system will be designed and built as a part of water system construction projects. The SCADA instrumentation and control work will be specified to be performed by an Instrumentation and Control Systems House working as a subcontractor to the project General Contractor. This SCADA subcontractor will have a minimum of 5 years continuous experience and shall provide references of at least 3 successful SCADA control projects similar in size and nature to the CCWSA water facilities.

- b. The Water System SCADA system will be centered around the Water Treatment Plant, which will be monitored and controlled through the SCADA system. Remote water system sites possibly including raw water pump stations, lift pump stations, tanks, valve actuators, flow meters, and pressure meters will be included in the SCADA system. All of these remote sites will report directly to the Water Treatment Plant. Communications between remote sites will be accomplished using Radio communication and a dedicated multidrop voice grade telephone line as a backup communication.
- c. One or more Programmable Logic Controllers (PLC's) will be located at larger sites such as the Water Treatment Plants. Remote locations such as raw water pump stations, lift stations, water tanks, valve actuators, and flow or pressure meters will typically have a single PLC.
- d. All desired binary and analog input signals would be input into a PLC including items such as:

BINARY INPUTS

Pushbuttons
Door switches
Level switches
Motor starter run auxiliary contacts
Pump failure contact
Power failure contact
Generator run contact
Generator failure contact

ANALOG INPUTS

Level signal
Flow signal
Pressure signal
Speed signal
Water quality signals

- e. Additionally, all desired binary and analog output signals would be output from the PLC including items such as:

BINARY OUTPUTS

- Start-stop signal (motors, systems)
- Status indication (all types)
- Status alarm (all types)
- Enable signal (allows activation)

ANALOG OUTPUTS

- Speed control signal
- Valve position signal for flow control
- Chemical feed signal for tracking one or more variables

All PLC's at the filter plant will be digitally networked together and in turn networked together with remote PLC's using a Radio system and dedicated telephone lines as a primary or backup communication.

These PLC's in turn are networked to filter plant computers containing "Human-Machine Interface" (HMI) software. This graphical user interface software allows an operator to retrieve information about the system such as raw water flow rate, which pumps are running, which valves are open, tank levels and which alarms are active. Additionally, the HMI software allows the operator to input control instructions into the SCADA system such as flow rate set points, motor start and stop instructions, pump sequence instructions, etc.

Desired Automatic control functions are accomplished using the PLC local to the function. The PLC will be programmed to respond depending on the input information to the SCADA system. Programmed functions might include sequences of operation, on and off set points values, and operating set point values.

In addition to the operator computers, there will be report generation and system monitoring SCADA computers located at the water treatment plant and at a remote central location for the Authority.

300 - PART I GENERAL FRAMEWORK

Article 1 Definitions

12 VAC 5-590-10 Definitions

- a. Applicant - means the Developer or property owner seeking approval of the Community Water System.
- b. Authority - means the Culpeper County Water and Sewer Authority.
- c. Authority Design Standards - means Authority-approved procedures methods and materials as promulgated in the *Approved Products List – Water and Sewer, Standard Details*, and all subsequent requirements for the design and construction of Authority Water Treatment facilities.
- d. Community Water System - means any freestanding system to be owned and/or operated by the Authority. Freestanding systems are not connected to the Authority’s central water system.
- e. Major Process Equipment - means mechanically or electrically actuated process equipment requiring routine maintenance and specified in Divisions 11 through 16 of contract specifications formatted in accordance with the Construction Specifications Institute. Major process equipment includes pumping and treatment unit processes and associated electrical controllers.
- f. Waterworks Regulations - means the latest edition of the “Waterworks Regulations” as published by the Commonwealth of Virginia, State Department of Health (VDH) (12 VAC 5-590-10 et seq.)

Article 2 General Information

12 VAC 5-590-40 Administration of Regulations

Comply with VDH Regulations and the following:

The Authority shall become the owner and operator of the facility that is to be designed and constructed. The Authority is responsible for definition and specification of standards, including equipment, materials and design criteria.

Article 3 Review and Approval Procedures

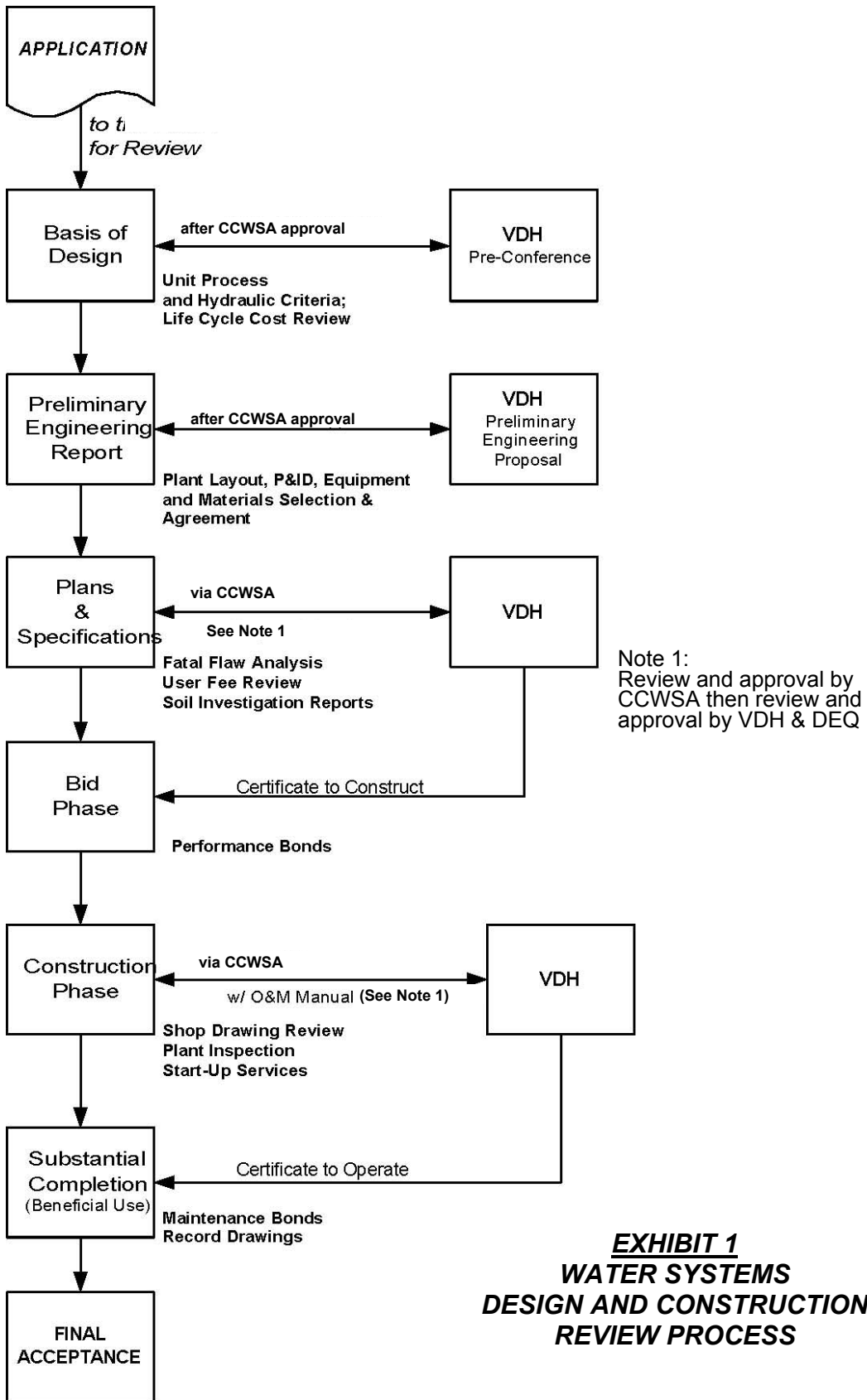
12 VAC 5-590-90 General

Comply with VDH Regulations and the following:

- a. The service area of any Community Water System shall be totally within one of the Service Areas designated by the Culpeper County Master Water and Sewer Plan report. The Applicant shall provide a certificate from the Culpeper County Zoning Administrator that the area to be served by the proposed treatment facility has been officially zoned for the

particular type, or types, of land use described in the application. If, in the future determination of the Authority, the system may be connected to another water system, the Authority may do so at its discretion.

- b. Community Water Treatment facilities shall be approved by the Authority. The Authority will only consider for approval groundwater systems that are not under the direct influence of surface water, as defined by EPA's Surface Water Treatment Rule (i.e., which would require the removal of *Cryptosporidium* and other pathogenic microorganisms). The Authority shall review and approve all design documents applicable to that system and its compatibility with the Plan's Service Area in which it is proposed; including the Basis of Design, Preliminary Engineering Report, and Plans and Specifications. Said review and approval shall be in accordance with Standards in Volumes A through G and shall be in addition to, and take precedence over, required approvals by county, state, and federal authorities. The Authority's procedure as shown in Exhibit 1 – Community Water Systems Design and Construction Review Process, shall govern all review and approvals. This procedure requires that the Authority approve a "Basis of Design" prior to the Preliminary Engineering Conference required by the VDH. It also requires approval of a "Preliminary Engineering Report" prior to submitting the official Engineer's Report to VDH. Applications to VDH shall be made through the Authority who, acting as the ultimate owner and operator, shall become the permit holder.
- c. Community Water Systems shall be constructed at no cost to the Authority.
- d. Each Community Water System shall be financially self-sustaining. As such, operating, maintenance, repair and replacement, and upgrade costs shall be borne by the owners of all properties within the service area for said system and a notice to this effect shall be recorded in each homeowner's covenant. In the interest of economy-of-scale, a mandatory connection provision may be required by the Authority Board for inclusion within the homeowner's covenant.



- e. Adequate construction and maintenance easements or access rights-of-way for all Community Water Systems shall be provided for future extensions as well as new infrastructure. Perpetual easements in lieu of fee simple property for pumping stations and treatment facilities shall not be provided unless specifically approved by the Authority.
- f. Community Water Systems shall require an Agreement (Water Agreement) between the Authority and the Applicant. The Water Agreement shall require the Applicant to subsidize the operation and maintenance of the waterworks until such time that 95 percent of the units within the development are sold and connected to the system. The Applicant shall agree to perform all construction in accordance with plans and specifications approved by the Authority and in accordance with Authority standards. Applicant shall agree to transfer to the Authority all property and facilities free of debts, liens and/or other legal encumbrances, for ownership, operation and maintenance. The Water Agreement between the Authority and the Developer shall be completed prior to acceptance of Plans and Specifications by the Authority. The Authority shall develop all Agreements.
- g. A "User Fee Review", consisting of a rate study, shall be provided to the Authority for review no later than the final submission of the plans and specifications. The user fee review shall determine annual costs for a five-year basis, replacement costs for 40 years, and develop a recommended fee structure for the community system based on a basic fee for administrative costs and a metered rate per 1,000 gallons of use.

12 VAC 5-590-140 Variances

Comply with VDH Regulations and the following:

- a. The Applicant may apply to the Authority for variances to these Treatment Standards provided the variance requests are brought to the attention of the Authority prior to the approval of the Preliminary Engineering Report.

12 VAC 5-590-200 Construction Permits

Comply with VDH Regulations and the following:

- a. The Authority must review and approve the construction drawings, plans and specifications for a project pursuant to construction permit issuance and will submit the same to Virginia Department of Health for a Certificate to Construct. The construction permit references the executed Community Water System Agreement between the Authority and the owner/developer and summarizes the terms and conditions between the

parties. Complete execution of this agreement is required before the project receives approval by the Authority's Engineer. Virginia Department of Health requires a construction permit to be issued and executed by an engineer certified in the State of Virginia as a Professional Engineer. Upon approval, the Authority will send notice and a construction permit for execution. Acceptable performance/labor and materials payment bond in the amount estimated for the installation of these utilities, as agreed by the developer's consulting engineers; certificate of insurance; payment of inspection fees; submission/approval of associated easement/record plats must be in place prior to issuance of construction permit. Once all necessary items are in place, the Authority will fully execute the permit and send approved plans and permit to Inspections Department for pre-construction meeting.

- b. Prior to commencement of construction, a mandatory pre-construction conference shall be held and a list of major process equipment shop drawings to be reviewed by the Authority shall be established. The Applicant shall submit its proposed agenda to the Authority for approval at least seven days prior to the conference.

VAC 5-590-210 Formal Requirements for the Submission of Engineering Data

Comply with VDH Regulations and the following:

- a. In accordance with Exhibit 1, provide a "Basis of Design" report which shall include:
 - (1) Proposed Service Area including a detailed vicinity map showing individual lots within the proposed subdivision layout; and the required system capacity based on number of proposed lots and Authority-required flow rates and number of wells.
 - (2) Treatment Technology to include applicable (and Authority acceptable) treatment technologies; provide a process flow diagram for each unit process.
 - (3) If necessary, life cycle cost comparisons among competing technologies considering initial and replacement costs, maintenance costs, operational costs and reliability.
 - (4) For selected treatment technology, provide design criteria, catalog cutsheets of major process equipment, and a detailed process flow diagram showing number of units and capacities of the major process equipment components. Design criteria must meet the more stringent of VDH Waterworks Regulations or Authority standards. Calculations submitted shall include hydraulics, process

chemistry, anti-flotation calculations, and water hammer analyses. Water hammer analyses may be waived by the Authority for booster pumping station capacities less than 500 gallons per minute, or station pressures less than 50-feet total dynamic head. Systems where column separation can occur shall have water hammer analyses conducted.

- b. Before the Authority will review the Applicant's plans and specifications, the Applicant must pay applicable engineering review fees as described in the appropriate Water System Agreement.

12 VAC 5-590-260 Issuance of the Operation Permit

Comply with VDH Regulations and the following:

- a. The Applicant shall complete and submit the "Statement of Completion of Construction" to the State upon its satisfaction that the Treatment Works meets the requirements of the approved plans and specifications and only when a final inspection by the VDH is warranted. The Authority shall approve the "Statement of Completion of Construction" prior to the Applicant submitting it to the State.
- b. The Applicant shall maintain record drawings of "as-built" conditions that vary from the work as originally shown on the contract drawings. The Applicant shall submit electronic files of the record drawings to the Authority within 30 days after completion of construction and prior to acceptance of the facility by the Authority. The files shall be on a Microsoft Windows compatible CD-ROM in AutoCAD 2005 file format or higher as designated by the Authority. Provide coordinates for field location of valves, manholes, and other buried facilities in accordance with the Virginia State Plane Coordinate System North Zone (NAD 83).
- c. Draft and Final "Operating and Maintenance Manuals" must be approved by the Authority before substantial completion and prior to submittal to the VDH for approval.

12 VAC 5-590-270 Inspection and Correction

Comply with VDH Regulations and the following:

- a. The Authority will accept or reject shop drawings for major process equipment and provide inspection of the Community Water Systems in accordance with the Water System Agreement. All shop drawing submittals shall bear the stamp of approval of the Applicant's design engineer as evidence that the Applicant has checked the shop drawings. Submittals without this stamp of approval will not be reviewed and will be

returned to the Applicant for resubmission. The Applicant shall cite in the letter of transmittal all shop drawing variances from the requirements of the Contract Documents and the design modifications proposed to accommodate the variances. If variances are not cited, the Applicant will not be relieved of the responsibility for executing the work in full conformance with the Contract Documents even though such submittals have been accepted by the Authority.

- b. Pumps and other major process equipment shall be certified by the manufacturer. Certifications shall be provided to the Authority prior to shipping to the site.

400 - PART II OPERATION REGULATIONS FOR WATERWORKS

No supplements

500 - PART III MANUAL OF PRACTICE FOR WATERWORKS DESIGN

Article 1 General Design Operation and Inspection Criteria

12 VAC 5-590-640 General

Comply with VDH Regulations and the following:

- a. Surveying shall meet State grid coordinate specifications. Provide four northern Virginia grid coordinates for plan views and two horizontal and vertical control benchmarks per site. All drawings shall be 24 x 36-inches in size. Pipeline profiles shall have a horizontal scale of 1" = 50' or less.

12 VAC 5-590-690 Capacity of Waterworks

Comply with VDH Regulations and the following:

- a. Add: Average daily design flow shall be based upon 300 gpd/connection and 12 hours per day of treatment plant operation. Peaking factors shall comply with the Authority's Design Standards. Treatment works shall be sized to match the well pumping capacity
- b. Add: Minimum acceptable effective storage for domestic and fire flow purposes shall be not less than 400 gallons per equivalent residential connection at minimum working pressure.
- c. Add: Minimum working pressure at service connections shall be 30 psi at peak hourly flow rates under build-out conditions and with system equalization storage at either low levels or pressures.

- d. Ground Water Systems (Wells)
- (1) All groundwater systems shall provide the number of wells that are anticipated to be capable of continuously pumping no less than 1.0 gpm per connection for sixty (60) consecutive days:
 - (2) Groundwater systems having more than fifty connections shall have the following number of hydrogeologically independent wells. (All well yield combinations stated below refer to the minimum pumping test rates to be used during a 72 hour groundwater testing program, as described in Article 2, Source Development, of this document):
 - (3) Two wells producing a combined total of 1.0 gpm per connection; the lowest yielding well must produce a minimum of 0.6 gpm per connection.
 - (4) Three wells producing a combined minimum of 1.0 gpm per connection. The two lowest yielding wells must produce a combined minimum yield of 0.6 gpm per residential connection.
 - (5) Four or more wells producing a combined total of 1.0 gpm per connection. The two lowest yielding wells shall produce a combined minimum yield of 0.6 gpm per connection.
 - (6) Groundwater systems serving twenty-six to fifty connections shall have at least two wells producing a combined total of 1.25 gpm per connection, the lowest yielding well must produce a minimum of 0.6 gpm per connection.
 - (7) Groundwater systems serving twenty-five or fewer connections shall have at least two wells producing a combined total of 1.5 gpm per connection, the lowest yielding well must produce a minimum of 0.6 gpm per connection.

12 VAC 5-590-710 Site Layout

Comply with VDH Regulations and the following:

- a. Provide exterior lighting around all major process equipment and controls with illuminance ranging from 10 to 20 foot-candles.
- b. Fencing shall be black, PVC-coated (ASTM F668 Class 2b) chain link (8 feet fabric height) with 3 barbed wire strands on top and a top rail. Access to facility shall be through a 12-foot wide lockable gate with reflectors. Gateposts shall be 4 inches in diameter and corner posts shall be 2.625 inches in diameter. Provide pad lock per Authority standard with a shank

size of 1/4 inch in diameter. All door locks and padlocks in the treatment facility will be keyed to the Authority's standard keys.

- c. Provide facility address sign at facility entrance in accordance with the Authority's standard detail.
- d. Building sites shall have bituminous concrete roadways and parking areas equal to 3-inch intermediate (IM1-A) on 6-inches of 21A bedding. A minimum of three parking spaces shall be provided. A turnaround area shall be provided for delivery trucks. Roadways to treatment and pumping facilities shall be gated. The gates shall have reflectors. In cases where the treatment plant and/or pumping facility are fenced, the gate shall be a fenced gate with pad lock per Authority standard with a shank size of 1/4 inch in diameter. Where the treatment plant and/or pumping facility is not fenced, the gate shall be constructed in accordance with the Authority's standard detail.

12 VAC 5-590-720 Building Layout

Comply with VDH Regulations and the following:

- a. Provide suitable architectural treatment. Brick/block shall be provided. Split-faced concrete masonry units (CMU) with foam insulation may also be used. Provide quality interior block paint. Slope roofs and provide aluminum gutters with leafguards and downspouts. Use standing seam roof for high visibility areas. Soffit and fascia shall be of low maintenance vinyl materials. Provide moisture-resistant painted drywall finish on interior walls; insulate drywall in laboratory and hypochlorite storage areas.
- b. Floor slabs within all buildings shall be steel reinforced and shall be 6-inches above finished grade and sloped 1/8-inch per foot to a floor drain. Provide industrial grade vinyl tile, or equal, for office and laboratory areas. Floor drains shall be provided in laboratory and lavatory. Well blowoff line and floor drain shall have separate discharge piping to grade (if possible) with a screened or capped discharge end.
- c. Provide 3-feet separation between all equipment and walls or other equipment.
- d. Provide standard Authority building inventory to include suitable shelving, desk and chair for operators, as well as file cabinet for on-site record storage.
- e. Provide lightning arrestor/protection for each well pump and treatment system control panel.

- f. Provide running time meters for all pumps.
- g. Doors shall have a closer and wall mounted hook doorstop and keys shall be matched using the Authority standard.
- h. Electrical equipment shall meet the following Authority standards:
 - Breakers shall be Square D or Cutler-Hammer.
 - Provide automatic reset and startup for all electrical relays.
 - Provide electrical receptacles on all walls, a maximum of twelve feet apart.
 - Exterior control panels shall be stainless steel NEMA 4X. Interior control panels shall be fiberglass NEMA 4X.
 - Do not mount equipment and electrical panels on tanks or wet wells.
 - Provide lights over all exterior doors.
 - Provide GFI protected electrical outlets every 30 (horizontal) feet.
- i. Treatment facilities shall provide Authority standard equipment, to include laboratory equipment and supplies, flow indicator, totalizer and digital recorder for production flow monitoring, Heat and air-condition laboratory and sodium hypochlorite storage rooms. Provide first aid kits per ANSI Z308.1, and provide fire extinguishers per NFPA 10.

12 VAC 5-590-740 Maintenance and Servicing of Equipment

Comply with VDH Regulations and the following:

- a. Specifications for major process equipment shall include provisions for training of Authority personnel in operation and maintenance of the equipment. Minimum training provided shall include 3 separate days of on-site instruction to allow attendance by different shifts of Authority personnel. Instructors shall be certified by the equipment manufacturers as competent to provide the required training.
- b. At the option of the Authority, the applicant shall provide a lump sum payment to the Authority equal to three percent of the construction costs of major process equipment in lieu of manufacturer-recommended spare parts. Under this option, the Authority will order and store spare parts.

12 VAC 5-590-780 Wall Castings

Comply with VDH Regulations and the following:

Pipe through floors and wall shall have sleeves with Link-Seal or equivalent.

12 VAC 5-590-800 Disinfection

Comply with VDH Regulations and the following:

Use of liquid chlorine is prohibited.

Article 2 Source Development

12 VAC 5-590-840 Groundwater Sources

Comply with VDH Regulations and the following:

- a. A hydrogeological study is required by the Authority. A copy of the study with the Health Department comments shall be provided to the Authority for review and comment. All wells shall be Class IA construction.
- b. A 100-foot radial or 200-foot square well lot will be required as a minimum for each well.
- c. A 72-hour yield test followed by recovery test must be performed. If more than one well is proposed, the yield and recovery tests must be simultaneous for all the wells. Note that the Authority requires minimum of 1.2 gpm production for each residential connection to the system. Well yield and drawdown information will be subject to disapproval if the information is older than five years, is not performed simultaneously with other nearby proposed wells, or negatively impacts existing nearby potable wells.
- d. A total of 20 water samples for total coliform analysis using MPN method must be collected from each well. Samples must be collected in accordance with an approved plan starting 24 to 48 hours after the yield test has begun. This groundwater sampling plan will be submitted to Authority as part of Article 2 Groundwater Sources paragraph H (pump test plan) below. If concentration of total coliform in any sample is greater than 3, the sample must further be analyzed for presence of fecal coliform.
- e. Water samples for complete chemical, physical and radiological analyses must be collected towards the end of the yield test, e.g., 70th hour for 72-hour test. List of the parameters to be analyzed must include all Primary and Secondary contaminants listed by VDH and comply with the most recent edition of the Waterworks Regulations and any upcoming federal regulations.
- f. A daily log of weather conditions, including barometric changes, during the pumping test program must be kept by the hydrogeologist. The log must also include rain events and their magnitude.

- g. Results of all sample analyses shall be submitted to the Authority and to the Virginia Department of Health if it so desires, as part of the overall hydrogeologic report (see Section A).
- h. A written pumping test plan shall be submitted to the Authority two weeks prior to start of the above evaluation. The Authority normally will provide comments within five days after receipt.
- i. Any impact to surrounding wells that would result in adversely affecting a nearby well must be reported to the County. Such impacts must be addressed and resolved by the applicant to the satisfaction of the County Authority.

Article 3 Processes and Devices

12 VAC 5-590-850 General

Comply with VDH Regulations and the following:

- a. Treatment systems shall be based on conventional technology and be supported by references, if required by the Authority, from three similar systems each with at least three years of successful operation at buildout capacity demand. Examples of conventional technology are manganese greensand filters for iron, manganese, and radium removal, hypochlorination for disinfection, sequestration for very low levels of iron and manganese, and addition of VDH approved chemicals for corrosion control.
- b. Treatment systems shall also meet the Statement of Design Standards and Performance as given in Section 200 INTRODUCTION, Item 2.
- c. Provide a water meter for each commercial and residential connection.

12 VAC 5-590-860 Chemical Application

Comply with VDH Regulations and the following:

- a. Chemical systems utilizing sodium hypochlorite shall utilize 15% solutions per AWWA B300 standard.
- b. Chemical feed systems shall use liquid solutions or, if approved by the Authority, liquid solutions prepared from dry chemicals. A spare chemical feed pump shall be provided for each system. Adequate facility room and climate control shall be provided for bulk chemical storage and solution day tanks, as the Authority deems necessary.

- c. The applicant shall provide secondary containment for day solution tanks, bulk tanks and chemical drums, adequate chemical transfer equipment, and calibration tubes for all chemical feeders; size chemical feeders to operate near middle of capacity range; and provide separate chemical storage room and ventilation for highly corrosive chemicals.
- d. Chemical feed systems shall have the following:
 - Peristaltic type feed pumps with an anti-siphon valve
 - Translucent solution tank with liquid level scale
 - Vacuum breaker on makeup water spigot when hoses are used
 - Temperature control for hypochlorite storage
 - Protective equipment (rubber apron, rubber gloves, combination face shield/head gear, safety shower and eyewash station)
 - Draw down graduated cylinders on day tanks

Article 4 Pumping Facilities

12 VAC 5-590-1030 Groundwater Facilities

Comply with VDH Regulations and the following:

- a. Well house piping shall utilize the following:
 - Separate blowoff lines and floor drains (provide blowoff lines downstream of the meter and check valve)
 - Concrete headwalls for termination of drain lines; cover flanged discharge opening with #4 mesh stainless steel screen and bolted flange.
 - Link Seal or other approved system for all pipe sleeves within slabs or walls
 - Dresser couplings
 - Straight pipe at least 5 times the pipe OD prior to meters
 - 12-inches minimum vertical distance between floors and flanges
 - 3/4-inch brass ball valves for sample taps
- b. Well meter shall have counter that has readout suitable for RTU service.
- c. Drawdown gauges and airlines are prohibited. Provide Authority approved level transducer with data logger.
- d. Well pumping controls shall be based on storage tank level and shall utilize remote LCD tank level indicators and include provisions for future SCADA transmission utilizing RTUs. Alarm conditions shall include storage tank high water and low water level, well pump failure, system low pressure, and power failure

- e. Add – Electric power cables shall be attached to the pump riser with approved plastic fasteners. Adhesive tapes are prohibited.

12 VAC 5-590-1040 Pump Stations

Comply with VDH Regulations and the following:

- a. Pumping stations shall be protected against lightning.
- b. Pump motors 20 horsepower and larger shall be 480 volt and shall be equipped with reduced-voltage starters.

Article 5 Finished Water Storage Structures

12 VAC 5-590-1080 General

VDH Regulations and comply with Volume F, Steel and Concrete Water Storage Tanks Design Standards.

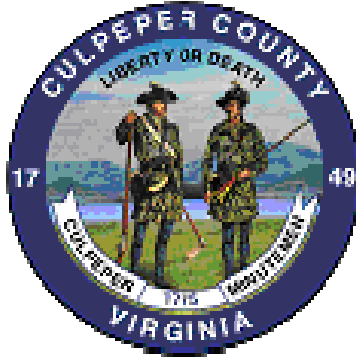
Article 6 Water Distribution Systems

12 VAC 5-590-1110 Materials

VDH Regulations and comply with Volume B, Design and Construction Standards and Volume C, Standard Details.

12 VAC 5-590-1130 System Design

VDH Regulations and comply with Volumes B and C.



Volume E

CULPEPER COUNTY WATER AND SEWER AUTHORITY

WASTEWATER TREATMENT FACILITIES DESIGN STANDARDS

October 6, 2005

This Volume represents a portion of the water and sewer system standards, rules, rates, and procedures as approved by the Culpeper County Water and Sewer Authority (Authority) on October 6, 2005 and effective October 6, 2005. As such, this Volume must be used for all service areas under the jurisdiction of the Authority. Comments and inquiries are to be directed to the Authority.

CULPEPER COUNTY WATER AND SEWER AUTHORITY

**VOLUME E
WASTEWATER TREATMENT FACILITIES STANDARDS
CULPEPER COUNTY WATER AND SEWER AUTHORITY**

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VOLUME E
WASTEWATER TREATMENT FACILITIES DESIGN STANDARDS
CULPEPER COUNTY WATER & SEWER AUTHORITY

100 **BACKGROUND**

These Wastewater System Standards establish requirements and standards for those systems that are connected to the Culpeper County Water and Sewer Authority's (CCWSA's) central wastewater system as well as freestanding Community Wastewater Systems that are constructed within Culpeper County. These standards are not intended to be all-inclusive. All such systems shall comply with all applicable laws, rules and regulations, including, without limitation, the *Operating Code* of the Culpeper County Water and Sewer Authority (the "CCWSA"). The Authority will, at its sole discretion, consider alternative means and methods to accomplish its objectives, based upon good engineering practice and demonstrated technical effectiveness, reliability, and cost-effectiveness.

The Wastewater Treatment Facility Standards presented herein shall supplement the latest edition of the "Sewage Collection and Treatment ("SCAT") Regulations" as published by the Commonwealth of Virginia, State Water Control Board, Department of Environmental Quality (DEQ), (9 VAC 25-790-10), (collectively, as may be amended, the "SCAT Regulations"). The SCAT Regulations represent the minimum design requirements set forth by the Virginia State Water Control Board. All aspects of the SCAT Regulations shall be adhered to. The headings and sub-headings of this document, beginning with Section 300, Part 1, Procedural Regulations, follow the general format of the SCAT Regulations.

The CCWSA reserves the right to identify and determine the need for standards and requirements that are more stringent than those contained in Part III of the SCAT Regulations. These additional standards and requirements are introduced by the phrase, "SCAT Regulations and the following". In instances where no additional requirements are specified, SCAT headings and sub-headings have been deleted to promote clarity.

No soil-based effluent discharges shall be allowed.

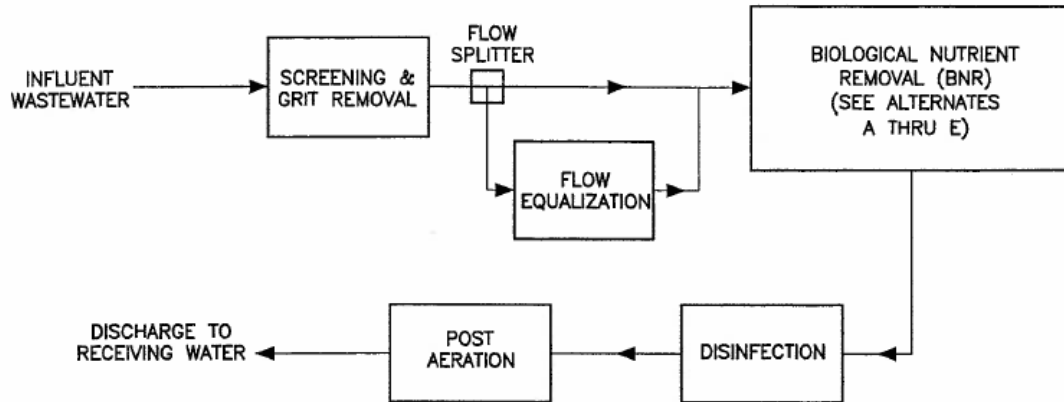
200 **INTRODUCTION - Statement of Design, Standards, and Performance**

Article 1 - Definitions and Terms Wastewater Treatment Alternatives the CCWSA will Consider and Approve:

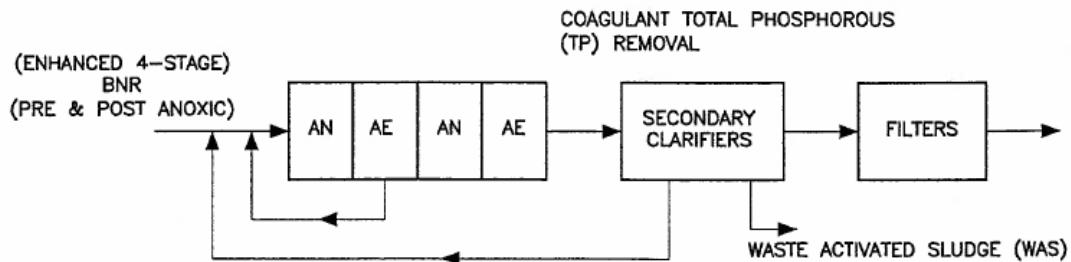
- a. Oxidation Ditch with additional Biological Nitrogen Removal (BNR);
- b. Sequencing Batch Reactor (SBR) with additional BNR; and
- c. Conventional Advanced Waste Treatment (AWT), activated sludge with BNR.

Line diagrams showing the major treatment components for the complete wastewater treatment process as well as five alternates for the BNR component appears as follows:

COMPLETE WASTEWATER TREATMENT PROCESS

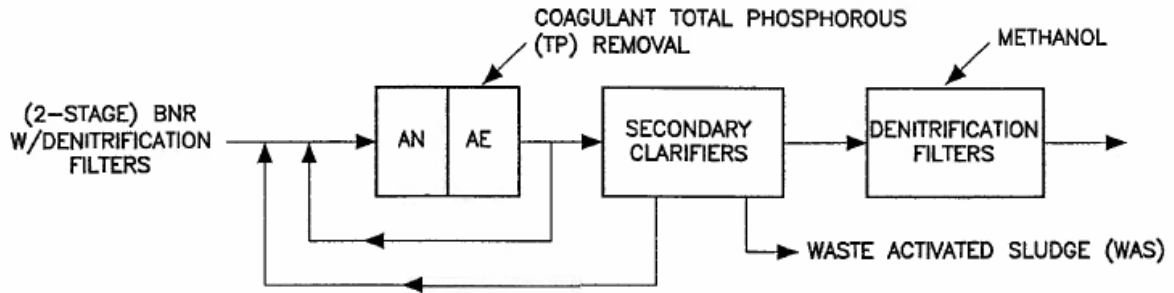


BNR – ALTERNATIVE A



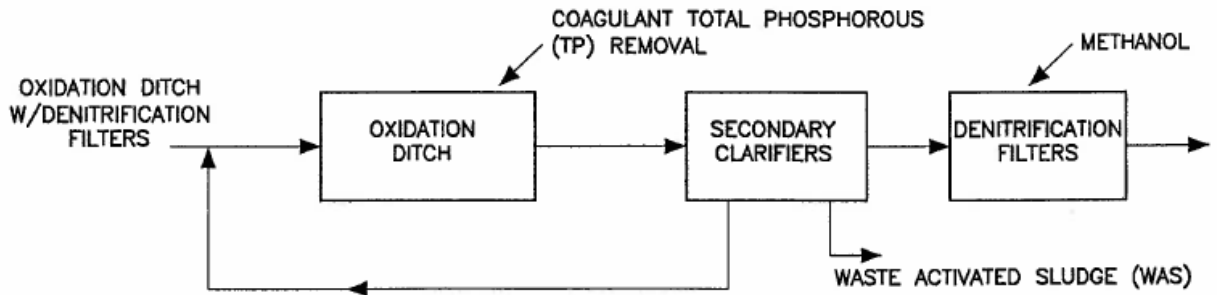
**Culpeper County
Water and Sewer Authority
Culpeper, Virginia**

BNR – ALTERNATIVE B



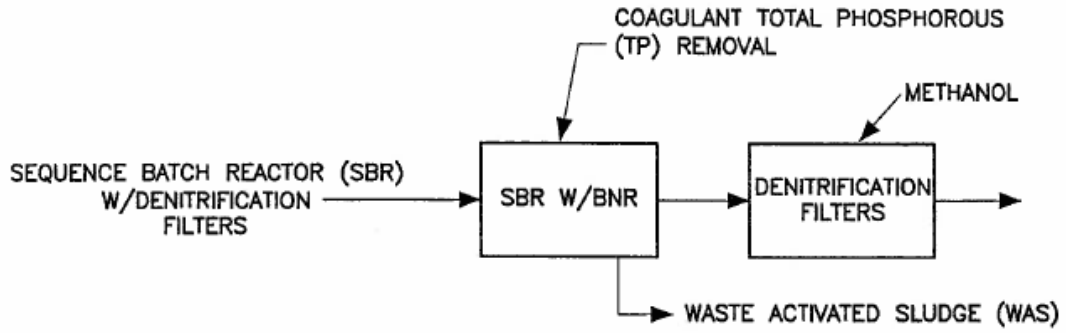
AN: ANOXIC
AE: ANAEROBIC

BNR – ALTERNATIVE C

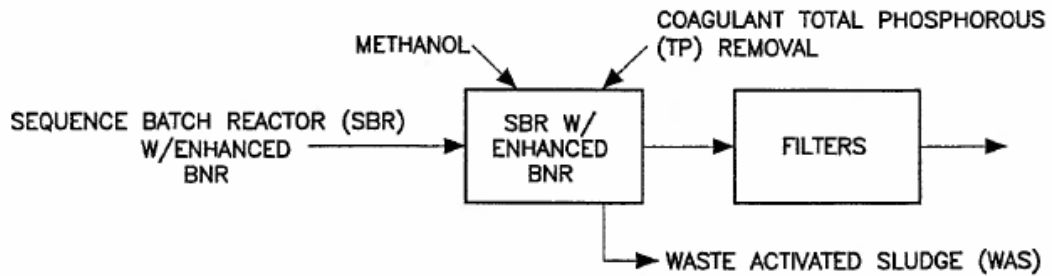


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BNR – ALTERNATIVE D



BNR – ALTERNATIVE E



**Culpeper County
Water and Sewer Authority
Culpeper, Virginia**

Article 2 - Brief Description of each Treatment's Alternative Components

- a. Enhanced BNR (pre and post anoxic) – consists of a minimum of 4-stage process for nitrification and denitrification. This process will include secondary clarifiers with Return Activated Sludge (RAS) pumping and effluent filtration. Coagulant feed for Total Phosphorus (TP) removal.
- b. BNR with Denitrification filters – consists of a 2-stage process for nitrification and denitrification. This process will include secondary clarifiers with RAS pumping. Denitrification filters will be provided. Coagulant feed for TP removal.
- c. Oxidation Ditch with Denitrification Filters – consists of an oxidation ditch aeration process with the ability to operate in simultaneous nitrification–denitrification mode or with aeration basin feed and aerator cycling. This process will include secondary clarifiers with RAS pumping. Denitrification filters will be provided. Coagulant feed for TP removal.
- d. SBR with Denitrification Filters – consists of sequencing batch reactors designed to operate in nitrification–denitrification mode (minimum of 2 reactors in parallel). Denitrification filters will be provided. Coagulant feed for TP removal.
- e. SBR with Enhanced BNR – consists of sequencing batch reactors designed to operate in nitrification–denitrification mode (minimum of 3 reactors in parallel). SBR design will include sufficient hydraulic detention time and cycles to provide high level nitrification and denitrification. Methanol feed system required. Coagulant feed for TP removal.

Article 3 - Current Chesapeake Bay and BNR Wastewater Treatment Facility Discharge Standards

Any wastewater treatment facility constructed in Culpeper County with a capacity over 20,000 gallons per day is required to have the above components as well as meet or exceed the following performance standards:

- a. Treatment discharge limits no greater than
 - (1) 3mg/liter CBOD₅;
 - (2) 3mg/liter TSS;
 - (3) 3 mg/liter TN and
 - (4) 0.3 mg/L TP.

- b. Plant flow should be such that:
 - (1) Maximum Monthly Average Daily Flow/Average Annual Daily Flow = no greater than 1.33
 - (2) Peak Day/Average Annual Daily Flow = no greater than 1.67
 - (3) Peak Hourly Flow/Average Annual Daily Flow = no greater than 2.44

Article 4 - Non Process Related Standards of Performance for the CCWSA Wastewater Treatment Facilities

- a. In cases where future additional unit process may be required in the opinion of the Authority, adequate physical space and hydraulic grade line shall be provided.
- b. Treatment plant sites shall have bituminous concrete roadways and parking areas equal to 3-inch intermediate (IM1-A) on 6 inches of 21A bedding. A minimum of three parking spaces shall be provided. A turnaround area shall be provided for delivery trucks and all roadways shall be designed for easy access by septic haulers who may be contracted to haul sewage sludge. Roadways to disposal and pumping facilities shall be gated.
- c. The treatment plant and/or pumping facility shall be fenced. Fencing shall be black, PVC-coated (ASTM F668 Class 2 b) chain link (8 feet fabric height) with 3 barbed wire strands on top and a top rail. Access to facility shall be through a 12 foot wide lockable gate with reflectors. Gateposts shall be 4 inches in diameter and corner posts shall be 2.625 inches in diameter. Provide pad lock per Authority standard with a shank size of 1/4 inch in diameter. All door locks and padlocks in the treatment facility will be keyed to the Authority's standard keys.
- d. Provide exterior lighting around all major process equipment and controls with illuminance ranging from 10 to 20 foot candles.
- e. Floor slabs within all buildings shall be steel reinforced and shall be 6 inches above finished grade and sloped 1/8-inch per foot to a floor drain. Provide industrial grade vinyl tile, or equal, for office and laboratory areas. Floor drains shall be provided in laboratory and lavatory.
- f. Architecture: Provide suitable architectural treatment. Brick/block shall be provided. Split-faced concrete masonry units (CMU) with foam insulation may also be used. Provide quality interior block paint. Roofs must be sloped and have aluminum gutters with leaf guards and downspouts. Use

standing seam roof for high visibility areas. Soffit and fascia shall be of low maintenance vinyl or aluminum materials. Provide moisture-resistant painted drywall finish on interior walls in office, restroom, and laboratory areas in accordance with Culpeper County code for residential occupancy.

- g. Painting systems shall be as directed by the Authority.
- h. All tanks housing treatment processes shall be constructed of steel reinforced concrete.
- i. Provide a minimum of 3-feet clearance around all equipment.

Article 5 - Wastewater System "Supervisory Control and Data Acquisition" (SCADA) Standards of Performance

- a. All wastewater treatment facilities and wastewater lift stations will be monitored by the Authority's Supervisory Control and Data Acquisition (SCADA) system. This system will be designed and built as a part of wastewater system construction projects. The SCADA instrumentation and control work will be specified to be performed by an Instrumentation and Control Systems House working as a subcontractor to the project general contractor. This SCADA subcontractor will have a minimum of 5 years continuous experience and shall provide references of at least 3 successful SCADA control projects similar in size and nature to the CCWSA water facilities.
- b. The Wastewater SCADA system will be centered around the Wastewater Treatment Plant, which will be monitored and controlled through the SCADA system. Remote wastewater system sites including wastewater lift pump stations will be included in the SCADA system. The remote lift stations will be monitored remotely and controlled by a local PLC but will not be controlled from a remote location. All of these remote sites will report directly to the Wastewater Treatment Plant. Communications between remote sites will be accomplished using a radio system and dedicated multi-drop voice grade telephone line as backup communication.
- c. One or more Programmable Logic Controllers (PLC's) will be located at the wastewater treatment plants. Remote locations such as wastewater lift stations will typically have a single PLC.
- d. All desired binary and analog input signals would be input into a PLC including items such as:

BINARY INPUTS

Pushbuttons
Door switches
Level switches
Motor starter run auxiliary contacts
Pump failure contact
Power failure contact
Generator run contact
Generator failure contact

ANALOG INPUTS

Level signal
Flow signal
Pressure signal
Speed signal
Analyzer signals

- e. Additionally, all desired binary and analog output signals would be output from the PLC including items such as:

BINARY OUTPUTS

Start-stop signal (motors, systems)
Status indication (all types)
Status alarm (all types)
Enable signal (allows activation)

ANALOG OUTPUTS

Speed control signal
Valve position signal for flow control
Chemical feed signal for tracking one or more variables

- f. All PLC's at the wastewater plant will be digitally networked together and in turn networked together with remote PLC's using the dedicated telephone lines.

These PLC's in turn are networked to the wastewater plant computers containing "Human-Machine Interface" (HMI) software. This graphical user interface software allows an operator to retrieve information about the system such as wastewater flow rate, which pumps are running, which valves are open, tank levels, and which alarms are active. Additionally, the HMI software allows the operator to input control instructions into the SCADA

system such as flow rate set points, motor start and stop instructions, pump sequence instructions, etc.

- g. Desired Automatic control functions are accomplished using the PLC local to the function. The PLC will be programmed to respond depending on the input information to the SCADA system. Programmed functions might include sequences of operation, on and off set points values, and operating set point values. Typically, the Wastewater Treatment Plant operator will monitor but does not remotely control remote wastewater lift stations.
- h. In addition to the operator computers, there will be report generation and system monitoring SCADA computers located at the Wastewater Treatment Plant and at a remote central location for the Authority Staff.

300 **PART I - PROCEDURAL REGULATIONS**

Article 1 - Definitions and Terms

9 VAC 25-790-10 Definitions

For the purpose of these Standards, all words and terms shall have the same meanings provided in the SCAT Regulations. In addition, the following words and terms shall have the following meanings:

- a. Applicant - means the Developer or property owner seeking approval of the Wastewater Facilities.
- b. Authority - means the Culpeper County Water and Sewer Authority.
- c. Authority Utility Standards - means all procedures, methods, materials, and standards set forth in the CCWSA adopted *Utility Standards*, as may be amended.
- d. Community Wastewater System - means any freestanding system to be owned and/or operated by the Authority. Freestanding systems are those systems that are not connected to the CCWSA's central wastewater systems.
- e. DEQ – Virginia Department of Environmental Quality
- f. Major Process Equipment - means mechanically or electrically actuated process equipment requiring routine maintenance and specified in Divisions 11 through 16 of contract specifications formatted in accordance with the Construction Specifications Institute. Major process equipment

includes pumping and treatment unit processes and associated electrical controllers.

- g. Master Water and Wastewater Manual - means the CCWSA's Water and Wastewater Rules, Regulations, Operational Procedures, Design Standards, Design Details, and Agreements for Service.
- h. SCAT Regulations - means the "Sewage Collection and Treatment Regulations" as published by the Commonwealth of Virginia, State Water Control Board, Department of Environmental Quality (DEQ) (9 VAC 25-790-) latest edition.
- i. VCPSS - means Virginia Certified Professional Soil Scientist.
- j. VDEQ - means the Virginia Department of Environmental Quality.
- k. VDH - means the Virginia Department of Health.

Article 2 – Procedures

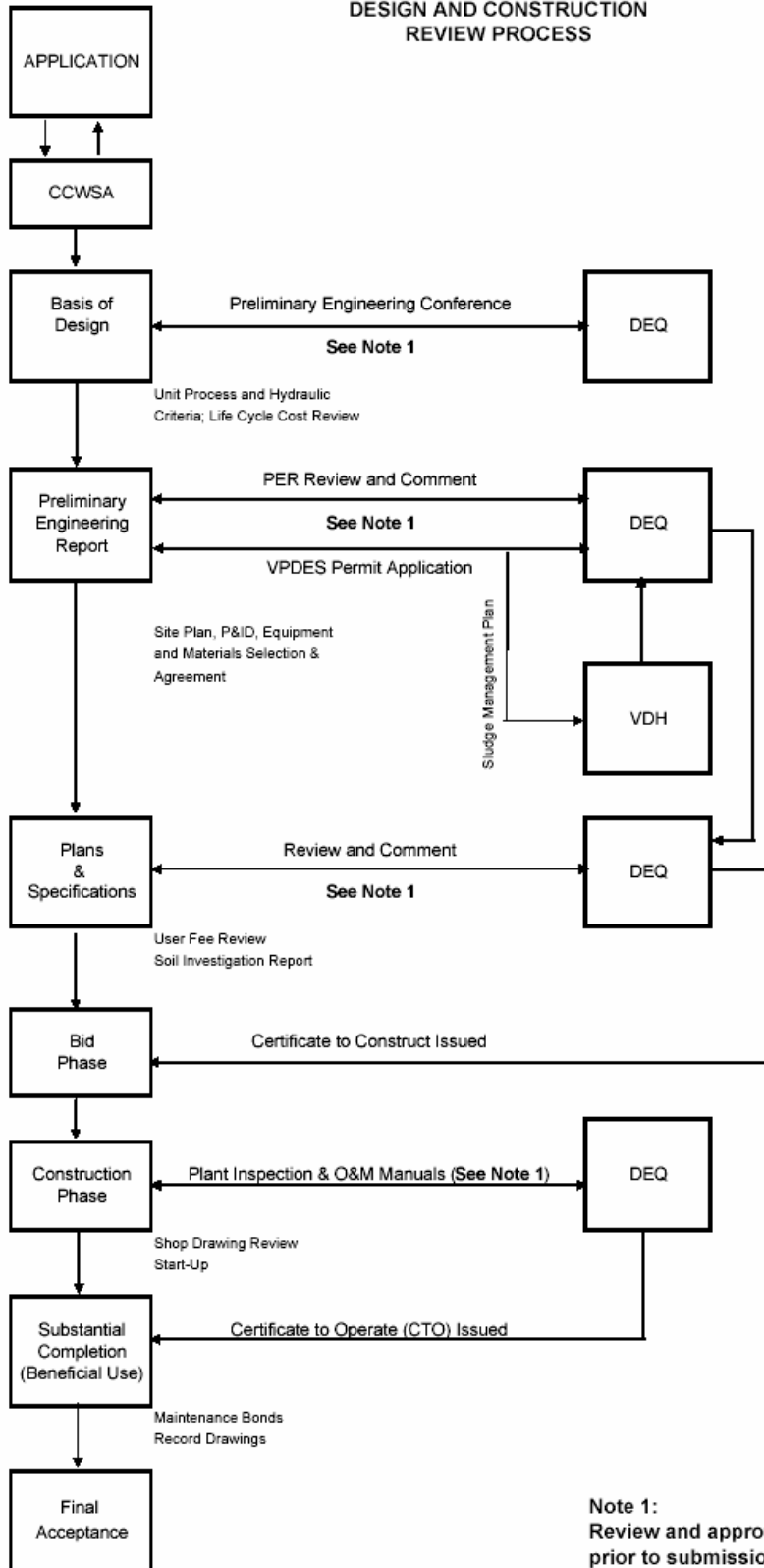
Comply with SCAT Regulations and the following:

- a. The proposed development shall be totally within one of the Service Areas designated in the Culpeper County Master Water and Sewer Plan report. The preliminary Engineering Report (PER) shall conform to the general engineering parameters established for the Service Area. The service area of any Wastewater System shall be as approved by the Authority. If, in the future determination of the Authority, the system may be connected to another wastewater system, the Authority may do so at its discretion.
- b. Community Wastewater Treatment Facilities shall be approved by the Authority. The Authority shall review and approve all design documents applicable to that system and its compatibility with the Plan's Service Area in which it is proposed; including the Basis of Design, Preliminary Engineering Report, and Plans and Specifications. Said review and approval shall be in accordance with Standards in Volume A through G and shall be in addition to any and all required approvals by county, state, and federal authorities. The Authority's procedure process as shown in Exhibit 1A and 1B, CCWSA Wastewater Systems Regulatory Design and Construction Review Process, shall govern all review and approvals. It is the intent of either process that the Authority and the Applicant will jointly apply for the VPDES permit. The applicant will be the named "Owner" of the treatment facility until such time as the treatment facility is accepted by the Authority. At that time the Authority will become the permit holder. All applications to DEQ shall be made with the knowledge and approval of the Authority.

- c. Community Wastewater Systems shall be constructed at no cost to the Authority.
- d. Each Community Wastewater System shall be financially self-sustaining. As such, operating, maintenance, and repair and replacement costs shall be borne by the owners of all properties within the service area for said system and a notice of this obligation shall be recorded in the land records as a covenant against any and all lots within the service area for said system. In the interest of economy-of-scale, a mandatory connection provision may be required by the Authority Board to be included in such covenant.
- e. Adequate construction and maintenance easements or access rights-of-way for all Community Wastewater Systems shall be provided to the Authority, at no cost to the Authority. Such easements shall be provided for planned extensions as well as new infrastructure. Fee simple title shall be provided for the location of pumping stations and treatment facilities.
- f. Community Wastewater Systems shall require an Agreement (“Wastewater Agreement”) between the Authority and the Applicant. The Agreement shall provide for the Applicant to subsidize the operation and maintenance of the plant until such time that 95 percent of the units within the development are sold and connected to the system. The Applicant shall agree to perform all construction in accordance with plans and specifications approved by the Authority and in accordance with Authority standards. The Applicant shall agree to transfer to the Authority all property and facilities free of debts, liens and/or other legal encumbrances, for ownership, operation and maintenance. The Agreement between the Authority and the Developer shall be completed prior to acceptance of Plans and Specifications by the Authority. The Authority shall develop all Agreements.
- g. Community Wastewater Systems shall provide a “User Fee Review”, consisting of a rate study, to the Authority for review no later than the final submission of the plans and specifications. The User Fee Review shall estimate annual operations and maintenance costs for a five-year basis, replacement costs based on the Authority’s depreciation schedule as contained in its annual audited Financial Statement, and develop a recommended fee structure for the Community Wastewater System based on a base service fee for fixed system costs and a metered rate per 1,000 gallons of use.

EXHIBIT 1A

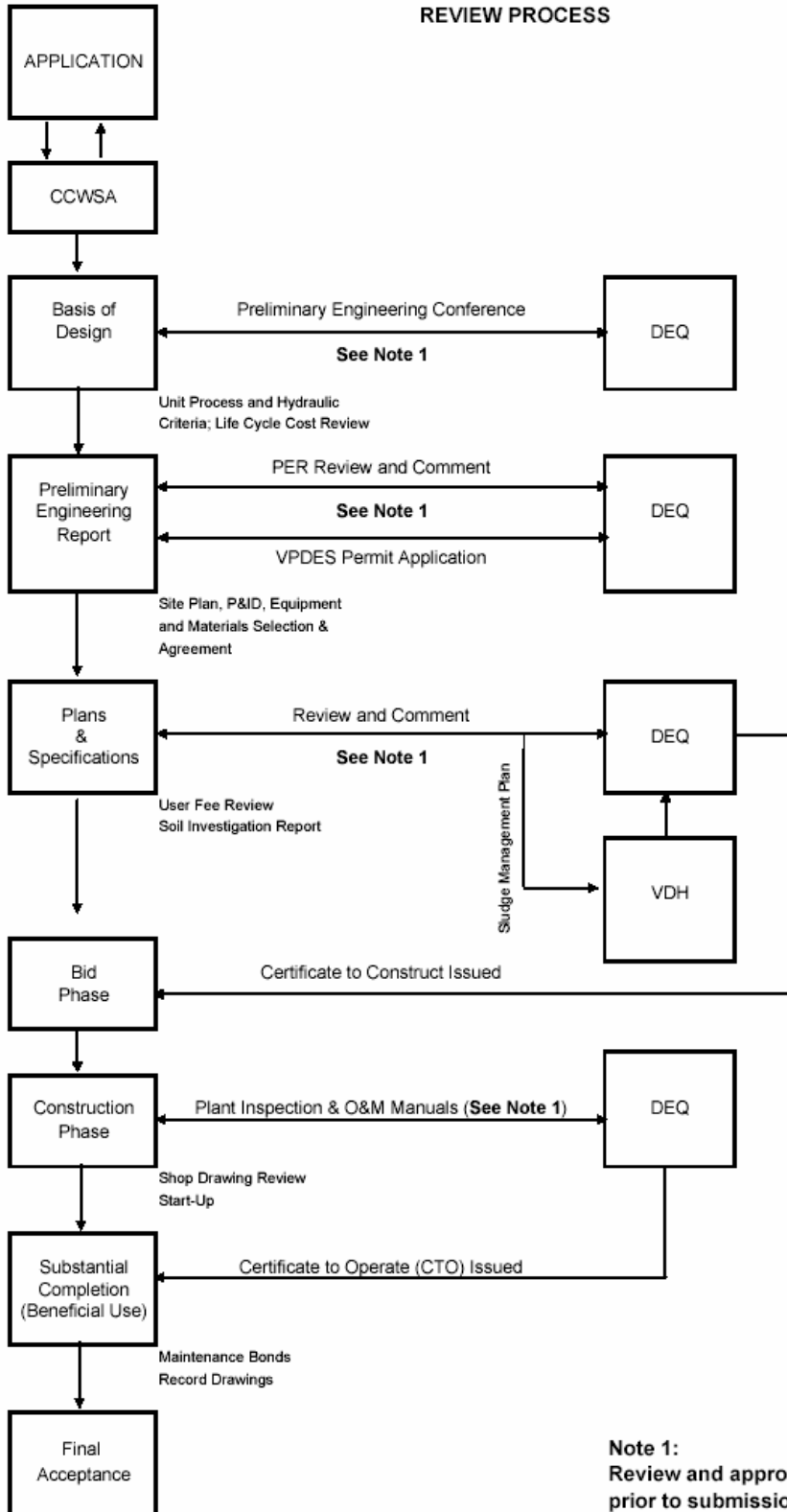
CCWSA WASTEWATER SYSTEMS REGULATORY
DESIGN AND CONSTRUCTION
REVIEW PROCESS



Note 1:
Review and approval by CCWSA
prior to submission/review by DEQ

EXHIBIT 1B

CCWSA WASTEWATER SYSTEMS REGULATORY
DESIGN AND CONSTRUCTION
REVIEW PROCESS



Note 1:
Review and approval by CCWSA
prior to submission/review by DEQ

9 VAC 25-790-40 Variances

Comply with SCAT Regulations and the following:

- a. The Applicant may apply to the Authority for variances, waivers or modifications to these Standards provided the requests are brought to the attention of the Authority prior to the approval of the Preliminary Engineering Report.
- b. The Applicant shall comply with the Authority Utility Standards.
- c. The Applicant shall obtain all approvals required by Culpeper County and the Culpeper County Water and Sewer Authority.
- d. Copies of all required approvals must be provided to the Authority.

9 VAC 25-790-70 Reliability Classification

Comply with SCAT Regulations and the following:

- a. Community Wastewater Systems shall be classified as Reliability Class I.

9 VAC 25-790-90 Application

Comply with SCAT Regulations and the following:

All applications shall include a "Basis of Design" report that shall include the following:

- a. Proposed Service Area
 - (1) Detailed vicinity map showing individual lots within the proposed community's layout. A map shall also show the proximity of the community to the nearest service area of the County's approved Master Water and Sewer Plan.
 - (2) Required system capacity based on number of proposed lots and flow rates required by the Authority Utility Standards. Show the relationship of these design elements to those of the nearest service area of the County's approved Master Water and Sewer Plan.
- b. Discharge Determination
 - (1) Description of discharge location
 - (2) Required permit

- (3) Required treatment limits
- c. Treatment Technology and Performance Criteria
- (1) Describe applicable and Authority acceptable treatment technologies and provide a process flow diagram for each.
 - (2) Perform, if required by the Authority, life cycle cost comparisons among competing technologies considering initial and replacement costs, maintenance costs, operational costs and reliability.
 - (3) For selected treatment technology, provide design criteria, catalog cutsheets of major process equipment, and a detailed process flow diagram showing number of units and capacities of the major equipment components.
 - (4) Design criteria must meet the more stringent of the SCAT Regulations or the Authority Utility Standards, Volumes B and E.
 - (5) For wastewater treatment facilities larger than 20,000 gpd, the required treatment performance discharge limits shall be no greater than 3 mg/L CBOD₅, 3 mg/L TSS, 3 mg/L TN, and 0.3 mg/L TP. Wastewater treatment facilities smaller than 20,000 gpd will not be allowed.
- d. Land Application of Treated Effluent
- (1) Land application of treated effluent shall not be allowed.
- e. Other Requirements of the Basis of Design Report:
- (1) Sludge Management Plan
 - (2) Facility location
 - (3) Architectural issues

9 VAC 25-790-100 Preliminary Engineering Conference (PEC)

Comply with SCAT Regulations and the following:

The Applicant shall first have a Preliminary Engineering Conference (PEC) with the Authority. After approval of the Basis of Design by the Authority, the applicant along with representatives of the Authority shall then meet with the DEQ for their approval.

9 VAC 25-790-110 Preliminary Engineering Proposal

Comply with SCAT Regulations and the following:

- a. Facility site plans must reflect potential expansion to treat ultimate flow as given in the County's approved Water and Sewer Plan for the appropriate Service Area.
- b. The Applicant will coordinate the meeting with DEQ and the Authority after approval of the Preliminary Engineering Proposal.
- c. In addition, the content of the Preliminary Engineering Proposal shall include the following:
 - (1) Process and instrumentation diagram
 - (2) Equipment selection
 - (3) Materials of construction
 - (4) Soil investigation reports which have been prepared by a Virginia Certified Professional Soil Scientist (VCPSS).
 - (5) Community Wastewater System Agreement modification requests, if applicable.

9 VAC 25-790-120 Plans

Comply with SCAT Regulations and the following:

The Applicant will initially submit the plans to the Authority for review. The Applicant may send subsequent submissions to the Authority and DEQ for concurrent review.

9 VAC 25-790-130 Specifications

Comply with SCAT Regulations and include a User Fee proposal.

The Applicant will initially submit specifications to the Authority for review. The Applicant may send subsequent submissions to the Authority and DEQ for concurrent review.

9 VAC 25-790-140 Operation and Maintenance Manual

Comply with SCAT Regulations and the following:

- a. Draft and Final "Operating and Maintenance Manuals" must be approved by the Authority prior to submittal to the DEQ for approval.
- b. Specifications for major process equipment shall include provisions for training of operations personnel in operation and maintenance of the equipment. Minimum training provided shall include 3 separate days of on-

site instruction to allow attendance by different shifts of operations personnel. Instructors shall be certified by the equipment manufacturers as competent to provide the required training.

9 VAC 25-790-160 Formal Requirements for Submission of Engineering Data

Comply with SCAT Regulations and the following:

- a. Surveying shall meet State grid coordinate specifications. Provide four Northern Virginia grid coordinates for plan views and two horizontal and vertical control benchmarks per site. All drawings shall be 24 x 36-inches in size. Pipeline profiles shall have a horizontal scale of 1" = 50' or less.
- b. A soils report completed by the VCPSS shall dictate the extent of the geotechnical evaluation, including adequate borings, which shall be provided as part of the formal submission of plans and specifications for the disposal site.
- c. Calculations shall be submitted for review, and will include hydraulics, process kinetics, anti-flotation calculations, generator sizing, and water hammer analyses. Water hammer analyses may be waived by the Authority for pump station capacities less than 50 gallons per minute, or station pressures less than 50-feet total dynamic head. Systems where column separation can occur shall have water hammer analyses conducted.
- d. A clean water testing and start-up plan shall be provided for review and approval by the Authority.
- e. Before the Authority will review the Applicant's plans and specifications, the Applicant must pay applicable engineering review fees as described in the Community Wastewater System Agreement, or as applicable.
- f. Final Plans and Specifications must be additionally provided in electronic form on a Microsoft Windows compatible CD-ROM in AutoCad 2005 file format, or higher as approved by the Authority, prior to approval. All submitted materials shall, without limitation, become the property of the Authority for such use as the Authority deems necessary.

9 VAC 25-790-170 Processing of Plans, Specifications, and Other Engineering Documents

Comply with SCAT Regulations and the following:

Documents must comply with the Authority Utility Standards.

9 VAC 25-790-180 Construction Permit

Comply with SCAT Regulations and the following:

- a. Issuance – The Authority must review and approve in writing the proposed Community Wastewater Systems construction drawings, plans, and specifications, and any amendments or modifications, for a project prior to issuance of a construction permit and will submit the same to the DEQ for a Certificate to Construct. All plans and specifications for the system must be stamped and signed by both the Design Engineer and the Virginia Certified Professional Soil Scientist (VCPSS) to specifically note that they mutually agree that the design and location are accurate and will function properly as designed. The construction permit references the executed Community Wastewater System Agreement between the Authority and the owner/developer, if applicable and summarizes the terms and conditions between the parties. Complete execution of this agreement is required before the project receives approval by the Authority's Engineer. DEQ requires a construction permit to be issued and executed by an engineer certified in the Commonwealth of Virginia as a Professional Engineer.

Upon approval, the Authority will send to DEQ notice and a construction permit for execution. Acceptable performance/labor and materials payment bond in the amount estimated for the installation of these utilities, as agreed by the developer's consulting engineers; certificate of insurance; payment of inspection fees; submission/approval of associated easement/record plats must be in place prior to issuance of a construction permit. Once all necessary items are in place, the Authority will fully execute the permit and send approved plans and permit to Inspections Department for pre-construction meeting. The Applicant shall submit its proposed agenda to the Authority for approval at least ten days prior to the conference. The Applicant shall also submit a proposed list of major process equipment shop drawings to be reviewed by the Authority.

The Authority will accept or reject shop drawings for major process equipment and provide inspection of the Community Wastewater Systems in accordance with the Community Wastewater System Agreement. All shop drawing submittals shall bear the stamp of approval of the Applicant's design engineer as evidence that the Applicant has checked the shop drawings. Submittals without this stamp of approval will not be reviewed and will be returned to the Applicant for resubmission. The Applicant shall cite in the letter of transmittal all shop drawing variances from the requirements of the Contract Documents and the design modifications proposed to accommodate the variances. If variances are not cited, the Applicant will not be relieved of the responsibility for executing the work in full conformance with the Contract Documents even though such submittals have been accepted by the Authority.

Pumps and other major process equipment shall be certified by the manufacturer. Certifications shall be provided to the Authority prior to shipping to the site.

b. Completion of Construction:

- (1) The Applicant shall complete and submit the "Statement of Completion of Construction" to DEQ upon the Authority's satisfaction that the Treatment Works meets the requirements of the approved plans and specifications and only when a final inspection by the DEQ is warranted. The Authority shall approve in writing the "Statement of Completion of Construction" prior to the Applicant submitting it to DEQ.
- (2) The Applicant shall maintain record drawings of as-built conditions that vary from the work as originally shown on the contract drawings. The Applicant shall submit electronic files of the record drawings and specifications with addenda to the Authority prior to acceptance of the facility by the Authority. The files shall be on a Microsoft Windows compatible CD-ROM in AutoCAD 2005 file format or higher as approved by the Authority. Provide coordinates in accordance with the Virginia State Plane Coordinate System North Zone (NAD 83) for field location of valves, manholes and other buried facilities as directed by the Authority. All submitted materials shall, without limitation, become the property of the Authority for such use as the Authority deems necessary.
- (3) The Design Engineer and the Virginia Certified Professional Soil Scientist (VCPSS) shall have representatives on-site during construction of the system and must approve any substantive changes to the approved plans and specifications prior to their construction. The Authority construction representatives shall be notified verbally and in writing immediately.
- (4) The Authority will assume all operation, testing, maintenance, and compliance responsibilities from the Developer upon (1) the issuance of a Certificate of Completion by the Authority; (2) the approval by VDEQ of the Facility's Operation and Maintenance Manual and the issuance of a Certificate to Operate the Facility.

9 VAC 25-790-210 Non-conventional Methods, Processes, or Equipment

Comply with SCAT Regulations and the following:

Land application processes are prohibited.

Article 1 – Monitoring***9 VAC 25-790-270 Operational Testing and Control***

Comply with SCAT Regulations and the following:

The Authority shall act as the permit applicant for obtaining the wastewater discharge permit.

The Authority shall assume full responsibility for the operation, testing, maintenance, and compliance with all discharge permit limitations only after issuance of the Certificate of Occupancy by the DEQ. Prior to issuance of the Certificate, the Developer shall retain full responsibility for the Facility.

Article 2 - Operation and Maintenance Manuals***9 VAC 25-790-290 Manuals***

Comply with SCAT Regulations and the following:

The Draft and Final “Operating and Maintenance Manuals” must be prepared by the Developer and approved by the Authority before submittal to DEQ for approval. Final “Operating and Maintenance Manuals” must be prepared by the Developer and approved by DEQ prior to substantial completion of construction.

Article 3 - Sewerage Systems and Treatment Works Reliability***9 VAC 25-790-300 Reliability***

Comply with SCAT Regulations and the following:

Operability: Dual process units shall be required.

Article I - Collection and Conveyance Sewers**9 VAC 25-790-310 Design Factors**

Comply with SCAT Regulations and the following:

Factors: Average daily design flow and peaking factors shall comply with those stated for the appropriate Service Area in the County's approved Water and Sewer Master Plan.

9 VAC 25-790-320 Design Details

Comply with SCAT Regulations and the following:

Design Details shall also comply with Volume B and E of the Authority's Master Water and Wastewater Manual

9 VAC 25-790-330 Construction Details

Comply with SCAT Regulations and the following:

Construction details shall also comply with Volume C of the Authority's Water and Wastewater Manual.

9 VAC 25-790-340 Vacuum Sewerage System

Vacuum sewer systems will not be allowed.

9 VAC 25-790-350 Manholes

Comply with SCAT Regulations and the following:

Manholes, frames and covers shall comply with Volumes B and C of the Authority's Water and Wastewater Manual.

Article 2 - Sewage Pump Stations**9 VAC 25-790-380 Sewage Pumping**

Comply with SCAT Regulations and the following:

- a. Pump Station design shall also comply with Volumes B and C of the Authority's Water and Wastewater Manual.

- b. Pump rail guides for submersible applications shall be continuous stainless steel with no couplings.
- c. Provide running time meters and external disconnect switches for all pumps.
- d. Corrosion protection shall be evaluated, and shall be provided if deemed appropriate by the Authority.
- e. Odor control provisions shall be evaluated, and shall be provided if deemed appropriate by the Authority.
- f. Fencing shall be black, PVC-coated (ASTM F668 Class 2b) chain link (8 feet fabric height) with 3 barbed wire strands on top and no top rail. Gateposts shall be 4 inches in diameter and corner posts shall be 2.625 inches in diameter.
- g. Provide padlock per Authority standards with a shank size of 1/4 inch in diameter.
- h. Class II and III reliability systems will not be allowed. All community wastewater treatment facilities shall be Class I reliability.

9 VAC 25-790-430 Alternatives

Comply with SCAT Regulations and the following:

Pneumatic Ejectors: Use of pneumatic ejectors is prohibited.

9 VAC 25-790-440 Force Mains

Comply with SCAT Regulations and the following:

Force main materials of construction shall comply with Volumes B and C of the Authority's Water and Wastewater Manual.

Article 3 - Sewage Treatment Works

9 VAC 25-790-450 and 460 Treatment Works Design and Standards

Comply with SCAT Regulations and the following;

- a. Comply with Section 1, Statement of Design, Standards, and Performance
- b. Provide manual bar screens only for emergency bypass applications.

- c. For treatment plants that do not have equalization basins, influent sewage pumping stations shall have three pumps of equal capacity, with two pumps in parallel being capable of delivering maximum design flow.

9 VAC 25-790-470 Treatment Works Details

Comply with SCAT Regulations and the following:

- a. Instrumentation: All influent and effluent flow meters shall be provided with indicating, totalizing and digital recording equipment.
- b. Odor Control: Odor control provisions shall be evaluated, and shall be provided if deemed appropriate by the Authority.
- c. Treatment facilities shall be provided with the following standard equipment:
 - (1) Safety equipment.
 - (2) Laboratory equipment and supplies.
 - (3) Confined spaces entry equipment.
 - (4) Flow indicator, totalizer and digital recorder for plant influent and effluent flow monitoring.
 - (5) Doors with closers and wall mounted hook doorstops. Keys shall be matched.
 - (6) Potable water system for wash down facilities, lavatory, and laboratory.
 - (7) Wash down facilities for each major unit process. Major unit processes will be identified as such by the Authority during the review of the "Basis of Design". Each major unit process shall have a hose bib with 50 feet of 1- inch diameter hose capable of producing at least 20 gpm at 60 psi.
 - (8) Lavatory (toilet, sink, and shower) with a 30-gallon hot water heater.
 - (9) Heating and air conditioning in the laboratory and sodium hypochlorite storage rooms.
 - (10) Facility address sign at facility entrance in accordance with Authority standard detail.

- (11) Emergency showers and eyewashes per OSHA requirements.
 - (12) Gas monitors per OSHA and Authority requirements.
 - (13) Provide standard Authority building inventory to include suitable shelving, desk and chair for operators, as well as file cabinet for on-site record storage.
- d. Treatment Facilities shall be provided with the following Electrical Equipment:
- (1) Breakers shall be Square D or Cutler-Hammer.
 - (2) Provide automatic reset and startup for all electrical relays.
 - (3) Provide electrical receptacles on all walls, a maximum of twelve feet apart.
 - (4) Exterior control panels shall be stainless steel NEMA 4X. Interior control panels shall be fiberglass NEMA 4X.
 - (5) Equipment and electrical panels shall not be mounted on tanks or wet wells.
 - (6) Provide lights over all exterior doors.
 - (7) Provide GFI protected electrical outlets on front and back of each building.
 - (8) Provided GFI protected electrical outlets every 30 (horizontal) feet in each building.
 - (9) Provide exterior lights around all major process equipment and controls with illumination ranging from 10 to 20 foot-candles.
- e. Treatment Facility shall be provided with a SCADA system as described in this Volume E, 200 - Introduction, Article 5.
- f. Miscellaneous standards for treatment facilities are as follows:
- (1) Pipe through floors and wall shall have sleeves with link-seals with stainless steel hardware, or equivalent.
 - (2) Air control valves shall be stainless steel ball valves.

- (3) Below grade and submerged reinforced and pre-cast concrete shall have bituminous coating.
 - (4) Minimum steel thickness shall be ¼ - inch plate.
 - (5) Parshall flume ultrasonic flow meters shall be Polysonics, or equivalent.
 - (6) Provide insect screens for all intake louvers.
 - (7) Valve stems, wheel and chains shall be readily accessible.
 - (8) Provide sufficient diesel fuel storage to allow all generation equipment to operate 36-hours at full load.
- g. Provide piping materials as specified in the Volume B of the Water and Wastewater Manual and the following Table 1:

Table 1 – Supplemental Piping Materials		
Application	Size	Specification
Aeration	2-inches & larger	Galvanized Steel Pipe ASTM A53, Schedule 40
Process Piping above grade	3-inches & larger	Ductile Iron Pipe AWWA C151 w/AWWA C110 flanged fittings
	2-inches & smaller	PVC ASTM D2241 Schedule 40 w/Schedule 80 fittings
Process Piping below grade	3-inches & larger	Ductile Iron Pipe AWWA C151 w/AWWA C110 or C153 MJ fittings
* Use VDOT No.8 stone in lieu of Authority Standard		

9 VAC 25-790-480 Treatment Works Outfalls

Comply with SCAT Regulations and the following:

Accessibility: Provide parallel access road 12 feet wide along outfall easement.

Article 4 - Preliminary Process

9 VAC 25-790-500 Screening

Comply with SCAT Regulations and the following:

Provide automatic screens as manufactured by Lakeside Corporation or Parkson Corporation, or approved equal shall be provided.

9 VAC 25-790-510 Grit Removal Facilities

Comply with SCAT Regulations and the following:

Provide an automatic, vortex type grit removal system as manufactured by Lakeside Corporation or Smith & Loveless Corporation, or approved equal, shall be provided.

Article 5 - Sludge Processing and Management

9 VAC 25-790-560 Aerobic Sludge Digestion

Comply with SCAT Regulations and the following:

- a. Aerobic Digestion shall be designed to meet Class II (Class B) standards for Pathogen reduction and vector attraction reduction as defined by the Virginia Biosolids Use Regulations 12 VAC5-585. To provide adequate "in system storage" the aerobic digestion volume shall have a hydraulic retention time of no less than 30 days.
- b. Aerobic digesters shall not utilize mechanical aeration.

9 VAC 25-790-590 Chemical Treatment

Comply with SCAT Regulations and the following:

- a. Chemical systems utilizing sodium hypochlorite shall utilize 15% solutions per AWWA B300 standard.
- b. Chemical feed systems shall use liquid solutions or, if approved by the Authority, liquid solutions prepared from dry chemicals. A spare chemical feed pump shall be provided for each system. Adequate facility room and climate control shall be provided for bulk chemical storage and solution day tanks, as the Authority deems necessary. Do not locate process or chemical feed equipment in laboratory or office areas.
- c. The applicant shall provide secondary containment equal in volume to 110% of the volume of the largest solution or storage tank for day solution

tanks and raw chemical drums, adequate raw chemical transfer equipment, and calibration tubes for all chemical feeders; size chemical feeders to operate near middle of capacity range; and provide separate chemical storage room and ventilation for highly corrosive chemicals. Limit weight of drum lift into secondary containment to 50 pounds.

- d. Chemical feed systems shall have the following:
- (1) Peristaltic type feed pumps with antisiphon valve
 - (2) Translucent solution tank with liquid level scale
 - (3) Vacuum breaker on makeup water spigot when hoses are used
 - (4) Temperature control for hypochlorite storage
 - (5) Protective equipment (rubber apron, rubber gloves, combination face shield/head gear, safety shower and eyewash station)

Article 6 - Biological Treatment

9 VAC 25-790-670 Attached Growth Processes

Comply with SCAT Regulations and the following:

Attached growth processes are prohibited except for deep bed denitrification filters or as specifically approved by the Authority.

9 VAC 25-790-680 Rotating Biological Contactors

Rotating Biological Contactors are prohibited.

9 VAC 25-790-690 Suspended Growth (Activated Sludge) Process

Comply with SCAT Regulations and the following:

- a. Subsurface and spray disposal wastewater treatment facilities shall be designed for a year-round Total Nitrogen effluent concentration of 5.0 mg/l as N through the biological process.
- b. Process kinetics for all biological treatment processes shall be designed using a minimum wastewater temperature of 12-degrees centigrade.
- c. Diffused aeration shall be utilized for all suspended growth activated sludge processes (25-degrees centigrade shall be used for the maximum wastewater temperature when calculating maximum diffused air requirements). Common blowers shall not be used for aeration and sludge holding tanks; provide separate blowers or the ability to isolate blowers and maintain adequate airflow to the biological reactors. Blower speed shall not exceed 1800 rpm. Blowers shall be low decibel models with inlet

filters, residential-type inlet and outlet silencers and shall be housed in a separate sound-insulated room within the treatment plant enclosure. If the treatment plant is not enclosed, provide sound insulated housings made by West Chester Manufacturing of Avondale, Pennsylvania or approved equal. The sound level at a distance of three (3) feet in any direction from the exterior wall of the sound insulated room or blower enclosure shall not exceed 75 dB.

- d. Alkalinity addition shall be provided using magnesium hydroxide to maintain a minimum secondary effluent alkalinity of at least 50 mg/l (CaCO₃). Alkalinity shall be fed using multiple feed points in the aeration basins. Lime shall not be used for alkalinity addition.
- e. All package plant systems shall minimally have 5 installations treating 100 percent domestic wastewater of similar design size of the proposed system. One of these installations must be operating in Virginia for at least 3 years from the date of initiating the Basis of Design Report. Provide references for all regional and Virginia installations. Provide operating data as requested by the Authority.

9 VAC 25-790-700 Oxidation Ditches

Comply with SCAT Regulations and the following:

Oxidation Ditches are prohibited, unless configured with additional biological nutrient removal as discussed in the "Introduction" to this Volume.

9 VAC 25-790-710 Sequencing Batch Reactors (SBR)

Comply with SCAT Regulations and the following:

- a. Sequencing Batch Reactors shall be of the true batch process type as manufactured by Aqua-Aerobics, U.S. Filter, or approved equal.
- b. Surface mounted mechanical aerators are prohibited.
- c. Provide retrievable diffuser assemblies. Each diffuser assembly shall be retrievable (at least 4 feet above the high water level) with an electric winch.
- d. A minimum of three reactor units will be provided to meet TN and TP removal requirements.
- e. For further requirements, see Section 200 INTRODUCTION, to this Volume.

9 VAC 25-790-720 Sewage Stabilization Ponds and Aerated Lagoons

Ponds and aerated lagoons are prohibited.

Article 7 – Effluent Polishing Ponds and Disinfection Processes

9 VAC 25-790-740 Chlorination

Comply with SCAT Regulations and the following:

- a. Chemical: Use of gaseous chlorine is prohibited.
- b. Design: Subsurface wastewater disposal systems and wastewater disposal systems incorporating holding ponds shall use calcium hypochlorite.

9 VAC 25-790-770 Ultraviolet Light Irradiation (UV)

Comply with SCAT Regulations and the following:

Surface discharge treatment facilities shall utilize UV disinfection.

9 VAC 25-790-820 Postaeration

Comply with SCAT Regulations and the following:

Cascade Type: Reference Manual of Practice #8, method by Barrett, et.al. Cascade type aerators shall be concrete steps.

Article 8 - Advanced Treatment

9 VAC 25-790-830 Flow Equalization

Comply with SCAT Regulations and the following:

Usage: Provide a separate in-line equalization basin, minimum 8-hour HRT based upon design maximum monthly average daily flow, for wastewater treatment facilities larger than 500,000 gpd, with a 12-hour minimum for plants less than 500,000 gpd.

9 VAC 25-790-860 Filtration

Comply with SCAT Regulations and the following:

Tertiary filtration is required. Tertiary filtration process equipment shall be a Dynasand filter unit as manufactured by Parkson Corporation, or approved equal.

Article 9 - Natural Treatment

9 VAC 25-790-870 Conventional Alternatives

Comply with SCAT Regulations and the following:

Conventional alternatives may be used if soil and site conditions are suitable. A 200 percent reserve area will be required for these type systems.

9 VAC 25-790-880 Land Treatment

Comply with SCAT Regulations and the following:

Land application processes are prohibited.

9 VAC 25-790-890 Constructed Wetlands

Comply with SCAT Regulations and the following:

Constructed wetlands may only be used for polishing before disposal.

Article 10 - Nutrient Control

9 VAC 25-790-900 Nutrient Reduction

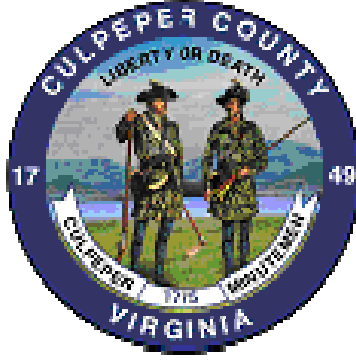
Comply with SCAT Regulations and the following:

Attached Growth Systems: Are prohibited except for deep bed denitrification filters.

9 VAC 25-790-910 Biological Nitrification

Comply with SCAT Regulations and the following:

Fixed Film Design Systems are prohibited.



Volume F

CULPEPER COUNTY WATER AND SEWER AUTHORITY

STEEL AND CONCRETE WATER STORAGE TANKS DESIGN STANDARDS

October 6, 2005

This Volume represents a portion of the water and sewer system standards, rules, rates, and procedures as approved by the Culpeper County Water and Sewer Authority (Authority) on October 6, 2005 and effective October 6, 2005. As such, this Volume must be used for all service areas under the jurisdiction of the Authority. Comments and inquiries are to be directed to the Authority.

CULPEPER COUNTY WATER AND SEWER AUTHORITY

Volume F
Standards of Design for Steel and
Concrete Water Storage
Culpeper County Water and Sewer Authority

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**VOLUME F
STANDARDS OF DESIGN FOR STEEL AND CONCRETE WATER STORAGE
TANKS**

CULPEPER COUNTY WATER AND SEWER AUTHORITY

110 GENERAL REQUIREMENTS

110.01 Introduction

The Authority or its engineer shall be responsible for the Preliminary Engineering Report (PER), Design and Construction Administration of any water storage tanks. The Developer shall pay the Authority for all costs associated with the design and construction of the tank.

110.02 Preliminary Engineering Report (PER).

- a. The location, size, type, and location of the water storage tank shall be the product of a preliminary engineering report (PER) prepared by the Authority or its representative to include a hydraulic analysis of the water system. A system model shall be developed or an existing model for the system previously approved by the Culpeper County Water and Sewer Authority (Authority) shall be modified. The model shall be field verified, if applicable.
- b. Computation of the required storage shall be shown. A registered professional engineer in the Commonwealth of Virginia shall prepare the report, sign, and seal it. All model computer runs and engineering calculations shall be furnished to the Authority for review.
- c. The PER shall show the basis for the need, size, overflow elevation, maximum approximate drawdown interval, and general location of the proposed tank and the estimated cost.
- d. The PER shall prepare a present worth analysis of the total cost comparison between an elevated steel tank and a ground storage steel tank. In addition to construction cost, the PER will consider differentials in maintenance cost, property acquisition costs, and aesthetics. If the analysis indicates a ground storage tank to be favorable, a present worth cost analysis will be prepared comparing a ground storage steel tank with a prestressed concrete tank. The Authority will make its decision based on the economic analyses, as well as the aesthetic effect on the area in the vicinity of the tank.

110.03 Geotechnical Analysis and Report for the Proposed Tank Site

- a. The geotechnical firm preparing the analysis shall be approved in advance by the Authority.
- b. The report shall be prepared and sealed by a registered professional engineer licensed to practice in the Commonwealth of Virginia.
- c. The report shall include the following:
 - (1) The presence of rock
 - (2) Sample and classify the soil strata
 - (3) Elevation of ground water
 - (4) Net allowable bearing pressure of the soils at varying depths
 - (5) Differential settlement under assumed loading
 - (6) Other conditions that may affect the design or construction methods.
 - (7) Grade elevation at each boring location. A minimum of 3 bores are required. Number required is dependent upon type and size of structure. Produce boring logs
 - (8) Laboratory test summary sheet and Atterburg limits
 - (9) Site location map
 - (10) Evaluation and recommendations concerning excavation, allowable soil bearing pressure, amount of square feet of foundation bearing surface, and foundation design, seismic design considerations, and ground water control.

110.04 Zoning and Permits

- a. The Authority or its representative is responsible for preparing the application and obtaining approval for the location and height of the water tank from the Federal Aviation Agency (FAA)
- b. The Developer is responsible for attaining the proper zoning for the tank site.
- c. The Developer is responsible for obtaining approval for the Land Disturbing Permit, the Building Permit, and the Erosion and Sediment Control Permit.
- d. The Developer is responsible for obtaining any other local permits or approvals that may be applicable. This should be verified with the Authority.

120 DESIGN PARAMETERS- STANDARD WATER TANKS

120.01 Steel Tank Design Criteria

- a. The design shall meet or exceed design requirements of applicable portions of American Water Works Association (AWWA) D100; current edition, and AWWA D115; current edition, respectively as well as the current requirements of the Virginia Department of Health, Drinking Water Standards.
- b. The design parameters for the tank shall be:
 - (1) The lowest one day mean ambient temperature shall be – 5 degrees F.
 - (2) Design wind load; 100 miles per hour
 - (3) Design snow load shall be a minimum of 30 pounds per square foot
 - (4) A zone 1 earthquake load and shall be in accordance with the fixed percentage method to calculate horizontal loads specified in AWWA section 3.1.5
 - (5) No corrosion allowance is required
 - (6) Foundations shall be designed for a total soil bearing capacity of (*site and size specific*) pounds per square foot.
 - (7) For welded steel tanks, shall meet requirements of AWWA D100 except that the minimum plate thickness shall be 1/4 inch.
 - (8) Tank design shall be based on 15,000 psi tension in the net section and 85 percent joint efficiency
 - (9) Full seal welding shall be required on both sides of all lap joints and on all joints between tank and structural members or tank assembly
 - (10) Joint penetration welded shell butt joints shall be inspected radiographically in accordance with AWWA D100, section 11
 - (11) Written report certifying the testing of the welds in accordance with AWWA D100, section 11 shall be submitted by the Developer at the completion of the project. The report shall be prepared in accordance with AWWA D100, Section 11.2.1
- c. Ground storage tanks shall have a height to radius ratio that will yield the most economical design.
- d. Hydropneumatic tanks will not be permitted.
- e. Elevated water storage tanks shall be either spheres or spheroids depending upon the size and shall be in conformance with the following table:

<u>Capacity</u>	<u>Diameter</u>	<u>Head Range</u>
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Sphere:

50,000 gallons	23'-8"	16'-5"
100,000 gallons	29'-7"	28'-6"
150,000 gallons	33'-10"	33'-0"

Spheroid

150,000 gallons	35'-0"	30'-0"
200,000 gallons	39'-10"	30'-0"
500,000 gallons	55'-10"	37'-6"
1,000,000 gallons	74'-8"	40'-0"
2,000,000 gallons	93'-8"	52'-0"

- e. See attached drawing entitled "General Plan, Elevated Water Storage Tank, Waterspheroid ®" by CBI.

120.02 Steel Tank Foundation Criteria

- a. The steel tank contractor shall design and construct the tank foundation. Foundations shown on the drawings are intended for conceptual purposes only.
- b. Within 30 days after the contract is awarded, the tank contractor shall submit to the Authority certified drawings of the tank and foundation design. Design shall be in accordance with AWWA D100 Section 12. Design loads shall be shown on the foundation drawings. Design drawing(s) shall be sealed by a Professional Engineer registered in the Commonwealth of Virginia.
- c. Contractor shall also furnish seven sets of design data, calculations, and drawings sealed by a Professional Engineer registered in the commonwealth of Virginia, to the Authority for review and approvals.

120.03 Wire and Strand – Wound Circular, Prestressed Concrete Water Tanks Design Criteria

- a. The design shall meet or exceed design requirements of applicable portions of American Water Works Association (AWWA) D110-04, February 1, 2005; current edition, as well as the current requirements of the Virginia Department of Health, Drinking Water Standards.

b. The design parameters for the concrete tank shall be:

- (1) The lowest 1-day mean ambient temperature shall be -5 degrees F.
- (2) The design wind load shall be 100 miles per hour.
- (3) The design snow load shall be a minimum of 30 pounds per square foot of the horizontal projection of the tank.
- (4) A zone 1 earthquake load shall be included in the design.

Earthquake design shall be in accordance section 4 of AWWA D110.

- (5) No corrosion allowance is required.
- (6) Design and construction of tank foundation shall meet requirements of AWWA D110. The tank foundation shall be designed for a total soil bearing capacity of (site and size specific) pounds per square foot.
- (7) Tank design shall assume differential backfill conditions as shown on plans and an undrained condition in the backfill around the tank.
- (8) The circular tank shall be of prestressed composite construction, in accordance with AWWA D110.
- (9) The tank floor shall be of concrete or shotcrete construction containing no less than 0.6 percent reinforcing steel.
- (10) The wire-prestressed composite wall shall consist of a shotcrete core wall encasing a steel shell diaphragm continuous the full wall height. All prestressing shall be done with high tensile wire, permanently bonded to the tank wall.
- (11) The tank roof shall be a circumferentially prestressed free span dome of concrete or shotcrete construction containing no less than 0.3 percent reinforcing steel.
- (12) The entire tank, including all portions of the floor, wall, and roof shall be built by tank contractor, using his own trained personnel and equipment.

- (13) All the exposed surfaces (interior and exterior) of the tank shall be treated with a cementitious crystalline waterproofing agent which is NSF61 approved: material must be capable of withstanding hydrostatic head of 50-feet and penetrating a maximum of 2 inches into concrete substrate.
- (14) The thickness of the core wall shall be calculated so as to accept the initial compressive forces applied by prestressing, hydrostatic stresses induced by contents, any soil backfill affects, and other applicable loads such as wind. Wall design shall include provisions for operating the tank without any backfill surrounding the tank.

The design shall be in conformance with American Concrete Institute (ACI) report by committee 372R "Design and Construction of Circular Wire and Strand-Wrapped Prestressed Concrete Structures," and currently accepted engineering principles and practices for the design of such facilities.

CONCRETE

Compressive Strength f_c' 3,500 psi at 28 days

SHOTCRETE

Compressive Strength f_g' 4,000 psi or greater at 28 days

PRESTRESSING WIRE

Wire Size (Diameter)	Based on tank configuration
Working Stress, Wall	Based on tank configuration
Working Stress, Dome ring	Based on tank configuration
Allowable Tensile Stress before Losses	Based on tank configuration
Ultimate Tensile	Based on tank configuration

REINFORCING STEEL

Allowable Tensile Stress Based on tank configuration

Yield Strength Based on tank configuration

(15) Floor

The concrete membrane floor (4 inches thick minimum) shall have a minimum thickness of 8 inches of concrete over all pipe encasements. The minimum percentage (0.6 percent) of reinforcing steel applies to these thickened sections and shall extend a minimum of 2 feet into the adjacent 4-inch thick floor.

The floor shall be sloped from the wall on a 1.0 percent slope towards the center sump.

(16) Core Wall

The core wall shall be constructed of shotcrete, encasing a steel diaphragm wall continuous the full height of the tank without any horizontal splices.

The thickness of the core wall shall be calculated so as to accept the initial compressive forces applied by prestressing, backfill, and other applicable loads.

To compensate for bending moments and for shrinkage, differential drying, and temperature stresses, the following reinforcing steel shall be incorporated in the core wall:

Inside Face:

26-gage (minimum) steel shell diaphragm continuous the full wall height without horizontal splices.

Outside Face:

Vertical Reinforcing Steel: Minimum of #4 bars at 12 inches center to center.

(17) Steel Shell Diaphragm

A 26-gage (minimum) steel tank shell, complying with ASTM A 366 for commercial quality cold rolled steel, shall be used within

and throughout the core wall, providing a positive waterstop. The steel shell diaphragm shall be encased and protected with shotcrete no less than 1 inch thick at all places.

All vertical joints in the diaphragm shall be sealed watertight by epoxy injection. This epoxy injection shall be carried out from bottom of wall to top of wall, using a pressure pumping procedure, after the steel shell has been fully encased inside and outside with shotcrete. The epoxy sealant shall be suitable for bonding to concrete, shotcrete, and steel.

(18) Shotcrete

All shotcrete shall be applied by or under direct supervision of experienced nozzlemen certified in accordance with guidelines by ACI Committee 506. Shotcrete mixes shall develop a 28-day strength of 4,000 psi (minimum).

(19) Horizontal Prestressing

Circumferential prestressing of the tank shall be achieved by the application of cold-drawn, high-carbon steel wire complying with ASTM A 421, placed under high tension.

Areas to be prestressed will contain not less than 10 wires per foot of wall. A maximum of 24 wires per layer per foot will be allowed.

(20) Measurement of Wire Stress

The tank contractor shall supply equipment at the construction site to measure tension in the wire after it is positioned on the tank wall. This stress measuring equipment shall include: electronic direct reading stressometer accurate to within 1 percent; calibrated dynamometers; test stand to field verify the accuracy of the stressometer. The initial tension in each wire shall be recorded.

(21) Exterior Covercoat

The shotcrete encasement shall completely encapsulate each wire, and shall permanently bond the wire to the tank wall. The shotcrete cover shall have a thickness of no less than 1 inch over the wire.

(22) Floor Openings

Pipes entering the tank through the floor shall be encased in concrete under the tank floor slab and foundation. The pipe penetration shall have a waterstop ring located in the floor slab.

(23) Qualifications and Experience of the Prestressed Concrete Tank Contractor

The prestressed concrete tank contractor shall have the following qualifications and experience:

The tank contractor shall be a firm with at least 5 years experience in the design and construction of wire-wound circular prestressed composite tanks; and shall give satisfactory evidence that it has the skill, reliability, and financial stability to build and guarantee the tank in accordance with the quality required by these specifications. The tank contractor shall have built completely in its own name in the past 5 years, and be presently responsible for, a minimum of five enclosed prestressed composite tanks of 200,000 gallons or larger, which meet these specifications and which are now giving satisfactory service for public water supply storage in a geographical region of similar climatic conditions as the project site.

The tank contractor shall have on its staff a full-time professional engineer, who shall have no less than 5 years experience in the design and field construction of circular prestressed composite tanks, and who shall be in responsible engineering charge of the work to be done. All working drawings and design calculations shall carry the seal of such registered professional engineer licensed in the Commonwealth of Virginia.

120.04 Instrumentation, Control and Monitoring Systems (ICMS)

Instrumentation, control and monitoring systems (ICMS) for steel and concrete storage tanks shall include telemetry via autodialer for the following alarms: well pump failure, tank HWL/LWL, low system pressure, power failure, and loss of radio transmitter signal. System shall be adaptable for future SCADA system. Provide LCD readout of tank level at well pump stations. See generalized SCADA System Description in Volume D, Section 200, Article 4.

120.05 Site Criteria

- a. The length and width of the tank site shall be twice the height of the tank.
- b. A security fence shall be provided inside the site perimeter. The fence shall be climb resistant.
- c. The site area shall be lighted using shielded lighting to minimize glare and light into nearby properties.

130 DESIGN STANDARDS – STEEL TANKS

- 130.01 Tank roof and accessories shall be designed to prevent entrance of fowl or other animal life.
- 130.02 The elevated steel tank and tower shall be pedestal spheroid type. (See cut sheet.)
- 130.03 Ladder safety device shall have a Type 304 stainless steel rail and cast manganese bronze sleeve. The ladder safety device shall be equal to Saf-T-Climb fall prevention device as manufactured by Air Space Devices, Paramount, California, 90723, or North Specialty Products, Brea, California 92621, or DBI Industries, or equal. Provide two safety belts with 6-foot lanyards and two sleeves.
- 130.04 Aircraft warning obstruction light fixture shall consist of two steady burning lamps of at least 116 watts enclosed in an aviation red obstruction light globe. The intensity shall not be less than 32.5 candles. The light fixture shall conform to FAA specification AC150/5345-2.
- 130.05 Steel pipe shall meet requirements for AWWA C200 AWWA standard for steel water pipe 6 inches and larger.
- a. Affidavit of compliance with standard shall be required.
 - b. Pipe shall be minimum Schedule 40 seamless pipe, Grade B. Minimum wall thickness for steel pipe 12 inches and larger shall be 0.250 inch.
 - c. Length of pipe shall be single random.
 - d. Pipe shall be lined with cement mortar.

130.06 Fittings for steel pipe shall be fabricated to dimensions specified in AWWA C208 AWWA standard for dimensions for steel water pipe fittings.

130.07 Materials for concrete tank foundation shall conform to the requirements of ACI 301-96. Minimum 28-day concrete compressive strength shall be 4,000 pounds per square inch. Reinforcing steel shall conform to the requirements of ASTM A 615, Grade 60.

130.08 Tank Accessories

- a. Provide interior ladders in the pedestal and access tube giving access to the roof and inside the tank.
- b. Each ladder system shall be provided with a ladder safety climbing device complying with OSHA standards. Exterior ladders shall terminate at least 20 feet from the ground.
- c. Provide an OSHA compliant roof handrail to enclose the roof hatches, aircraft warning light, and the vents.
- d. The tank shall be provided with two watertight roof hatches, one mushroom vent located near the center of the tank, and one manhole tank vent located at or near the center of the tank.
 - (1) The flanged manhole tank vent near the center of the tank shall have a minimum opening dimension of 24 inches.
 - (2) The roof hatches shall have a minimum opening dimension of 30 inches.
- e. Provide a cement mortar lined overflow pipe to grade of the size shown on the drawings. The weirbox or bell mouth fitting at the top of the overflow pipe shall be capable of discharging 1,000 gpm with not more than 6 inches of water above the weirbox or fitting.
- f. Provide one 36-inch by 80-inch access door with flush threshold located in the base of the pedestal complete with a handle, drip cover, and dead bolt lock.
- h. One access tube with a minimum of 42 inches in diameter shall be provided from the top of the pedestal to the tank roof.
- i. Provide an insulated cement mortar lined steel inlet/outlet pipe of the size shown on the drawings inside the pedestal from the valve up to the tank bottom. The inlet/outlet pipe shall be supported every 15 feet or less.

- j. Provide a removable silt stop with safety grate for the inlet/outlet pipe inside the tank bottom.
- k. Provide electrical lights, receptacles, panelboards, etc. as shown on the drawings and as specified.
- l. Provide a steel condensate ceiling located at the junction of the pedestal shaft and base cone complete with drain, openings for inlet/outlet pipe, overflow pipe, and ladder. Provide a handrail around the ladder opening and a 2-inch pvc drain down and through base cone to the overflow drain.
- m. The access ways to the pedestal or to the tank shall be securely locked with heavy duty locks.
- n. Provide separate inlet/outlet lines for standpipes and ground storage tanks with weephole near bottom of internal inlet.
- o. Floats and electrodes are prohibited within tanks; provide ultrasonic level transmitters.

130.09 Other Design Standards

Applicable sections of the following shall also be addressed:

- a. Paving and Surfacing (See Volume B)
- b. Water Distribution System (See Volume B)

140 DESIGN STANDARDS – CONCRETE TANKS

140.01 Prestressed Concrete Tank Drawings, Design Calculations, and Submittals

- a. The prestressed concrete tank contractor shall design and construct the tank. Tank components shown on the drawings are intended for conceptual purposes only.
- b. Within 45 days after the contract is awarded, certified drawings shall be submitted to the Authority by the tank contractor showing dimensions, sizes, thickness, gages, materials, foundation, and accessories for the prestressed concrete tank.
- c. A complete set of design calculations shall also be submitted. These calculations shall be sealed by a Professional Engineer licensed in the

Commonwealth of Virginia. All work shall be fabricated and erected in accordance with the approved drawings.

- d. Certification that the specified material alloys, sizes and quantities have been furnished shall be submitted upon completion of the project.

140.02 Fiberglass accessories shall be manufactured in strict accordance with the specifications for fiberglass reinforced plastic products, and all hardware and fasteners shall be 316 stainless steel.

140.03 All reservoir accessories shall be provided in accordance with Section 3.11 of AWWA D110.

- a. A tank roof hatch shall be provided. Roof hatch shall be placed over the inlet pipe area, with convenient access to interior and exterior ladders. Roof hatch shall have a 7-foot by 7-foot clear opening with a watertight locking fiberglass cover attached by 3/8-inch by 3-inch stainless steel anchor bolts.
- b. Exterior ladder shall be constructed of 6061-T6 or 6063-T6 Schedule 40 aluminum pipe.
- c. Interior ladder shall be constructed of fiberglass.
- d. Provide fiberglass vent in the center of the dome roof to permit the passage of air of sufficient size to prevent pressure or vacuum damage to tank structure.
- e. At least one wall manway shall be provided 12 inches above finished grade on the lower side of the tank.
- f. Provide HDPE inlet and outlet header pipes and mounting hardware as shown on the drawings.
- g. Provide center sump drain.
- h. Provide a minimum of three fiberglass overflow ports capable of passing up to 5,000 gpm in the event of tank overfillage.

150 TANK CONSTRUCTION

150.01 Site Preparation

150.02 Earthwork

- 150.03 On Site Water Distribution System (mechanical and push on piping, gate and check valves, tapping sleeves and tapping valves, altitude valve, disinfection, acceptance tests ,and bacteriological testing)
- 150.04 Tank Valve Vault – Pre-stressed or cast-in-place concrete.
- 150.05 Tank painting - Interior and exterior painting systems.
- a. Coating applicator shall be approved by the coating manufacturer.
 - b. Lead-free interior and exterior coatings: the tank interior and exterior paint systems shall be certified lead-free (contain less than 0.06 percent total lead in the dry film paint thickness).
 - c. A testing firm engaged by owner will subject painting work and products to tests for pinholes, number of coats, dry mil thickness, and formulation.
 - d. Before expiration of the 1-year guarantee period, the tank shall be subject to draining and inspection by representatives of the owner, paint manufacturer, and contractor. All areas indicating evidence of failure shall be properly repaired at no additional cost to owner. Comply with AWWA D102; Section 9.0 "First Anniversary Inspection."
 - e. Submittals: provide the following in a timely manner in accordance with the approved submittals schedule as specified in Division 1 - General Requirements.
 1. Complete preparation and painting schedule.
 2. Manufacturer's certificates and test reports as applicable.
 3. Manufacturer's certificate that a qualified representative is familiar with the project and the exposures requiring coating, and that the proposed coating systems are suitable for the respective purposes.
 4. Contractor affidavit of work & materials compliance contractor's affidavit, in accordance with Section 1.4 of AWWA D102.
 5. Dry film thickness painting inspection report contractor's report at the conclusion of dry film thickness testing, in accordance with Section 8.5 of AWWA D102.
 6. First anniversary painting inspection report.
 - f. Concrete tank exterior paint system

1. Thoro system products

One base coat of Thoroseal modified with acryl 60 - at 2 pounds per square yard, 1/16 inch cured thickness

One intermediate coat of Thoroseal modified with acryl 60 - at 1 pound per square yard, 1/32 inch cured thickness

One top coat of Thorocoat, at 60-100 square feet per gallon

- g. Immersed environment (potable water) epoxy finish: one top coat over an intermediate coat and a primer for use on exterior of steel, iron, pipes, valves, accessories, and the like.
 1. Surface preparation SSPC-SSP10 near white metal abrasive blast clean.
 2. Primer: self-priming primer applied at spreading rate recommended by manufacturer to achieve a dry film thickness of 3.0 to 5.0 mils.
 3. Intermediate coat: polyamide epoxy applied at spreading rate recommended by manufacturer to achieve a dry film thickness of 4.0 to 5.0 mils.
 4. Topcoat: polyamide epoxy applied at spreading rate recommended by manufacturer to achieve a dry film thickness of 4.0 to 6.0 mils.

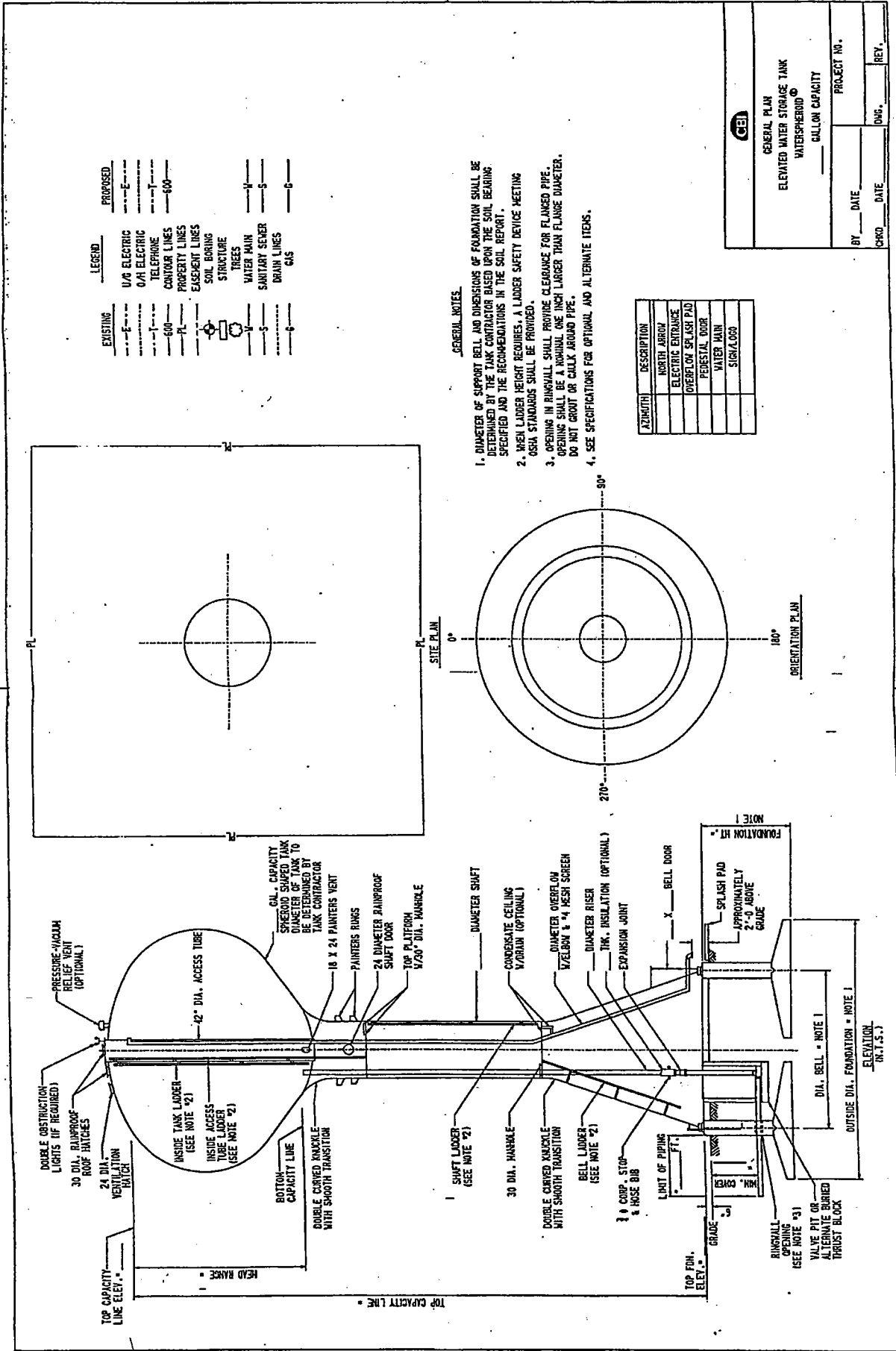
150.06 Tank Testing

- a. When erection and painting of the tank have been completed, fill the tank with water for testing by the tank contractor.
- b. Repair all leaks and other defects.
- c. Testing water for the initial tank filling will be furnished by the owner. The flow rate and availability time of test water will be determined by the owner. Should leaks or other defects require subsequent tank refilling and testing, contractor shall be responsible for all refilling costs including the cost of the water.
- d. Before the 1-year warranty expires, the owner will draw the tank down and subject the tank to an internal inspection and an external coating inspection.

150.07 Cleaning and Disinfection

- a. Submit chlorinating procedures to the Authority for approval at least 2 weeks prior to commencing chlorination.
- b. When painting has been completed and the paint has cured, thoroughly clean and flush interior tank surfaces with clear water. After cleaning and flushing, disinfect interior tank surfaces with chlorine

150.08 Paving and Surfacing; Fencing and Seeding; Lighting and Power; and Sequence of Controls shall be as discussed in Volumes B and D.



LEGEND

EXISTING	PROPOSED
U/A	ELECTRIC
0/A	ELECTRIC
TEL	TELEPHONE
600	PROPERTY LINES
PL	EASEMENT LINES
SOIL BORING	STRUCTURE
TREES	TREES
WATER MAIN	WATER MAIN
SANITARY SEWER	SANITARY SEWER
DRAIN LINES	DRAIN LINES
GAS	GAS

- GENERAL NOTES.**
1. DIAMETER OF SUPPORT BELL AND DIMENSIONS OF FOUNDATION SHALL BE DETERMINED BY THE TANK CONTRACTOR BASED UPON THE SOIL BEARING SPECIFIED AND THE RECOMMENDATIONS IN THE SOIL REPORT.
 2. WHEN LADDER HEIGHT REQUIRES, A LADDER SAFETY DEVICE MEETING OSHA STANDARDS SHALL BE PROVIDED.
 3. OPENING IN RINGSALL SHALL PROVIDE CLEARANCE FOR FLANGED PIPE. OPENING SHALL BE A MINIMUM ONE INCH LARGER THAN FLANGE DIAMETER. DO NOT GROUT OR CALK AROUND PIPE.
 4. SEE SPECIFICATIONS FOR OPTIONAL AND ALTERNATE ITEMS.

AZIMUTH	DESCRIPTION
	NORTH ARROW
	ELECTRIC ENTRANCE
	OVERFLOW SPLASH PAD
	PEDESTAL DOOR
	WATER MAIN
	SURFACE

CEI

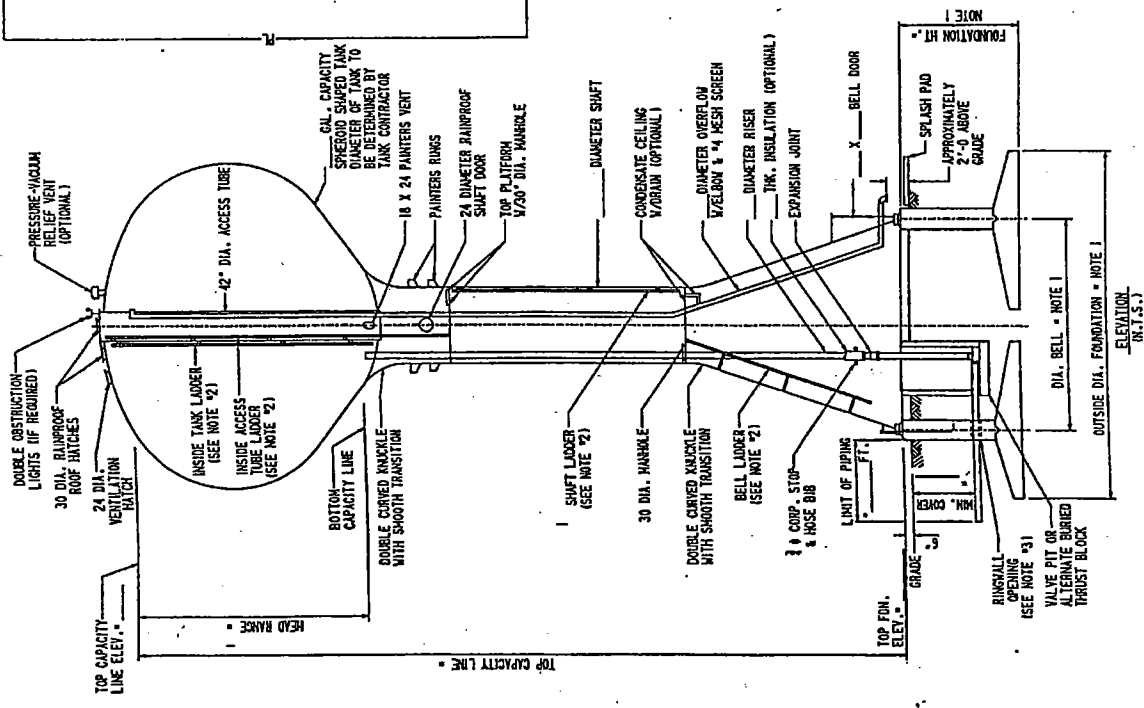
GENERAL PLAN
ELEVATED WATER STORAGE TANK
WATERSHERED
GALLON CAPACITY

PROJECT NO.

BY: _____ DATE: _____

CHKD: _____ DATE: _____

DWG. _____ REV. _____





Volume G

CULPEPER COUNTY WATER AND SEWER AUTHORITY

OWNER – CONTRACTOR CONSTRUCTION DOCUMENTS

Introduction

- 1. Standard Form of Agreement between Owner and Contractor (EJCDC – 1996 Edition)**
- 2. Instructions to Bidders (Wiley & Wilson)**
- 3. Bid Form, including Certification of Non Discrimination and Anti-Collusion, Equal Opportunity Report Statement, and Contractor Qualifications (Wiley & Wilson)**
- 4. Bonds (Bid, Performance, Payment (EJCDC)**
- 5. Certificate of Insurance (AIA)**
- 6. Application and Certification for Payment (AIA)**
- 7. Contractor's Affidavit of Payment of Debts and Claims (AIA)**
- 8. General Conditions (EJCDC – 1996 Edition)**
- 9. Supplemental Conditions (Wiley & Wilson)**

October 6, 2005

This Volume represents a portion of the water and sewer system standards, rules, rates, and procedures as approved by the Culpeper County Water and Sewer Authority (Authority) on October 6, 2005 and effective October 6, 2005. As such, this Volume must be used for all service areas under the jurisdiction of the Authority. Comments and inquiries are to be directed to the Authority.

CULPEPER COUNTY WATER AND SEWER AUTHORITY

Introduction

The following Owner-Contractor construction documents have been included as a guide. The Authority has the sole right to add, delete, or modify the documents as it deems applicable for a particular project.

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification.

**STANDARD FORM OF AGREEMENT
BETWEEN OWNER AND CONTRACTOR
ON THE BASIS OF A STIPULATED PRICE**

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly By

[insert seals]

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
a practice division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

AMERICAN CONSULTING ENGINEERS COUNCIL

AMERICAN SOCIETY OF CIVIL ENGINEERS

This document has been approved and endorsed by

The Associated General [seal] Contractors of America

Construction Specifications Institute

[seal]

This Standard Form of Agreement has been prepared for use with the Standard General Conditions of the Construction Contract (No. 1910-8, 1996 Edition). Their provisions are interrelated, and a change in one may necessitate a change in the other. The suggested language for instructions of bidders contained in the Guide to the Preparation of Instructions to Bidders (No. 1910-12, 1996 Edition) is also carefully interrelated with the language of this Agreement. Comments concerning their usage are contained in the EJCDC User's Guide (No. 1910-50). See also Guide to the Preparation of Supplementary Conditions (No. 1910-17, 1996 Edition).

Note to User

Certain states and federal agencies require provisions in public contracts which permit Contractors to deposit acceptable securities with Owner or a stakeholder in lieu of retainage. Many Owners will not accept this procedure except where required by Laws or Regulations. In the event such a procedure is required, the provisions of this Agreement and possibly those of the other Contract Documents dealing with retainage should be amended, and an attorney should be consulted to prepare the revised language. Among the issues to be addressed by such language are: initial and subsequent valuations of the securities, right to withdraw excess collateral and obligation to deposit additional collateral as market value changes, who is entitled to interest and dividends on deposited collateral, responsibilities of stakeholder, may collateral be freely sold in the event of Contractor default and method of such sale, and application of Uniform Commercial Code and state and federal security laws to the arrangement.

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National Society of Professional Engineers
1420 King Street, Alexandria, VA 22314-2715

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

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

Introduction

This Agreement between Owner and Contractor on the Basis of a Stipulated Price (“Agreement”) has been prepared for use with the Guide to the Preparation of Instructions to Bidders (“Instructions”) (No. 1910-12, 1996 Edition) and with the Standard General Conditions of the Construction Contract (“General Conditions”) (No. 1910-8, 1996 Edition). Their provisions are interrelated, and a change in one may necessitate a change in the others. Comments concerning their usage are contained in the Commentary on Agreements for Engineering Services and Construction Related Documents (“Commentary”) (No. 1910-9, 1996 Edition). For guidance in the preparation of Supplementary Conditions and coordination with Instructions to Bidders, see Guide to the Preparation of Supplementary Conditions (“Supplementary Conditions”) (No. 1910-17, 1996 Edition). See also Guide to Preparation of the Bid Form (“Bid Form”) (No. 1910-18, 1996 Edition). The EJCDC has not prepared a suggested form of Advertisement or Invitation to Bid because such documents will vary widely in response to statutory requirements.

This form and the other Bidding Documents prepared and issued by the EJCDC assume acceptance of the Project Manual concept of the Construction Specifications Institute which provides for an organizational format for location of all bound documentary information for a construction project, namely: Bidding Requirements (which term refers to the Advertisement or Invitation to Bid, the Instructions, and any bid form that may be suggested or prescribed, all of which provide information and guidance for all Bidders) and the Contract Documents (defined in Article 1 of the General Conditions), which include the Agreement, Bonds and Certificates, the General Conditions, the Supplementary Conditions, the Drawings, and the Specifications. The Bidding Requirements are not considered part of the 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 and because many contracts are awarded without going through the bidding process. In some cases, however, the actual Bid may be attached as an exhibit to the Agreement to avoid extensive retyping. (The terms “Bidding Documents” and “Bidding Requirements” are defined in Article 1 of the General Conditions.) The Project Manual concept is explained in the *Manual of Practice* issued by the Construction Specifications Institute.

Suggested language is presented herein with “Notes to User” to assist in preparing the Agreement. Much of the language should be usable on most projects, but modifications and additional provisions will often be necessary. The suggested language has been coordinated with the other standard forms produced by the EJCDC. When modifying the suggested language or writing additional provisions, the user must check the other documents thoroughly for conflicts and coordination of language usage and make appropriate revisions in all affected documents.

For brevity, referenced paragraphs of the Instructions to Bidders with the prefix “I,” those of the Bid Form with the prefix “BF,” and those of this Agreement with the prefix “A.”

Refer to Contract Documents Bibliography (No. 1910-24, 1996 Edition), which will be helpful in preparing the Agreement, and see in particular the discussions in EJCDC’s *Recommended Competitive Bidding Procedures for Construction Projects* (“Bidding Procedures”) (No. 1910-9-D, 1987 Edition) by Robert J. Smith, P.E., Esq., on the particular paragraphs of which frequent reference is made below.

NOTES:

1. EJCDC publications may be ordered from NSPE headquarters at 1420 King Street, Alexandria VA 22314-2715; or ACEC headquarters at 1015 15th Street NW, Washington DC 20005; or ASCE headquarters at 345 East 47th Street, New York NY 10017.
2. CSI publications may be ordered from CSI headquarters at 601 Madison Street, Alexandria VA 22314.
3. AIA publications may be obtained from most local AIA chapter offices or by writing to AIA headquarters at 1735 New York Avenue NW, Washington, DC 20006.
4. The Associated General Contractors of America has a series of construction related documents which may be of interest. The AGC’s Publications and Services Catalog may be obtained from AGC headquarters at 1957 E Street NW, Washington, DC 20006.

**EJCDC
STANDARD FORM OF AGREEMENT
BETWEEN OWNER AND CONTRACTOR
ON THE BASIS OF A STIPULATED PRICE**

THIS AGREEMENT is by and between _____
(hereinafter called OWNER) and _____
(hereinafter called CONTRACTOR).

OWNER and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, 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 for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

ARTICLE 3 - ENGINEER

3.01 The Project has been designed by

who is hereinafter called ENGINEER and who is to act as OWNER's representative, assume all duties and responsibilities, and have the rights and authority assigned to ENGINEER in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 4 - CONTRACT TIMES

4.01 Time of the Essence

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

4.02 Dates for Substantial Completion and Final Payment

A. The Work will be substantially completed on or before _____, _____, and completed and ready for final payment in accordance with paragraph 14.07 of the General Conditions on or before _____, _____.

[or]

4.02 Days to Achieve Substantial Completion and Final Payment

A. The Work will be substantially completed within _____ days after the date when the Contract Times commence to run as provided in paragraph 2.03 of the General Conditions, and completed and ready for final payment in accordance with paragraph 14.07 of the General Conditions within _____ days after the date when the Contract Times commence to run.

4.03 Liquidated Damages

A. CONTRACTOR and OWNER recognize that time is of the essence of this Agreement and that OWNER will suffer financial loss if the Work is not completed within the times specified in paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in 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), CONTRACTOR shall pay OWNER \$ _____ for each day that expires after the time specified in paragraph 4.02 for Substantial Completion until the Work is substantially complete. After Substantial Completion, if CONTRACTOR shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by OWNER, CONTRACTOR shall pay OWNER \$ _____ for each day that expires after the time specified in paragraph 4.02 for completion and readiness for final payment until the Work is completed and ready for final payment.

NOTE TO USER

- 1. Where failure to reach a Milestone on time is of such consequence that the assessment of liquidated damages for failure to reach one or more Milestones on time is to be provided, appropriate amending or supplementing language should be inserted here.*

ARTICLE 5 - CONTRACT PRICE

5.01 OWNER shall pay CONTRACTOR for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to paragraphs 5.01.A, 5.01.B, and 5.01.C below:

A. For all Work other than Unit Price Work, a Lump Sum of:

_____ (\$ _____)
 (use words) (figure)

All specific cash allowances are included in the above price and have been computed in accordance with paragraph 11.02 of the General Conditions.

B. For all Unit Price Work, an amount equal to the sum of the established unit price for each separately identified item of Unit Price Work times the estimated quantity of that item as indicated in this paragraph 5.01.B:

UNIT PRICE WORK

<u>No.</u>	<u>Item</u>	<u>Unit</u>	<u>Estimated Quantity</u>	<u>Unit Price</u>	<u>Total Estimated</u>
------------	-------------	-------------	-------------------------------	-------------------	----------------------------

TOTAL OF ALL UNIT PRICES _____ \$ _____ (dollars)
 (use words)

As provided in paragraph 11.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by ENGINEER as provided in paragraph 9.08 of the General Conditions. Unit prices have been computed as provided in paragraph 11.03 of the General Conditions.

C. For all Work, at the prices stated in CONTRACTOR’s Bid, attached hereto as an exhibit.

NOTES TO USER

1. *If adjustment prices for variations from stipulated Base Bid quantities have been agreed to, insert appropriate provisions. See BF-4.*
2. *Depending upon the particular project bid form used, use A-5.01.A alone, A-5.01.A and A-5.01.B together, A-5.01.B alone, or A-5.01.C alone, deleting those not used and renumbering accordingly. If A-5.01.C is used, CONTRACTOR’s Bid is attached as an exhibit and listed in A-9.*

ARTICLE 6 - PAYMENT PROCEDURES

6.01 Submittal and Processing of Payments

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

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 paragraphs 6.02.A.1 and 6.02.A.2 below. All such payments will be measured by the schedule of values established in paragraph 2.07.A of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements:

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 ENGINEER may determine or OWNER may withhold, in accordance with paragraph 14.02 of the General Conditions:

a. _____% of Work completed (with the balance being retainage). If the Work has been 50% completed as determined by ENGINEER, and if the character and progress of the Work have been satisfactory to OWNER and ENGINEER, OWNER, on recommendation of ENGINEER, may determine that as long as the character and progress of the Work remain satisfactory to them, there will be no retainage on account of Work subsequently completed, in which case the remaining progress payments prior to Substantial Completion will be in an amount equal to 100% of the Work completed less the aggregate of payments previously made; and

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

2. Upon Substantial Completion, OWNER shall pay an amount sufficient to increase total payments to CONTRACTOR to _____% of the Work completed, less such amounts as ENGINEER shall determine in accordance with paragraph 14.02.B.5 of the General Conditions and less _____% of ENGINEER's estimate of the value of Work to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

6.03 Final Payment

A. Upon final completion and acceptance of the Work in accordance with paragraph 14.07 of the General Conditions, OWNER shall pay the remainder of the Contract Price as recommended by ENGINEER as provided in said paragraph 14.07.

ARTICLE 7 - INTEREST

7.01 All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest at the rate of _____% per annum.

ARTICLE 8 - CONTRACTOR'S REPRESENTATIONS

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

A. CONTRACTOR has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.

B. CONTRACTOR has visited the Site 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 federal, state, and local 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 contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in paragraph 4.02 of the General Conditions and (2) reports and drawings of a Hazardous Environmental Condition, if any, at the Site which has been identified in the Supplementary Conditions as provided in paragraph 4.06 of the General Conditions.

NOTE TO USER

1. *If the reports and/or drawings referred to in A-8.01.D do not exist, either modify A-8.01.D or delete A-8.01.D and renumber accordingly.*

E. CONTRACTOR has obtained and carefully studied (or assumes responsibility for having done so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by CONTRACTOR, including applying the specific means, methods, techniques, sequences, and procedures of construction, if any, expressly required by the Contract Documents to be employed by CONTRACTOR, and safety precautions and programs incident thereto

NOTE TO USER

1. *If the reports and/or drawings referred to in A-8.01.D do not exist, delete the phrase "additional or supplementary" in the first sentence of A-8.01.E.*

F. CONTRACTOR does not consider that any 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 Documents.

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 correlated the information known to CONTRACTOR, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.

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

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

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 (pages _____ to _____, inclusive);
 - a. _____ (pages _____ to _____, inclusive);
 - b. _____ (pages _____ to _____, inclusive);
 - c. _____ (pages _____ to _____, inclusive);
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 consisting of a cover sheet and sheets numbered _____ through _____, inclusive, with each sheet bearing the following general title: _____;
9. Addenda (numbers _____ to _____, inclusive);
10. Exhibits to this Agreement (enumerated as follows):
 - a. Notice to Proceed (pages _____ to _____, inclusive);
 - b. CONTRACTOR's Bid (pages _____ to _____, inclusive);
 - c. Documentation submitted by CONTRACTOR prior to Notice of Award (pages _____ to _____, inclusive);
 - d. _____;
11. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
 - a. Written Amendments;
 - b. Work Change Directives;
 - c. Change Order(s).

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 paragraph 3.05 of the General Conditions.

ARTICLE 10 - MISCELLANEOUS

10.01 *Terms*

A. Terms used in this Agreement will have the meanings indicated in the General Conditions.

10.02 *Assignment of Contract*

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

10.03 *Successors and Assigns*

A. OWNER and CONTRACTOR each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, 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 *Other Provisions*

NOTE TO USER

- 1. Insert other provisions here if applicable.*

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

NOTE TO USER

1. See I-21 and correlate procedures for format and signing between the two documents.

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

OWNER:

CONTRACTOR:

By: _____

By: _____

[CORPORATE SEAL]

[CORPORATE SEAL]

Attest _____

Attest _____

Address for giving notices:

Address for giving notices:

(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 OWNER-CONTRACTOR Agreement.)

License No. _____
(Where applicable)

Agent for service of process: _____

(If CONTRACTOR is a corporation or a partnership, attach evidence of authority to sign.)

Designated Representative:

Designated Representative:

Name: _____

Name: _____

Title: _____

Title: _____

Address: _____

Address: _____

Phone: _____

Phone: _____

Facsimile: _____

Facsimile: _____

INSTRUCTIONS TO BIDDERS

1. GENERAL: TO BE VALID FOR CONSIDERATION, BIDS MUST BE COMPLETED AND SUBMITTED IN ACCORDANCE WITH THESE INSTRUCTIONS TO BIDDERS.
2. BIDDING DOCUMENTS WILL BE PROVIDED AS INDICATED IN THE ADVERTISEMENT FOR BIDS.
3. QUALIFICATION OF BIDDERS: EACH BIDDER MUST BE PREPARED TO SUBMIT WITHIN 5 CALENDAR DAYS OF THE OWNER'S REQUEST WRITTEN EVIDENCE OF HIS QUALIFICATIONS FOR THE PROJECT INCLUDING FINANCIAL DATA, PREVIOUS EXPERIENCE, AND EVIDENCE OF AUTHORITY TO CONDUCT BUSINESS IN THE JURISDICTION WHERE THE PROJECT IS LOCATED.
4. EXAMINATION OF BID DOCUMENTS AND SITE:
 - 4.01 BEFORE SUBMITTING BIDS, EACH BIDDER MUST EXAMINE BID DOCUMENTS THOROUGHLY; FAMILIARIZE HIMSELF WITH FEDERAL, STATE, AND LOCAL LAWS, ORDINANCES, RULES, AND REGULATIONS AFFECTING THE WORK; AND CORRELATE HIS OBSERVATIONS WITH REQUIREMENTS OF THE BID DOCUMENTS.
 - 4.02 BIDDERS ARE REQUESTED AND EXPECTED TO VISIT THE SITE OF THE PROJECT TO ALERT THEMSELVES TO LOCAL AND SPECIAL CONDITIONS WHICH MAY BE ENCOUNTERED DURING CONSTRUCTION OF THE PROJECT SUCH AS: LABOR AND TRANSPORTATION, HANDLING AND STORAGE OF MATERIALS, THE AVAILABILITY OF MATERIALS, AND SITE ACCESS. FAILURE TO MAKE SUCH INVESTIGATIONS SHALL NOT RELIEVE THE SUCCESSFUL BIDDER FROM PERFORMING AND COMPLETING THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
 - A. A PRE-BID CONFERENCE WILL BE HELD AT THE TIME AND PLACE STATED IN THE ADVERTISEMENT FOR BIDS.
5. INTERPRETATIONS:
 - 5.01 NO ORAL INTERPRETATIONS OF THE BID DOCUMENTS WILL BE MADE TO ANY BIDDER. TO BE GIVEN CONSIDERATION, REQUESTS FOR INTERPRETATIONS MUST BE RECEIVED IN TIME TO ALLOW PREPARATION OF WRITTEN RESPONSE AT LEAST 5 DAYS PRIOR TO DATE FIXED FOR [RECEIPT] OF BIDS. INTERPRETATIONS WILL BE ISSUED IN THE FORM OF WRITTEN ADDENDA TO THE BID DOCUMENTS AND MAILED TO ALL PARTIES RECORDED BY WILEY & WILSON AS HAVING RECEIVED BID DOCUMENTS, PRIOR TO SCHEDULED [RECEIPT] OF BIDS. ONLY INTERPRETATIONS BY FORMAL WRITTEN ADDENDA WILL BE BINDING.
 - 5.02 ALL COMMUNICATIONS IN REGARD TO INTERPRETATIONS AND ANY OTHER MATTERS RELATED TO THIS PROJECT SHALL BE ADDRESSED TO THE PROJECT MANAGER, [_____] AT THE LYNCHBURG OFFICE OF WILEY & WILSON, INC., P. O. BOX 877, LYNCHBURG, VIRGINIA 24505-0877
6. SUBSTITUTIONS OF MATERIAL OR EQUIPMENT OR BOTH MAY BE OFFERED IN ACCORDANCE WITH DIVISION 1 - GENERAL REQUIREMENTS.
7. BID SUBMISSION:
 - 7.01 SUBMIT BIDS USING FORMS FURNISHED BY WILEY & WILSON AND FILL IN ALL BLANK SPACES ON THE FORM. REPEAT NOTATION "CONTRACTOR'S CURRENT [_____] LICENSE NO. _____" ON OUTSIDE OF INNER ENVELOPE

CONTAINING BID AND BID SECURITY, AND PLACE THIS ENVELOPE WITHIN ANOTHER ENVELOPE ADDRESSED:

A. [_____

_____]

7.02 THE INNER ENVELOPE SHALL HAVE NOTED THEREON:

A. "BID FOR CONSTRUCTION OF [_____
_____] FOR [_____]"

7.03 DEFINITION: CONTRACTOR'S WORK PAPERS ARE THE ORIGINAL WORK PAPERS, DOCUMENTS, AND MATERIALS USED IN THE PREPARATION OF THE BID AS REFERRED TO IN SECTION 2.2-4330 OF THE CODE OF VIRGINIA.

7.04 CONTRACTOR'S WORK PAPERS SHALL BE SUBMITTED IN A SECOND SEALED ENVELOPE WITH THE NOTATION "CONTRACTOR'S WORK PAPERS FOR CONSTRUCTION OF [_____]" ON THE OUTSIDE OF THE ENVELOPE. CONTRACTOR'S WORK PAPERS SHALL BE SUBMITTED IN PERSON OR BY REGISTERED MAIL AT THE PLACE INDICATED IN ADVERTISEMENT FOR BIDS PRIOR TO THE TIME AND DATE OF THE BID OPENING.

7.05 BID SECURITY SHALL BE PROVIDED AS STATED IN ADVERTISEMENT FOR BIDS.

7.06 RECEIPT DEADLINE FOR BIDS WILL BE AS STATED IN THE ADVERTISEMENT FOR BIDS.

A. NO BIDDER SHALL WITHDRAW, MODIFY, OR CANCEL ANY PART OF HIS BID FOR THE NUMBER OF DAYS STATED ON THE BID FORM FOLLOWING THIS DATE AND TIME [EXCEPT AS PROVIDED BY CODE OF VIRGINIA SECTION 2.2-4330(A) PROCEDURE [(1)] OR [(2)].

7.07 BIDS WILL NOT BE OPENED PUBLICLY AND NO BID INFORMATION WILL BE AVAILABLE UNTIL THE OWNER IS PREPARED TO MAKE AN ANNOUNCEMENT.

7.08 BIDS WILL BE OPENED PUBLICLY IN ACCORDANCE WITH [_____].

7.09 MODIFICATION AND WITHDRAWAL OF BIDS: BIDS MAY BE MODIFIED OR WITHDRAWN BY AN APPROPRIATE DOCUMENT DULY EXECUTED (IN THE MANNER THAT A BID MUST BE EXECUTED) AND DELIVERED TO THE PLACE WHERE BIDS ARE TO BE SUBMITTED AT ANY TIME PRIOR TO THE [RECEIPT] OF BIDS.

7.10 WITHDRAWAL OF BIDS AFTER DATE FOR SUBMISSION: IN ACCORDANCE WITH SECTION 2.2-4330(A) PROCEDURE [(1) THE BIDDER SHALL GIVE NOTICE IN WRITING OF HIS CLAIM OF RIGHT TO WITHDRAW HIS BID WITHIN 2 BUSINESS DAYS AFTER THE CONCLUSION OF THE BID OPENING PROCEDURE AND SHALL SUBMIT ORIGINAL WORK PAPERS WITH SUCH NOTICE.] [(2) THE BIDDER SHALL SUBMIT TO THE PUBLIC BODY OR DESIGNATED OFFICIAL HIS ORIGINAL WORK PAPERS, DOCUMENTS, AND MATERIALS USED IN THE PREPARATION OF THE BID WITHIN 1 DAY AFTER THE DATE FIXED FOR SUBMISSION OF BIDS. THE WORK PAPERS SHALL BE DELIVERED BY THE BIDDER IN PERSON OR BY REGISTERED MAIL AT OR PRIOR TO THE TIME FIXED FOR THE OPENING OF BIDS. IN EITHER INSTANCE, SUCH WORK PAPERS, DOCUMENTS AND MATERIALS MAY BE CONSIDERED AS TRADE SECRETS OR PROPRIETARY INFORMATION

SUBJECT TO THE CONDITIONS OF SUBSECTION F OF 2.2-4342. THE BIDS SHALL BE OPENED ONE DAY FOLLOWING THE TIME FIXED BY THE PUBLIC BODY FOR THE SUBMISSION OF BIDS. THEREAFTER, THE BIDDER SHALL HAVE 2 HOURS AFTER THE OPENING OF BIDS WITHIN WHICH TO CLAIM IN WRITING ANY MISTAKE AS DEFINED HEREIN AND WITHDRAW HIS BID. THE CONTRACT SHALL NOT BE AWARDED BY THE PUBLIC BODY UNTIL THE 2-HOUR PERIOD HAS ELAPSED. SUCH MISTAKE SHALL BE PROVIDED ONLY FROM THE ORIGINAL WORK PAPERS, DOCUMENTS, AND MATERIALS DELIVERED AS REQUIRED HEREIN.] FAILURE TO SUBMIT CONTRACTOR'S WORK PAPERS WILL BE CONSIDERED AS A WAIVER OF ANY RIGHT OF WITHDRAWAL OF BIDS AFTER THE DATE FOR SUBMISSION.

8. AGREEMENT, INSURANCE CERTIFICATE, AND BONDS SHALL BE DRAWN ON FORMS IDENTICAL TO THOSE BOUND WITHIN THIS PROJECT MANUAL.
 - 8.01 BONDS SHALL BE WITH A SURETY COMPANY ACCEPTABLE TO THE OWNER.
 - 8.02 A PERFORMANCE BOND AND A LABOR AND MATERIAL PAYMENT BOND WILL BE REQUIRED IN THE AMOUNT OF 100 PERCENT OF THE BID.
9. AWARD OF CONTRACT:
 - 9.01 THE AWARD OF THE CONTRACT WILL BE TO THE RESPONSIBLE BIDDER SUBMITTING THE LOWEST BASE BID WHOSE QUALIFICATIONS INDICATE THE AWARD WILL BE IN THE BEST INTEREST OF THE OWNER AND WHOSE BID MEETS THE PRESCRIBED REQUIREMENTS.
 - 9.02 THE OWNER RESERVES THE RIGHT TO REJECT ANY AND ALL BIDS AND WAIVE ANY AND ALL INFORMALITIES AND THE RIGHT TO DISREGARD ALL NONCONFORMING OR CONDITIONAL BIDS OR COUNTERPROPOSALS.
 - 9.03 SUBMISSION OF POST-BID INFORMATION SHALL BE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

END OF INSTRUCTIONS TO BIDDER

BID FORM

[_____

_____]

GENTLEMEN:

THE UNDERSIGNED, HAVING VISITED AND EXAMINED THE SITE AND HAVING CAREFULLY STUDIED THE DRAWINGS AND PROJECT MANUAL FOR [_____],
HEREBY PROPOSES TO FURNISH ALL PLANT, 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 DRAWINGS AND PROJECT MANUAL PREPARED BY WILEY & WILSON, INC., DATED [_____] 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 SHALL BE REFERRED TO HEREINAFTER AS THE BASE BID.

THE BASE BID IS FOUNDED UPON FURNISHING EQUIPMENT AND MATERIALS OF SPECIFIED MANUFACTURERS. EQUIPMENT OR MATERIALS OF OTHER MANUFACTURERS ARE OFFERED AS SUBSTITUTES AS SHOWN ON THE LAST PAGE OF THIS BID FORM.

SUBSTITUTES ARE OFFERED FOR THE OWNER'S CONSIDERATION IN ACCORDANCE WITH DIVISION 1 - GENERAL REQUIREMENTS.

IT IS UNDERSTOOD AND AGREED THAT THE OWNER, IN PROTECTING HIS BEST INTEREST, RESERVES THE RIGHT TO:

REJECT ANY OR ALL BIDS,

ACCEPT ANY BID AT THE BASE BID PRICE, WHEREUPON THE CONTRACTOR SHALL FURNISH EQUIPMENT AND MATERIALS AS SPECIFIED, OR

ACCEPT ANY BID AT THE BASE BID PRICE AND, IF EQUIPMENT OR MATERIALS OF SUBSTITUTE MANUFACTURERS ARE OFFERED, TO ACCEPT ANY OR ALL OF SUCH OFFERED SUBSTITUTES, WHICH ARE APPROVED, THE CONTRACT PRICE BEING ADJUSTED ACCORDINGLY.

WE ARE PROPERLY EQUIPPED TO EXECUTE WORK OF THE CHARACTER AND EXTENT INDICATED BY THE BIDDING 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 AND 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 CONTRACTOR TO PROCEED" AND PROSECUTE THE WORK AND ALL OBLIGATIONS WITHIN [_____] CALENDAR DAYS.

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 DRAWINGS AND PROJECT MANUAL:

CASHIERS 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 CONSECUTIVE CALENDAR DAYS AFTER WRITTEN NOTICE BEING GIVEN ON THE AWARD OF THE CONTRACT, THE MONEYS PAYABLE BY THE SECURITIES ACCOMPANYING THIS BID SHALL BE PAID TO [_____] 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 [_____] DAYS FROM THIS DATE.

RESPECTFULLY SUBMITTED,

CONTRACTOR

BY _____

ADDRESS

TELEPHONE NUMBER

DATE _____

CONTRACTOR'S CURRENT [VIRGINIA] [_____] }
LICENSE NUMBER _____ CODE _____

SUBSTITUTE EQUIPMENT OR MATERIALS

PROJECT NAME [_____

_____]

EQUIPMENT OR MATERIAL ITEM AS SPECIFIED	MANUFACTURER'S NAME, CATALOG OR MODEL NO. OF SUBSTITUTE OFFERED	AMOUNT INDICATE, ADD OR DEDUCT \$ _____
1. _____	_____	\$ _____
2. _____	_____	\$ _____
3. _____	_____	\$ _____
4. _____	_____	\$ _____
5. _____	_____	\$ _____
6. _____	_____	\$ _____
7. _____	_____	\$ _____
8. _____	_____	\$ _____
9. _____	_____	\$ _____
10. _____	_____	\$ _____

THE ABOVE LISTED SUBSTITUTE ITEMS ARE HEREBY GUARANTEED TO PERFORM IN ALL RESPECTS THE FUNCTIONS OF THE ITEMS OF SPECIFIED MANUFACTURERS, AND IT IS FULLY UNDERSTOOD THAT APPROVAL OF SUCH ITEMS IS CONTINGENT UPON THIS GUARANTEE.

CONTRACTOR'S NAME: _____

CONTRACTOR'S SIGNATURE: _____

CURRENT LICENSE NUMBER: _____ CODE: _____

DATE: _____

CERTIFICATION OF NONDISCRIMINATION AND ANTI-COLLUSION

BY SUBMITTING THEIR BIDS, ALL BIDDERS CERTIFY TO THE CULPEPER COUNTY WATER AND SEWER AUTHORITY, CULPEPER COUNTY, VA THAT THEY WILL CONFORM TO THE PROVISIONS OF THE FEDERAL CIVIL RIGHTS ACT OF 1964, AS AMENDED, AS WELL AS THE VIRGINIA FAIR EMPLOYMENT CONTRACTING ACT OF 1975, AS AMENDED, WHERE APPLICABLE, THE VIRGINIAN'S WITH DISABILITIES ACT, THE AMERICANS WITH DISABILITIES ACT, SECTION 2.2-4311 OF THE VIRGINIA PUBLIC PROCUREMENT ACT, AND THE LYNCHBURG PROCUREMENT ORDINANCE:

IN EVERY CONTRACT OVER \$10,000, THE PROVISIONS BELOW APPLY:

1. DURING THE PERFORMANCE OF THIS CONTRACT, THE CONTRACTOR AGREES AS FOLLOWS:
 - A. THE CONTRACTOR WILL NOT DISCRIMINATE AGAINST ANY EMPLOYEE OR APPLICANT FOR EMPLOYMENT BECAUSE OF RACE, RELIGION, COLOR, SEX, NATIONAL ORIGIN, AGE, DISABILITY, OR ANY OTHER BASIS PROHIBITED BY STATE LAW RELATING TO DISCRIMINATION IN EMPLOYMENT, EXCEPT WHERE THERE IS 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.
2. 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.

I ALSO HEREBY CERTIFY THAT THIS BID IS NOT THE RESULT OF, OR AFFECTED BY, ANY ACT OF COLLUSION WITH ANOTHER PERSON ENGAGED IN THE SAME LINE OF BUSINESS, OR ANY ACT OF FRAUD PUNISHABLE UNDER THE VIRGINIA COMMONWEALTH FRAUDS ACT.

CERTIFIED BY: _____ (CORPORATE SEAL)

DATE: _____

(SEAL)

ACKNOWLEDGED BEFORE ME THIS _____ DAY OF _____, _____

NOTARY PUBLIC

MY COMMISSION EXPIRES: _____

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 CULPEPER COUNTY WATER AND SEWER AUTHORITY TO UTILIZE MINORITY AND WOMEN OWNED BUSINESSES WHEREVER POSSIBLE, THE BIDDER HAS SOLICITED QUOTATIONS FOR LABOR, MATERIAL, AND/OR SERVICES FROM THE FOLLOWING:

<u>NAME OF FIRM</u>	<u>CONTACT NAME AND PHONE NUMBER</u>	<u>DATE</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

OF THOSE LISTED ABOVE, WE INTEND, AT THIS TIME, TO UTILIZE THE FOLLOWING IN THE COMPLETION OF THE WORK REQUIRED BY THIS CONTRACT:

<u>NAME OF FIRM</u>	<u>SERVICE/WORK TO BE PERFORMED</u>	<u>ESTIMATED VALUE</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

"THIS FIRM ASSURES THAT IT WILL GIVE ITS BEST EFFORTS TO UTILIZE MBE/WBE BUSINESS ENTERPRISES WHEREVER POSSIBLE THROUGHOUT THE TERM OF THIS CONTRACT."

CERTIFIED BY: _____ (SIGNATURE)
_____ (TYPED/PRINTED NAME & TITLE)

COMPANY NAME: _____ (FIRM NAME)

IRS NUMBER: _____ (FIRM TAXPAYER ID)

FAILURE TO DOCUMENT AND REPORT MBE/WBE FIRM CONTACTS ON THIS FORM MAY BE A BASIS FOR REJECTION OF THE BID AS NONCONFORMING.

BID BOND

BIDDER (Name and Address):

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

OWNER (Name and Address):

BID

BID DUE DATE: _____

PROJECT (Brief Description Including Location):

BOND

BOND NUMBER: _____

DATE (Not later than Bid due date): _____

PENAL SUM: _____

(Words)

(Figures)

IN WITNESS WHEREOF, Surety and Bidder, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

BIDDER

SURETY

_____(Seal)

_____(Seal)

Bidder's Name and Corporate Seal

Surety's Name and Corporate Seal

By: _____

By: _____

Signature and Title

Signature and Title
(Attach Power of Attorney)

Attest: _____

Attest: _____

Signature and Title

Signature and Title

-
- Note: (1) Above addresses are to be used for giving required notice.
 (2) Any singular reference to Bidder, Surety, OWNER or other party shall be considered plural where applicable.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to pay to OWNER upon default of Bidder the penal sum set forth on the face of this Bond.

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

3. This obligation shall be null and void if:

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

3.2. All Bids are rejected by OWNER, or

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

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

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

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

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

8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier or by

United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

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

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

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

Performance Bond

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

CONTRACTOR (Name and Address):

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

OWNER (Name and Address):

CONTRACT

Date:

Amount:

Description (Name and Location):

BOND

Date (Not earlier than Contract Date):

Amount:

Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent or representative.

CONTRACTOR AS PRINCIPAL

Company: _____ (Corp. Seal)

Signature: _____
Name and Title:

SURETY

Company: _____ (Corp. Seal)

Signature: _____
Name and Title:
(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

CONTRACTOR AS PRINCIPAL

Company: _____ (Corp. Seal)

Signature: _____
Name and Title:

SURETY

Company: _____ (Corp. Seal)

Signature: _____
Name and Title:

EJCDC No. 1910-28-A (1996 Edition)

Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, and the American Institute of Architects.

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

2. If the CONTRACTOR performs the Contract, the Surety and the CONTRACTOR have no obligation under this Bond, except to participate in conferences as provided in paragraph 3.1.

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

3.1. The OWNER has notified the CONTRACTOR and the Surety at the addresses described in paragraph 10 below, that the OWNER is considering declaring a CONTRACTOR Default and has requested and attempted to arrange a conference with the CONTRACTOR and the Surety to be held not later than fifteen days after receipt of such notice to discuss methods of performing the Contract. If the OWNER, the CONTRACTOR and the Surety agree, the CONTRACTOR shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive the OWNER's right, if any, subsequently to declare a CONTRACTOR Default; and

3.2. The OWNER has declared a CONTRACTOR Default and formally terminated the CONTRACTOR's right to complete the Contract. Such CONTRACTOR Default shall not be declared earlier than twenty days after the CONTRACTOR and the Surety have received notice as provided in paragraph 3.1; and

3.3. The OWNER has agreed to pay the Balance of the Contract Price to:

3.3.1. The Surety in accordance with the terms of the Contract;

3.3.2 Another contractor selected pursuant to paragraph 4.3 to perform the Contract.

4. When the OWNER has satisfied the conditions of paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

4.1. Arrange for the CONTRACTOR, with consent of the OWNER, to perform and complete the Contract; or

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

4.3. Obtain bids or negotiated proposals from qualified contractors acceptable to the OWNER for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by the OWNER and the contractor selected with the OWNER's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the Bonds issued on the Contract, and pay to the OWNER the amount of damages as described in paragraph 6 in excess of the Balance of the Contract Price incurred by the OWNER resulting from the CONTRACTOR Default; or

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

4.4.1 After investigation, determine the amount for which it may be liable to the OWNER and, as soon as practicable after the amount is determined, tender payment therefor to the OWNER; or

4.4.2 Deny liability in whole or in part and notify the OWNER citing reasons therefor.

5. If the Surety does not proceed as provided in paragraph 4 with reasonable promptness, the Surety shall be deemed to be in default on this Bond fifteen days after receipt of an additional written notice from the OWNER to the Surety demanding that the Surety perform its obligations under this Bond, and the OWNER shall be entitled to enforce any remedy available to the OWNER. If the Surety proceeds as provided in paragraph 4.4, and the OWNER refuses the payment tendered or the Surety has denied liability, in whole or in part, without further notice the OWNER shall be entitled to enforce any remedy available to the OWNER.

6. After the OWNER has terminated the CONTRACTOR's right to complete the Contract, and if the Surety elects to act under paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of the Surety to the OWNER shall not be greater than those of the CONTRACTOR under the Contract, and the responsibilities of the OWNER to the Surety shall not be greater than those of the OWNER under the Contract. To a limit of the amount of this Bond, but subject to commitment by the OWNER of the Balance of the Contract Price to mitigation of costs and damages on the Contract, the Surety is obligated without duplication for:

6.1. The responsibilities of the CONTRACTOR for correction of defective Work and completion of the Contract;

6.2. Additional legal, design professional and delay costs resulting from the CONTRACTOR's Default, and resulting from the actions or failure to act of the Surety under paragraph 4; and

6.3. Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of the CONTRACTOR.

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

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

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

10. Notice to the Surety, the OWNER or the CONTRACTOR shall be mailed or delivered to the address shown on the signature page.

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

12. Definitions.

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

12.2. Contract: The agreement between the OWNER and the CONTRACTOR identified on the signature page, including all Contract Documents and changes thereto.

12.3. CONTRACTOR Default: Failure of the CONTRACTOR, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.

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

(FOR INFORMATION ONLY--Name, Address and Telephone)
AGENT or BROKER: OWNER'S REPRESENTATIVE (Engineer or other party):

Payment Bond

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

CONTRACTOR (Name and Address):

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

OWNER (Name and Address):

CONTRACT

Date:

Amount:

Description (Name and Location):

BOND

Date (Not earlier than Contract Date):

Amount:

Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Payment Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

Company: _____ (Corp. Seal)

Signature: _____
Name and Title:

SURETY

Company: _____ (Corp. Seal)

Signature: _____
Name and Title:
(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

CONTRACTOR AS PRINCIPAL

Company: _____ (Corp. Seal)

Signature: _____
Name and Title:

SURETY

Company: _____ (Corp. Seal)

Signature: _____
Name and Title:

EJCDC No. 1910-28-B (1996 Edition)

Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, the American Institute of Architects, the American Subcontractors Association, and the Associated Specialty Contractors.

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

2. With respect to the OWNER, this obligation shall be null and void if the CONTRACTOR:

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

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

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

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

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

4.2. Claimants who do not have a direct contract with the CONTRACTOR:

1. Have furnished written notice to the CONTRACTOR and sent a copy, or notice thereof, to the OWNER, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials were furnished or supplied or for whom the labor was done or performed; and

2. Have either received a rejection in whole or in part from the CONTRACTOR, or not received within 30 days of furnishing the above notice any communication from the CONTRACTOR by which the CONTRACTOR had indicated the claim will be paid directly or indirectly; and

3. Not having been paid within the above 30 days, have sent a written notice to the Surety and sent a copy, or notice thereof, to the OWNER, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to the CONTRACTOR.

5. If a notice required by paragraph 4 is given by the OWNER to the CONTRACTOR or to the Surety, that is sufficient compliance.

6. When the Claimant has satisfied the conditions of paragraph 4, the Surety shall promptly and at the Surety's expense take the following actions:

6.1. Send an answer to the Claimant, with a copy to the OWNER, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.

6.2. Pay or arrange for payment of any undisputed amounts.

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

8. Amounts owed by the OWNER to the CONTRACTOR under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any Performance Bond. By the CONTRACTOR furnishing and the OWNER accepting this Bond, they agree that all funds earned by the CONTRACTOR in the performance of the Contract are dedicated to satisfy obligations of the

CONTRACTOR and the Surety under this Bond, subject to the OWNER's priority to use the funds for the completion of the Work.

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

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

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

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

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

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

15. DEFINITIONS

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

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

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

(FOR INFORMATION ONLY--Name, Address and Telephone)

AGENCY or BROKER: OWNER'S REPRESENTATIVE (Engineer or other party):



AIA[®] Document G715[™] – 1991

Supplemental Attachment for ACORD Certificate of Insurance 25-S

(This document replaces AIA Document G705, Certificate of Insurance.)

PROJECT (Name and address): _____

INSURED _____

A. General Liability

- | | Yes | No | N/A |
|--|--------------------------|--------------------------|--------------------------|
| 1. Does the General Aggregate apply to this Project only? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Does this policy include coverage for: | | | |
| a. Premises - Operations? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Explosion, Collapse and Underground Hazards? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c. Personal Injury Coverage? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| d. Products Coverage? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| e. Completed Operations? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| f. Contractual Coverage for the Insured's obligations in A201? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. If coverage is written on a claims-made basis, what is the: | | | |
| a. Retroactive Date? | | | |
| b. Extended Reporting Date? | | | |

B. Worker's Compensation

- | | | | |
|---|--------------------------|--------------------------|--------------------------|
| 1. If the Insured is exempt from Worker's Compensation statutes, does the Insured carry the equivalent Voluntary Compensation coverage? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---|--------------------------|--------------------------|--------------------------|

C. Final Payment Information

- | | | | |
|---|--------------------------|--------------------------|--------------------------|
| 1. Is this certificate being furnished in connection with the Contractor's request for final payment in accordance with the requirements of Sections 9.10.2 and 11.1.3 of AIA Document A201, General Conditions of the Contract for Construction? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. If so, and if the policy period extends beyond termination of the Contract for Construction, is Completed Operations coverage for this Project continued for the balance of the policy period? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

D. Termination Provisions

- | | | | |
|--|--------------------------|--------------------------|--------------------------|
| 1. Has each policy shown on the certificate and this Supplement been endorsed to provide the holder with 30 days notice of cancellation and/or expiration? List below any policies which do not contain this notice. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|--------------------------|--------------------------|--------------------------|

E. Other Provisions

Authorized Representative

Date of Issue

Application and Certificate for Payment

TO OWNER: PROJECT: APPLICATION NO: Distribution to: OWNER ARCHITECT CONTRACTOR FIELD OTHER

FROM CONTRACTOR: VIA ARCHITECT: PERIOD TO: CONTRACT FOR: General Construction CONTRACT DATE: PROJECT NOS: / /

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract. Continuation Sheet, AIA Document G703, is attached.

1. ORIGINAL CONTRACT SUM \$ 0.00
2. Net change by Change Orders \$ 0.00
3. CONTRACT SUM TO DATE (Line 1 ± 2) \$ 0.00
4. TOTAL COMPLETED & STORED TO DATE (Column G on G703) \$ 0.00
5. RETAINAGE:
 - a. 0 % of Completed Work (Column D + E on G703) \$ 0.00
 - b. 0 % of Stored Material (Column F on G703) \$ 0.00
6. TOTAL EARNED LESS RETAINAGE \$ 0.00
(Line 4 Less Line 5 Total)
7. LESS PREVIOUS CERTIFICATES FOR PAYMENT \$ 0.00
(Line 6 from prior Certificate)
8. CURRENT PAYMENT DUE \$ 0.00
9. BALANCE TO FINISH, INCLUDING RETAINAGE
(Line 3 less Line 6) \$ 0.00

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	\$ 0.00	\$ 0.00
Total approved this Month	\$ 0.00	\$ 0.00
TOTALS	\$ 0.00	\$ 0.00
NET CHANGES by Change Order	\$ 0.00	\$ 0.00

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR: _____ Date: _____
 By: _____
 State of: _____
 County of: _____
 Subscribed and sworn to before me this _____ day of _____
 Notary Public: _____
 My Commission expires: _____

ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising this application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED \$ 0.00
 (Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

ARCHITECT: _____ Date: _____
 By: _____

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract



AIA[®] Document G706[™] – 1994

Contractor's Affidavit of Payment of Debts and Claims

OWNER	<input type="checkbox"/>
ARCHITECT	<input type="checkbox"/>
CONTRACTOR	<input type="checkbox"/>
SURETY	<input type="checkbox"/>
OTHER	<input type="checkbox"/>

PROJECT: *(Name and address)*

ARCHITECT'S PROJECT NUMBER:

TO OWNER: *(Name and address)*

CONTRACT FOR: General Construction
CONTRACT DATED:

STATE OF:
COUNTY OF:

The undersigned hereby certifies that, except as listed below, payment has been made in full and all obligations have otherwise been satisfied for all materials and equipment furnished, for all work, labor, and services performed, and for all known indebtedness and claims against the Contractor for damages arising in any manner in connection with the performance of the Contract referenced above for which the Owner or Owner's property might in any way be held responsible or encumbered.

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

- Consent of Surety to Final Payment. Whenever Surety is involved, Consent of Surety is required. AIA Document G707, Consent of Surety, may be used for this purpose

Indicate Attachment Yes No

CONTRACTOR: *(Name and address)*

The following supporting documents should be attached hereto if required by the Owner:

- Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.
- Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof.
- Contractor's Affidavit of Release of Liens (AIA Document G706A).

BY: _____
(Signature of authorized representative)

(Printed name and title)

Subscribed and sworn to before me on this date:

Notary Public:
My Commission Expires:

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 Law.

STANDARD
GENERAL CONDITIONS
OF THE
CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly By

[INSERT LOGOS]

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
a practice division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

AMERICAN CONSULTING ENGINEERS COUNCIL

AMERICAN SOCIETY OF CIVIL ENGINEERS

This document has been approved and endorsed by

The Associated General [seal] Contractors of America

Construction Specifications Institute

[seal]

These General Conditions have been prepared for use with the Owner-Contractor Agreements (No. 1910-8-A-1 or 1910-8-A-2) (1996 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the EJCDC User's Guide (No. 1910-50). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (No. 1910-17) (1996 Edition).

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National Society of Professional Engineers
1420 King Street, Alexandria, VA 22314

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

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

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GENERAL CONDITIONS

ARTICLE 1 - DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Contract Documents and printed with initial or all capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof.

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

2. *Agreement*--The written instrument which is evidence of the agreement between OWNER and CONTRACTOR covering the Work.

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

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

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

6. *Bidding Documents*--The Bidding Requirements and the proposed Contract Documents (including all Addenda issued prior to receipt of Bids).

7. *Bidding Requirements*--The Advertisement or Invitation to Bid, Instructions to Bidders, Bid security form, if any, and the Bid form with any supplements.

8. *Bonds*--Performance and payment bonds and other instruments of security.

9. *Change Order*--A document recommended by ENGINEER which is signed by CONTRACTOR and OWNER and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the

Contract Times, issued on or after the Effective Date of the Agreement.

10. *Claim*--A demand or assertion by OWNER or CONTRACTOR seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

11. *Contract*--The entire and integrated written agreement between the OWNER and CONTRACTOR concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*--The Contract Documents establish the rights and obligations of the parties and include the Agreement, Addenda (which pertain to the Contract Documents), CONTRACTOR's Bid (including documentation accompanying the Bid and any post Bid documentation submitted prior to the Notice of Award) when attached as an exhibit to the Agreement, the Notice to Proceed, the Bonds, these General Conditions, the Supplementary Conditions, the Specifications and the Drawings as the same are more specifically identified in the Agreement, together with all Written Amendments, Change Orders, Work Change Directives, Field Orders, and ENGINEER's written interpretations and clarifications issued on or after the Effective Date of the Agreement. Approved Shop Drawings and the reports and drawings of subsurface and physical conditions are not Contract Documents. Only printed or hard copies of the items listed in this paragraph are Contract Documents. Files in electronic media format of text, data, graphics, and the like that may be furnished by OWNER to CONTRACTOR are not Contract Documents.

13. *Contract Price*--The moneys payable by OWNER to CONTRACTOR for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of paragraph 11.03 in the case of Unit Price Work).

14. *Contract Times*--The number of days or the dates stated in the Agreement to: (i) achieve Substantial Completion; and (ii) complete the Work so that it is ready for final payment as evidenced by ENGINEER's written recommendation of final payment.

15. *CONTRACTOR*--The individual or entity with whom OWNER has entered into the Agreement.

16. *Cost of the Work*--See paragraph 11.01.A for definition.

17. *Drawings*--That part of the Contract Documents prepared or approved by ENGINEER which graphically shows the scope, extent, and character of the Work to be performed by CONTRACTOR. Shop Drawings and other CONTRACTOR submittals are not Drawings as so defined.

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

19. *ENGINEER*--The individual or entity named as such in the Agreement.

20. *ENGINEER's Consultant*--An individual or entity having a contract with ENGINEER to furnish services as ENGINEER's independent professional associate or consultant with respect to the Project and who is identified as such in the Supplementary Conditions.

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

22. *General Requirements*--Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.

23. *Hazardous Environmental Condition*--The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto in connection with the Work.

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

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

26. *Liens*--Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

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

28. *Notice of Award*--The written notice by OWNER to the apparent successful bidder stating that upon timely compliance by the apparent successful bidder with the conditions precedent listed therein, OWNER will sign and deliver the Agreement.

29. *Notice to Proceed*--A written notice given by OWNER to CONTRACTOR fixing the date on which the Contract Times will commence to run and on which CONTRACTOR shall start to perform the Work under the Contract Documents.

30. *OWNER*--The individual, entity, public body, or authority with whom CONTRACTOR has entered into the Agreement and for whom the Work is to be performed.

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

32. *PCBs*--Polychlorinated biphenyls.

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

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

35. *Project Manual*--The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

36. *Radioactive Material*--Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

37. *Resident Project Representative*--The authorized representative of ENGINEER who may be assigned to the Site or any part thereof.

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

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

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

41. *Specifications*--That part of the Contract Documents consisting of written technical descriptions of materials, equipment, systems, standards, and workmanship as applied to the Work and certain administrative details applicable thereto.

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

43. *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.

44. *Supplementary Conditions*--That part of the Contract Documents which amends or supplements these General Conditions.

45. *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 any Subcontractor.

46. *Underground Facilities*--All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum

products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

47. *Unit Price Work*--Work to be paid for on the basis of unit prices.

48. *Work*--The entire completed construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

49. *Work Change Directive*--A written statement to CONTRACTOR issued on or after the Effective Date of the Agreement and signed by OWNER and recommended by ENGINEER ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

50. *Written Amendment*--A written statement modifying the Contract Documents, signed by OWNER and CONTRACTOR on or after the Effective Date of the Agreement and normally dealing with the nonengineering or nontechnical rather than strictly construction-related aspects of the Contract Documents.

1.02 Terminology

A. Intent of Certain Terms or Adjectives

1. Whenever in the Contract Documents the terms "as allowed," "as approved," or terms of like effect or import are used, or 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 action or determination will be solely to evaluate, in general, the completed Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such

term or adjective shall not be effective to assign to ENGINEER any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.10 or any other provision of the Contract Documents.

B. *Day*

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

C. *Defective*

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it does not conform to the Contract Documents or does not meet the requirements of any inspection, reference standard, test, or approval referred to in the Contract Documents, or has been damaged prior to ENGINEER's recommendation of final payment (unless responsibility for the protection thereof has been assumed by OWNER at Substantial Completion in accordance with paragraph 14.04 or 14.05).

D. *Furnish, Install, Perform, Provide*

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

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

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

4. When "furnish," "install," "perform," or "provide" is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of CONTRACTOR, "provide" is implied.

E. Unless stated otherwise in the Contract Documents, words or phrases which 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*

A. When CONTRACTOR delivers the executed Agreements to OWNER, CONTRACTOR shall also deliver to OWNER such Bonds as CONTRACTOR may be required to furnish.

2.02 *Copies of Documents*

A. OWNER shall furnish to CONTRACTOR up to ten copies of the Contract Documents. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *Commencement of Contract Times; Notice to Proceed*

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

2.04 *Starting the Work*

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

2.05 *Before Starting Construction*

A. *CONTRACTOR's Review of Contract Documents:* Before undertaking each part of the Work, CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. CONTRACTOR shall promptly report in writing to ENGINEER any conflict, error, ambiguity, or discrepancy which CONTRACTOR may discover and shall obtain a written interpretation or clarification from ENGINEER before proceeding with any Work affected thereby;

however, CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless CONTRACTOR knew or reasonably should have known thereof.

B. *Preliminary Schedules:* Within ten days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), CONTRACTOR shall submit to ENGINEER for its timely review:

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

2. a preliminary schedule of Shop Drawing and Sample submittals which will list each required submittal and the times for submitting, reviewing, and processing such submittal; 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.

C. *Evidence of Insurance:* Before any Work at the Site is started, CONTRACTOR and OWNER shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which CONTRACTOR and OWNER respectively are required to purchase and maintain in accordance with Article 5.

2.06 *Preconstruction Conference*

A. Within 20 days after the Contract Times start to run, but before any Work at the Site is started, a conference attended by CONTRACTOR, ENGINEER, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in paragraph 2.05.B, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

2.07 *Initial Acceptance of Schedules*

A. Unless otherwise provided in the Contract Documents, at least ten days before submission of the first Application for Payment a conference attended by CONTRACTOR, ENGINEER, and others as appropriate will be held to review for acceptability to ENGINEER as provided below the schedules submitted in accordance with paragraph 2.05.B. CONTRACTOR shall have an additional ten days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to CONTRACTOR until 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 any specified Milestones and 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 Shop Drawing and Sample submittals will be acceptable to ENGINEER if it provides a workable arrangement for reviewing and processing the required submittals.

3. CONTRACTOR's schedule of values will be acceptable to ENGINEER as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

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

B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to OWNER.

C. Clarifications and interpretations of the Contract Documents shall be issued by ENGINEER as provided in Article 9.

3.02 *Reference Standards*

A. *Standards, Specifications, Codes, Laws, and Regulations*

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

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

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*

1. If, during the performance of the Work, CONTRACTOR discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, CONTRACTOR shall report it to ENGINEER in writing at once. CONTRACTOR shall not proceed with the Work affected thereby (except in an emergency as required by paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in paragraph 3.04; provided, however, that CONTRACTOR shall not be liable to

OWNER or ENGINEER for failure to report any such conflict, error, ambiguity, or discrepancy unless CONTRACTOR knew or reasonably should have known thereof.

B. *Resolving Discrepancies*

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

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

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

3.04 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof in one or more of the following ways: (i) a Written Amendment; (ii) a Change Order; or (iii) a Work Change Directive.

B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways: (i) a Field Order; (ii) ENGINEER's approval of a Shop Drawing or Sample; or (iii) ENGINEER's written interpretation or clarification.

3.05 *Reuse of Documents*

A. CONTRACTOR and any Subcontractor or Supplier or other individual or entity performing or furnishing any of the Work under a direct or indirect contract with OWNER: (i) shall not have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of ENGINEER or ENGINEER's Consultant, including electronic media editions; and (ii) shall not reuse any of 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 adaption by ENGINEER. This prohibition will survive final payment, completion, and acceptance of the Work, or termination or completion of the Contract. Nothing herein shall preclude CONTRACTOR from retaining copies of the Contract Documents for record purposes.

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

4.01 *Availability of Lands*

A. OWNER shall furnish the Site. OWNER shall notify CONTRACTOR of any encumbrances or restrictions not of general application but specifically related to use of the Site with which CONTRACTOR must comply in performing the Work. OWNER will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If CONTRACTOR and OWNER are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in OWNER's furnishing the Site, CONTRACTOR may make a Claim therefor as provided in paragraph 10.05.

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

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

4.02 *Subsurface and Physical Conditions*

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

1. those reports of explorations and tests of subsurface conditions at or contiguous to the Site that ENGINEER has used in preparing the Contract Documents; and

2. those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except

Underground Facilities) that ENGINEER has used in preparing the Contract Documents.

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

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

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

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

4.03 *Differing Subsurface or Physical Conditions*

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

1. is of such a nature as to establish that any "technical data" on which CONTRACTOR is entitled to rely as provided in paragraph 4.02 is materially inaccurate; or

2. is of such a nature as to require a change in the Contract Documents; or

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

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

then CONTRACTOR shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection

therewith (except in an emergency as required by paragraph 6.16.A), notify OWNER and ENGINEER in writing about such condition. CONTRACTOR shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

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

C. *Possible Price and Times Adjustments*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in CONTRACTOR's cost of, or time required for, performance of the Work; subject, however, to the following:

a. such condition must meet any one or more of the categories described in paragraph 4.03.A; and

b. with respect to Work that is paid for on a Unit Price Basis, any adjustment in Contract Price will be subject to the provisions of paragraphs 9.08 and 11.03.

2. CONTRACTOR shall not be entitled to any adjustment in the Contract Price or Contract Times if:

a. CONTRACTOR knew of the existence of such conditions at the time CONTRACTOR made a final commitment to OWNER in respect of Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or

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

c. CONTRACTOR failed to give the written notice within the time and as required by paragraph 4.03.A.

3. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in paragraph 10.05. However, OWNER, ENGINEER, and ENGINEER's Consultants shall not be liable to CONTRACTOR for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by CONTRACTOR on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

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

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

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

a. reviewing and checking all such information and data,

b. locating all Underground Facilities shown or indicated in the Contract Documents,

c. coordination of the Work with the owners of such Underground Facilities, including OWNER, during construction, and

d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, CONTRACTOR shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to OWNER and ENGINEER. ENGINEER will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, CONTRACTOR shall be responsible for the safety and protection of such Underground Facility.

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

4.05 Reference Points

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

or property monuments by professionally qualified personnel.

4.06 Hazardous Environmental Condition at Site

A. *Reports and Drawings:* Reference is made to the Supplementary Conditions for the identification of those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that have been utilized by the ENGINEER in the preparation of the Contract Documents.

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

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

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

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

C. CONTRACTOR shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. CONTRACTOR shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by CONTRACTOR, Subcontractors, Suppliers, or anyone else for whom CONTRACTOR is responsible.

D. If CONTRACTOR encounters a Hazardous Environmental Condition or if CONTRACTOR or anyone for whom CONTRACTOR is responsible creates a Hazardous Environmental Condition, CONTRACTOR shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such

condition and in any area affected thereby (except in an emergency as required by paragraph 6.16); and (iii) notify OWNER and ENGINEER (and promptly thereafter confirm such notice in writing). OWNER shall promptly consult with ENGINEER concerning the necessity for OWNER to retain a qualified expert to evaluate such condition or take corrective action, if any.

E. CONTRACTOR shall not be required to resume Work in connection with such condition or in any affected area until after OWNER has obtained any required permits related thereto and delivered to CONTRACTOR written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If OWNER and CONTRACTOR cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by CONTRACTOR, either party may make a Claim therefor as provided in paragraph 10.05.

F. If after receipt of such written notice CONTRACTOR does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then OWNER may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If OWNER and CONTRACTOR cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in paragraph 10.05. OWNER may have such deleted portion of the Work performed by OWNER's own forces or others in accordance with Article 7.

G. To the fullest extent permitted by Laws and Regulations, OWNER shall indemnify and hold harmless CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and the officers, directors, partners, employees, agents, other consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by CONTRACTOR or by anyone for whom CONTRACTOR is responsible. Nothing in this paragraph

4.06.E shall obligate OWNER to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

H. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultants, and the officers, directors, partners, employees, agents, other consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by CONTRACTOR or by anyone for whom CONTRACTOR is responsible. Nothing in this paragraph 4.06.F shall obligate CONTRACTOR to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

I. The provisions of paragraphs 4.02, 4.03, and 4.04 are not intended to apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 - BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

A. CONTRACTOR shall furnish performance and payment Bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all CONTRACTOR's obligations under the Contract Documents. These Bonds shall remain in effect at least until one year after the date when final payment becomes due, except as provided otherwise by Laws or Regulations or by the Contract Documents. CONTRACTOR shall also furnish such other Bonds as are required by the Contract Documents.

B. All Bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All Bonds signed by an agent must be accompanied by a certified copy of such agent's authority to act.

C. If the surety on any Bond furnished by CONTRACTOR is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of paragraph 5.01.B, CONTRACTOR shall within 20 days thereafter substitute another Bond and surety, both of which shall comply with the requirements of paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

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

5.03 *Certificates of Insurance*

A. CONTRACTOR shall deliver to OWNER, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by OWNER or any other additional insured) which CONTRACTOR is required to purchase and maintain. OWNER shall deliver to CONTRACTOR, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by CONTRACTOR or any other additional insured) which OWNER is required to purchase and maintain.

5.04 *CONTRACTOR's Liability Insurance*

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

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

2. claims for damages because of bodily injury, occupational sickness or disease, or death of CONTRACTOR's employees;

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

4. claims for damages insured by reasonably available personal injury liability coverage which are sustained: (i) by any person as a result of an offense directly or indirectly related to the employment of such person by CONTRACTOR, or (ii) by any other person for any other reason;

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

6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

B. The policies of insurance so required by this paragraph 5.04 to be purchased and maintained shall:

1. with respect to insurance required by paragraphs 5.04.A.3 through 5.04.A.6 inclusive, include as additional insureds (subject to any customary exclusion in respect of professional liability) OWNER, ENGINEER, ENGINEER's Consultants, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;

3. include completed operations insurance;

4. include contractual liability insurance covering CONTRACTOR's indemnity obligations under paragraphs 6.07, 6.11, and 6.20;

5. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least thirty days prior written notice has been given to OWNER and CONTRACTOR and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the CONTRACTOR pursuant to paragraph 5.03 will so provide);

6. remain in effect at least until final payment and at all times thereafter when CONTRACTOR may be correcting, removing, or replacing defective Work in accordance with paragraph 13.07; and

7. with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment (and CONTRACTOR shall furnish OWNER and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to OWNER and any such additional insured of continuation of such insurance at final payment and one year thereafter).

5.05 *OWNER's Liability Insurance*

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

5.06 *Property Insurance*

A. Unless otherwise provided in the Supplementary Conditions, OWNER shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of

them, each of whom is deemed to have an insurable interest and shall be listed as an additional insured;

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

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

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

5. allow for partial utilization of the Work by OWNER;

6. include testing and startup; and

7. be maintained in effect until final payment is made unless otherwise agreed to in writing by OWNER, CONTRACTOR, and ENGINEER with 30 days written notice to each other additional insured to whom a certificate of insurance has been issued.

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

C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with paragraph 5.06 will contain a provision or endorsement that the coverage afforded will

not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to OWNER and CONTRACTOR and to each other additional insured to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with paragraph 5.07.

D. OWNER shall not be responsible for purchasing and maintaining any property insurance specified in this paragraph 5.06 to protect the interests of CONTRACTOR, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by CONTRACTOR, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

E. If CONTRACTOR requests in writing that other special insurance be included in the property insurance policies provided under paragraph 5.06, OWNER shall, if possible, include such insurance, and the cost thereof will be charged to CONTRACTOR by appropriate Change Order or Written Amendment. Prior to commencement of the Work at the Site, OWNER shall in writing advise CONTRACTOR whether or not such other insurance has been procured by OWNER.

5.07 *Waiver of Rights*

A. OWNER and CONTRACTOR intend that all policies purchased in accordance with paragraph 5.06 will protect OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder. OWNER and CONTRACTOR waive all rights against each other and their respective officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors, ENGINEER, ENGINEER's Consultants, and all other individuals or entities identified in the Supplementary

Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by OWNER as trustee or otherwise payable under any policy so issued.

B. OWNER waives all rights against CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants, and the officers, directors, partners, employees, agents, and other 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 peril whether or not insured by OWNER; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by OWNER during partial utilization pursuant to paragraph 14.05, after Substantial Completion pursuant to paragraph 14.04, or after final payment pursuant to paragraph 14.07.

C. Any insurance policy maintained by OWNER covering any loss, damage or consequential loss referred to in paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against CONTRACTOR, Subcontractors, ENGINEER, or ENGINEER's Consultants and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

A. Any insured loss under the policies of insurance required by paragraph 5.06 will be adjusted with OWNER and made payable to OWNER as fiduciary for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of paragraph 5.08.B. OWNER shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on

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

B. OWNER as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to OWNER's exercise of this power. If such objection be made, OWNER as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, OWNER as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, OWNER as fiduciary shall give bond for the proper performance of such duties.

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

A. If either OWNER or CONTRACTOR has any objection to the coverage afforded by or other provisions of the Bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by paragraph 2.05.C. OWNER and CONTRACTOR shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the Bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent Bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

A. If OWNER finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but

the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

A. CONTRACTOR shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction, but CONTRACTOR shall not be responsible for the negligence of OWNER or ENGINEER in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents. CONTRACTOR shall be responsible to see that the completed Work complies accurately with the Contract Documents.

B. At all times during the progress of the Work, CONTRACTOR shall assign a competent resident superintendent thereto who shall not be replaced without written notice to OWNER and ENGINEER except under extraordinary circumstances. The superintendent will be CONTRACTOR's representative at the Site and shall have authority to act on behalf of CONTRACTOR. All communications given to or received from the superintendent shall be binding on CONTRACTOR.

6.02 *Labor; Working Hours*

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

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, and CONTRACTOR will not permit overtime work or the performance of Work on Saturday, Sunday, or any legal holiday without OWNER's written consent (which will not be unreasonably withheld) given after prior written notice to ENGINEER.

6.03 *Services, Materials, and Equipment*

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

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

6.04 *Progress Schedule*

A. CONTRACTOR shall adhere to the progress schedule established in accordance with paragraph 2.07 as it may be adjusted from time to time as provided below.

1. CONTRACTOR shall submit to ENGINEER for acceptance (to the extent indicated in paragraph 2.07) proposed adjustments in the progress schedule that will not result in changing the Contract Times (or Milestones). Such adjustments will conform generally to the progress schedule then in effect and additionally will comply with any provisions of the General Requirements applicable thereto.

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

6.05 *Substitutes and "Or-Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using

the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to ENGINEER for review under the circumstances described below.

1. "*Or-Equal*" Items: If in ENGINEER's sole discretion an item of material or equipment proposed by CONTRACTOR is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by ENGINEER as an "or-equal" item, in which case review and approval of the proposed item may, in ENGINEER's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment ENGINEER determines that: (i) it is at least equal in quality, durability, appearance, strength, and design characteristics; (ii) it will reliably perform at least equally well the function imposed by the design concept of the completed Project as a functioning whole, and;

b. CONTRACTOR certifies that: (i) there is no increase in cost to the OWNER; and (ii) it will conform substantially, even with deviations, to the detailed requirements of the item named in the Contract Documents.

2. *Substitute Items*

a. If in ENGINEER's sole discretion an item of material or equipment proposed by CONTRACTOR does not qualify as an "or-equal" item under paragraph 6.05.A.1, it will be considered a proposed substitute item.

b. CONTRACTOR shall submit sufficient information as provided below to allow ENGINEER to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be

accepted by ENGINEER from anyone other than CONTRACTOR.

c. The procedure for review by ENGINEER will be as set forth in paragraph 6.05.A.2.d, as supplemented in the General Requirements and as ENGINEER may decide is appropriate under the circumstances.

d. CONTRACTOR shall first 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 shall certify that the proposed substitute item will perform adequately the functions and achieve the results called for by the general design, be similar in substance to that specified, and be suited to the same use as that specified. The application will state the extent, if any, to which the use of the proposed substitute item will prejudice CONTRACTOR's achievement of Substantial Completion on time, whether or not 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 work on the Project) to adapt the design to the proposed substitute item and whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute item from that specified will be identified in the application, and available engineering, sales, maintenance, repair, and replacement services will be indicated. The application will also contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change, all of which will be considered by ENGINEER in evaluating the proposed substitute item. ENGINEER may require CONTRACTOR to furnish additional data about the proposed substitute item.

B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is shown or indicated in and expressly required by the Contract Documents, CONTRACTOR may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by ENGINEER. CONTRACTOR shall submit sufficient information to allow ENGINEER, in

ENGINEER's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The procedure for review by ENGINEER will be similar to that provided in subparagraph 6.05.A.2.

C. *Engineer's Evaluation:* ENGINEER will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to paragraphs 6.05.A and 6.05.B. ENGINEER will be the sole judge of acceptability. No "or-equal" or substitute will be ordered, installed or utilized until ENGINEER's review is complete, which will be evidenced by either a Change Order for a substitute or an approved Shop Drawing for an "or equal." ENGINEER will advise CONTRACTOR in writing of any negative determination.

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

E. *ENGINEER's Cost Reimbursement:* ENGINEER will record time required by ENGINEER and ENGINEER's Consultants in evaluating substitute proposed or submitted by CONTRACTOR pursuant to paragraphs 6.05.A.2 and 6.05.B and in making changes in the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) occasioned thereby. Whether or not ENGINEER approves a substitute item so proposed or submitted by CONTRACTOR, CONTRACTOR shall reimburse OWNER for the charges of ENGINEER and ENGINEER's Consultants for evaluating each such proposed substitute.

F. *CONTRACTOR's Expense:* CONTRACTOR shall provide all data in support of any proposed substitute or "or-equal" at CONTRACTOR's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

A. CONTRACTOR shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to OWNER as indicated in paragraph 6.06.B), whether initially or as a replacement, against whom OWNER may have reasonable objection. CONTRACTOR shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom CONTRACTOR has reasonable objection.

B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to OWNER in

advance for acceptance by OWNER by a specified date prior to the Effective Date of the Agreement, and if CONTRACTOR has submitted a list thereof in accordance with the Supplementary Conditions, OWNER's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. CONTRACTOR shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued or Written Amendment signed. No acceptance by OWNER of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of OWNER or ENGINEER to reject defective Work.

C. CONTRACTOR shall be fully responsible to OWNER and ENGINEER for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as CONTRACTOR is responsible for CONTRACTOR's own acts and omissions. Nothing in the Contract Documents 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 shall it create any obligation on the part of OWNER or ENGINEER to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

D. CONTRACTOR shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR.

E. CONTRACTOR shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with ENGINEER through CONTRACTOR.

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

G. All Work performed for CONTRACTOR by a Subcontractor or Supplier will be pursuant to an appro-

priate agreement between CONTRACTOR and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of OWNER and ENGINEER. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance provided in paragraph 5.06, the agreement between the CONTRACTOR and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against OWNER, CONTRACTOR, ENGINEER, ENGINEER's Consultants, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, CONTRACTOR will obtain the same.

6.07 *Patent Fees and Royalties*

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

6.08 *Permits*

A. Unless otherwise provided in the Supplementary Conditions, CONTRACTOR shall obtain and pay for all construction permits and licenses. OWNER shall assist CONTRACTOR, when necessary, in obtaining such permits and licenses. CONTRACTOR shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. CONTRACTOR shall pay all charges of utility owners for connections to the Work, and OWNER shall pay all charges of such utility owners for capital costs related thereto, such as plant investment fees.

6.09 *Laws and Regulations*

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

B. If CONTRACTOR performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, CONTRACTOR shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work; however, it shall not be CONTRACTOR's primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve CONTRACTOR of CONTRACTOR's obligations under paragraph 3.03.

C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work may be the subject of an adjustment in Contract Price or Contract Times. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in paragraph 10.05.

6.10 *Taxes*

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

6.11 *Use of Site and Other Areas*

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

1. CONTRACTOR shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. CONTRACTOR shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

2. Should any claim be made by any such owner or occupant because of the performance of the Work, CONTRACTOR shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

3. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultant, and the officers, directors, partners, employees, agents, and other consultants of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against OWNER, ENGINEER, or any other party indemnified hereunder to the extent caused by or based upon CONTRACTOR's performance of the Work.

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

C. *Cleaning:* Prior to Substantial Completion of the Work CONTRACTOR shall clean the Site and make it ready for utilization by OWNER. At the completion of the Work CONTRACTOR shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all

property not designated for alteration by the Contract Documents.

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

6.12 *Record Documents*

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

6.13 *Safety and Protection*

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

1. all persons on the Site or who may be affected by the Work;
2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

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

loss to any property referred to in paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by CONTRACTOR, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by CONTRACTOR (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of OWNER or ENGINEER or ENGINEER's Consultant, or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of CONTRACTOR or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them). CONTRACTOR's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and ENGINEER has issued a notice to OWNER and CONTRACTOR in accordance with paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

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

6.15 *Hazard Communication Programs*

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

6.16 *Emergencies*

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

6.17 *Shop Drawings and Samples*

A. CONTRACTOR shall submit Shop Drawings to ENGINEER for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals. All submittals will be identified as ENGINEER may require and in the number of copies specified in the General Requirements. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show ENGINEER the services, materials, and equipment CONTRACTOR proposes to provide and to enable ENGINEER to review the information for the limited purposes required by paragraph 6.17.E.

B. CONTRACTOR shall also submit Samples to ENGINEER for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals. Each Sample will be identified clearly as to material, Supplier, pertinent data such as catalog numbers, and the use for which intended and otherwise as ENGINEER may require to enable ENGINEER to review the submittal for the limited purposes required by paragraph 6.17.E. The numbers of each Sample to be submitted will be as specified in the Specifications.

C. Where a Shop Drawing or Sample is required by the Contract Documents or the schedule of Shop Drawings and Sample submittals acceptable to ENGINEER as required by paragraph 2.07, 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.

D. *Submittal Procedures*

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

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

b. all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work;

c. all information relative to means, methods, techniques, sequences, and procedures of

construction and safety precautions and programs incident thereto; and

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

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

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

E. *ENGINEER's Review*

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

2. ENGINEER's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. ENGINEER's review and approval of Shop Drawings or Samples shall not relieve CONTRACTOR from responsibility for any variation

from the requirements of the Contract Documents unless CONTRACTOR has in writing called ENGINEER's attention to each such variation at the time of each submittal as required by paragraph 6.17.D.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 approval; nor will any approval by ENGINEER relieve CONTRACTOR from responsibility for complying with the requirements of paragraph 6.17.D.1.

F. *Resubmittal Procedures*

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

6.18 *Continuing the Work*

A. CONTRACTOR shall carry on the Work and adhere to the progress schedule during all disputes or disagreements with OWNER. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by paragraph 15.04 or as OWNER and CONTRACTOR may otherwise agree in writing.

6.19 *CONTRACTOR's General Warranty and Guarantee*

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

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.

B. 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 acceptance by OWNER or any failure to do so;
6. any review and approval of a Shop Drawing or Sample submittal or 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.

6.20 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultants, and the officers, directors, partners, employees, agents, and other 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:

1. is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom; and
2. is caused in whole or in part 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, regardless of whether or not caused in part by any negligence or omission of an individual or entity indemnified hereunder or whether liability is imposed upon such indemnified party by Laws and Regulations regardless of the negligence of any such individual or entity.

B. In any and all claims against OWNER or ENGINEER or any of their respective consultants, agents, officers, directors, partners, or employees by any employee (or the survivor or personal representative of such employee) of CONTRACTOR, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for CONTRACTOR or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of CONTRACTOR under paragraph 6.20.A shall not extend to the liability of ENGINEER and ENGINEER's Consultants or to the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them 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.

ARTICLE 7 - OTHER WORK

7.01 *Related Work at Site*

A. OWNER may perform other work related to the Project at the Site by OWNER's employees, or let other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to CONTRACTOR prior to starting any such other work; and

2. if OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in paragraph 10.05.

B. CONTRACTOR shall afford each other contractor who is a party to such a direct contract and each utility owner (and OWNER, if OWNER is performing the other work with OWNER's employees) proper and safe access to the Site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work and shall properly coordinate the Work with theirs. Unless otherwise provided in the Contract Documents, CONTRACTOR shall do all cutting, fitting, and patching of the Work that may be required to 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 their work and will only cut or alter their work with the written consent of ENGINEER and the others whose work will be affected. The duties and responsibilities of CONTRACTOR under this paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of CONTRACTOR in said direct contracts between OWNER and such utility owners and other contractors.

C. If the proper execution or results of any part of CONTRACTOR's Work depends upon work performed by others under this Article 7, CONTRACTOR shall inspect such other work and promptly report to ENGINEER in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of CONTRACTOR's Work. CONTRACTOR's failure to so report will constitute an acceptance of such other work as fit and proper for integration with CONTRACTOR's Work except for latent defects and deficiencies in such other work.

7.02 *Coordination*

A. If OWNER intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:

1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;

2. the specific matters to be covered by such authority and responsibility will be itemized; and

3. the extent of such authority and responsibilities will be provided.

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

ARTICLE 8 - OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

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

8.02 *Replacement of ENGINEER*

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

8.03 *Furnish Data*

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

8.04 *Pay Promptly When Due*

A. OWNER shall make payments to CONTRACTOR promptly when they are due as provided in paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

A. OWNER's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in paragraphs 4.01 and 4.05. Paragraph 4.02 refers to OWNER's identifying and making available to CONTRACTOR copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by ENGINEER in preparing the Contract Documents.

8.06 *Insurance*

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

8.07 *Change Orders*

A. OWNER is obligated to execute Change Orders as indicated in paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

A. OWNER's responsibility in respect to certain inspections, tests, and approvals is set forth in paragraph 13.03.B.

8.09 *Limitations on OWNER's Responsibilities*

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

8.10 *Undisclosed Hazardous Environmental Condition*

A. OWNER's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

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

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *OWNER'S Representative*

A. ENGINEER will be OWNER's representative during the construction period. The duties and responsibilities and the limitations of authority of ENGINEER as OWNER's representative during construction are set forth in the Contract Documents and will not be changed without written consent of OWNER and ENGINEER.

9.02 *Visits to Site*

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

B. ENGINEER's visits and observations are subject to all the limitations on ENGINEER's authority and responsibility set forth in paragraph 9.10, and particularly, but without limitation, during or as a result of ENGINEER's visits or observations of CONTRACTOR's Work ENGINEER will not supervise, direct, control, or have authority over or be responsible for CONTRACTOR's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

A. If OWNER and ENGINEER agree, ENGINEER will furnish a Resident Project Representative to assist ENGINEER in providing more extensive observation of the Work. The responsibilities and authority and limitations thereon of any such Resident Project Representative and assistants will be as provided in paragraph 9.10 and in the Supplementary Conditions. If OWNER designates another representative or agent to represent OWNER at the Site who is not ENGINEER's Consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Clarifications and Interpretations*

A. ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents as ENGINEER

may determine necessary, which shall be consistent with the intent of and reasonably inferable from the Contract Documents. Such written clarifications and interpretations will be binding on OWNER and CONTRACTOR. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a written clarification or interpretation, a Claim may be made therefor as provided in paragraph 10.05.

9.05 *Authorized Variations in Work*

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

9.06 *Rejecting Defective Work*

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

9.07 *Shop Drawings, Change Orders and Payments*

A. In connection with ENGINEER's authority as to Shop Drawings and Samples, see paragraph 6.17.

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

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

9.08 *Determinations for Unit Price Work*

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

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

A. ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. Claims, disputes and other matters relating to the acceptability of the Work, the quantities and classifications of Unit Price Work, the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, and Claims seeking changes in the Contract Price or Contract Times will be referred initially to ENGINEER in writing, in accordance with the provisions of paragraph 10.05, with a request for a formal decision.

B. When functioning as interpreter and judge under this paragraph 9.09, ENGINEER will not show partiality to OWNER or CONTRACTOR and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity. The rendering of a decision by ENGINEER pursuant to this paragraph 9.09 with respect to any such Claim, dispute, or other matter (except any which have been waived by the making or acceptance of final payment as provided in paragraph 14.07) will be a condition precedent to any exercise by OWNER or CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such Claim, dispute, or other matter.

9.10 *Limitations on ENGINEER's Authority and Responsibilities*

A. Neither ENGINEER's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by ENGINEER in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by ENGINEER shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by ENGINEER to CONTRACTOR, any Subcontractor, any Supplier, any

other individual or entity, or to any surety for or employee or agent of any of them.

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

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

D. ENGINEER's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, Bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.

E. The limitations upon authority and responsibility set forth in this paragraph 9.10 shall also apply to ENGINEER's Consultants, Resident Project Representative, and assistants.

ARTICLE 10 - CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

A. Without invalidating the Agreement and without notice to any surety, OWNER may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Written Amendment, a Change Order, or a Work Change Directive. Upon receipt of any such document, CONTRACTOR shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

B. If OWNER and CONTRACTOR are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change

Directive, a Claim may be made therefor as provided in paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

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

10.03 *Execution of Change Orders*

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

1. changes in the Work which are: (i) ordered by OWNER pursuant to paragraph 10.01.A, (ii) required because of acceptance of defective Work under paragraph 13.08.A or OWNER's correction of defective Work under paragraph 13.09, or (iii) agreed to by the parties;

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

3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by ENGINEER pursuant to paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, CONTRACTOR shall carry on the Work and adhere to the progress schedule as provided in paragraph 6.18.A.

10.04 *Notification to Surety*

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

10.05 *Claims and Disputes*

A. *Notice:* Written notice stating the general nature of each Claim, dispute, or other matter shall be delivered by the claimant to ENGINEER and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. Notice of the amount or extent of the Claim, dispute, or other matter with supporting data shall be delivered to the ENGINEER and the other party to the Contract within 60 days after the start of such event (unless ENGINEER allows additional time for claimant to submit additional or more accurate data in support of such Claim, dispute, or other matter). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of paragraph 12.01.B. A Claim for an adjustment in Contract Time shall be prepared in accordance with the provisions of paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to ENGINEER and the claimant within 30 days after receipt of the claimant's last submittal (unless ENGINEER allows additional time).

B. *ENGINEER's Decision:* ENGINEER will render a formal decision in writing within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any. ENGINEER's written decision on such Claim, dispute, or other matter will be final and binding upon OWNER and CONTRACTOR unless:

1. an appeal from ENGINEER's decision is taken within the time limits and in accordance with the dispute resolution procedures set forth in Article 16; or

2. if no such dispute resolution procedures have been set forth in Article 16, a written notice of intention to appeal from ENGINEER's written decision is delivered by OWNER or CONTRACTOR to the other and to ENGINEER within 30 days after the date of such decision, and a formal proceeding is instituted by the appealing party in a forum of competent jurisdiction within 60 days after the date of such decision or within 60 days after Substantial Completion, whichever is later (unless otherwise agreed in writing by OWNER and CONTRACTOR), to exercise such rights or remedies as the appealing party may have with respect to such Claim, dispute, or other matter in accordance with applicable Laws and Regulations.

C. If ENGINEER does not render a formal decision in writing within the time stated in paragraph 10.05.B, a decision denying the Claim in its entirety shall be deemed to have been issued 31 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any.

D. No Claim for an adjustment in Contract Price or Contract Times (or Milestones) will be valid if not submitted in accordance with this paragraph 10.05.

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

11.01 *Cost of the Work*

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

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 at the Site. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by OWNER.

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

3. Payments made by CONTRACTOR to Subcontractors for Work performed by Subcontractors. If required by OWNER, CONTRACTOR shall obtain competitive bids from subcontractors acceptable to OWNER and CONTRACTOR and shall deliver such bids to OWNER, who will then determine, with the advice of ENGINEER, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as CONTRACTOR's Cost of the Work and fee as provided in this paragraph 11.01.

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

5. Supplemental costs including the following:

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

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

c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from CONTRACTOR or others in accordance with

rental agreements approved by OWNER with the advice of ENGINEER, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

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

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

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by CONTRACTOR in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of OWNER. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining CONTRACTOR's fee.

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

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

i. When the Cost of the Work is used to determine the value of a Change Order or of a Claim, the cost of premiums for additional Bonds and insurance required because of the changes in the Work or caused by the event giving rise to the Claim.

j. When all the Work is performed on the basis of cost-plus, the costs of premiums for all Bonds and insurance CONTRACTOR is required by the Contract Documents to purchase and maintain.

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

1. Payroll costs and other compensation of CONTRACTOR's officers, executives, principals (of partnerships and sole proprietorships), general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by CONTRACTOR, whether at the Site or in CONTRACTOR's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in paragraph 11.01.A.1 or specifically covered by paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the CONTRACTOR's fee.

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

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

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

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in paragraphs 11.01.A and 11.01.B.

C. *CONTRACTOR's Fee:* When all the Work is performed on the basis of cost-plus, CONTRACTOR's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, CONTRACTOR's fee shall be determined as set forth in paragraph 12.01.C.

D. *Documentation*: Whenever the Cost of the Work for any purpose is to be determined pursuant to paragraphs 11.01.A and 11.01.B, CONTRACTOR will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to ENGINEER an itemized cost breakdown together with supporting data.

11.02 *Cash 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 as may be acceptable to OWNER and ENGINEER. CONTRACTOR agrees that:

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

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

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

11.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by CONTRACTOR will be made by ENGINEER subject to the provisions of paragraph 9.08.

B. 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.

C. OWNER or CONTRACTOR may make a Claim for an adjustment in the Contract Price in accordance with paragraph 10.05 if:

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

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

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

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

12.01 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order or by a Written Amendment. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the ENGINEER and the other party to the Contract in accordance with the provisions of paragraph 10.05.

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

1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of paragraph 11.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with paragraph 12.01.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents

and agreement to a lump sum is not reached under paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in paragraph 11.01) plus a CONTRACTOR's fee for overhead and profit (determined as provided in paragraph 12.01.C).

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

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

12.02. *Change of Contract Times*

A. The Contract Times (or Milestones) may only be changed by a Change Order or by a Written Amendment. Any Claim for an adjustment in the Contract Times (or Milestones) shall be based on written notice submitted by the party making the claim to the ENGINEER and the other party to the Contract in accordance with the provisions of paragraph 10.05.

B. Any adjustment of the Contract Times (or Milestones) covered by a Change Order or of any Claim for an adjustment in the Contract Times (or Milestones) will be determined in accordance with the provisions of this Article 12.

12.03 *Delays Beyond CONTRACTOR's Control*

A. Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of CONTRACTOR, the Contract Times (or Milestones) will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in paragraph 12.02.A. Delays beyond the control of CONTRACTOR shall include, but not be limited to, acts or neglect by OWNER, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

12.04 *Delays Within CONTRACTOR's Control*

A. The Contract Times (or Milestones) will not be extended due to delays within the control of CONTRACTOR. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of CONTRACTOR.

12.05 *Delays Beyond OWNER's and CONTRACTOR's Control*

A. Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of both OWNER and CONTRACTOR, an extension of the Contract Times (or Milestones) in an amount equal to the time lost due to such delay shall be CONTRACTOR's sole and exclusive remedy for such delay.

12.06 *Delay Damages*

A. In no event shall OWNER or ENGINEER be liable to CONTRACTOR, any Subcontractor, any Supplier,

or any other person or organization, or to any surety for or employee or agent of any of them, for damages arising out of or resulting from:

1. delays caused by or within the control of CONTRACTOR; or

2. delays beyond the control of both OWNER and CONTRACTOR including but not limited to fires, floods, epidemics, abnormal weather conditions, acts of God, or acts or neglect by utility owners or other contractors performing other work as contemplated by Article 7.

B. Nothing in this paragraph 12.06 bars a change in Contract Price pursuant to this Article 12 to compensate CONTRACTOR due to delay, interference, or disruption directly attributable to actions or inactions of OWNER or anyone for whom OWNER is responsible.

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

13.01 *Notice of Defects*

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

13.02 *Access to Work*

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

13.03 *Tests and Inspections*

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

B. OWNER shall employ and pay for the services of an independent testing laboratory to perform all

inspections, tests, or approvals required by the Contract Documents except:

1. for inspections, tests, or approvals covered by paragraphs 13.03.C and 13.03.D below;

2. that costs incurred in connection with tests or inspections conducted pursuant to paragraph 13.04.B shall be paid as provided in said paragraph 13.04.B; and

3. as otherwise specifically provided in the Contract Documents.

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

D. CONTRACTOR shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for OWNER's and ENGINEER's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to CONTRACTOR's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to OWNER and ENGINEER.

E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by CONTRACTOR without written concurrence of ENGINEER, it must, if requested by ENGINEER, be uncovered for observation.

F. Uncovering Work as provided in paragraph 13.03.E shall be at CONTRACTOR's expense unless CONTRACTOR has given ENGINEER timely notice of CONTRACTOR's intention to cover the same and ENGINEER has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

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

B. If ENGINEER considers it necessary or advisable that covered Work be observed by ENGINEER or inspect-

ed or tested by others, CONTRACTOR, at ENGINEER's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as ENGINEER may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment. If it is found that such Work is defective, CONTRACTOR shall pay all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and OWNER shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, OWNER may make a Claim therefor as provided in paragraph 10.05. If, however, such Work is not found to be defective, CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Times (or Milestones), or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a Claim therefor as provided in paragraph 10.05.

13.05 *OWNER May Stop the Work*

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

13.06 *Correction or Removal of Defective Work*

A. CONTRACTOR shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by ENGINEER, remove it from the Project and replace it with Work that is not defective. CONTRACTOR shall pay all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

13.07 *Correction Period*

A. If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for CONTRACTOR's use by OWNER or permitted by Laws and Regulations as contemplated in paragraph 6.11.A is found to be defective, CONTRACTOR shall promptly, without cost to OWNER and in accordance with OWNER's written instructions: (i) repair such defective land or areas, or (ii) correct such defective Work or, if the defective Work has been rejected by OWNER, remove it from the Project and replace it with Work that is not defective, and (iii) satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom. If CONTRACTOR does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, OWNER may have the defective Work corrected or repaired or may have the rejected Work removed and replaced, and all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by CONTRACTOR.

B. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications or by Written Amendment.

C. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

D. CONTRACTOR's obligations under this paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this paragraph 13.07 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

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

13.09 *OWNER May Correct Defective Work*

A. If CONTRACTOR fails within a reasonable time after written notice from ENGINEER to correct defective Work or to remove and replace rejected Work as required by ENGINEER in accordance with paragraph 13.06.A, or if CONTRACTOR fails to perform the Work in accordance with the Contract Documents, or if CONTRACTOR fails to comply with any other provision of the Contract Documents, OWNER may, after seven days written notice to CONTRACTOR, correct and remedy any such deficiency.

B. In exercising the rights and remedies under this paragraph, OWNER shall proceed expeditiously. In connection with such corrective and remedial action, OWNER may exclude CONTRACTOR from all or part of the Site, take possession of all or part of the Work and suspend CONTRACTOR's services related thereto, take possession of CONTRACTOR's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which OWNER has paid CONTRACTOR but which are stored elsewhere. CONTRACTOR shall allow OWNER, OWNER's representatives, agents and employees, OWNER's other contractors, and ENGINEER and ENGINEER's Consultants access to the Site to enable OWNER to exercise the rights and remedies under this paragraph.

C. All Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by OWNER in exercising the rights and remedies under this paragraph 13.09 will be charged against CONTRACTOR, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, OWNER may make a Claim therefor as provided in paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of CONTRACTOR's defective Work.

D. CONTRACTOR shall not be allowed an extension of the Contract Times (or Milestones) because of any delay in the performance of the Work attributable to the exercise by OWNER of OWNER's rights and remedies under this paragraph 13.09.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

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

14.02 *Progress Payments*

A. *Applications for Payments*

1. At least 20 days before the date established 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 Applica-

tion for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that OWNER has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect OWNER's interest therein, all of which must be satisfactory to OWNER.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of CONTRACTOR stating that all previous progress payments received on account of the Work have been applied on account to discharge CONTRACTOR's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to pro-gress payments will be as stipulated in the Agreement.

B. *Review of Applications*

1. ENGINEER will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to OWNER or return the Application to CONTRACTOR indicating in writing ENGINEER's reasons for refusing to recommend payment. In the latter case, CONTRACTOR may make the necessary corrections and resubmit the Application.

2. ENGINEER's recommendation of any payment requested in an Application for Payment will constitute a representation by ENGINEER to OWNER, based on ENGINEER's observations on the Site 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, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under paragraph 9.08, and to

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: (i) inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to ENGINEER in the Contract Documents; or (ii) that there may not be other matters or issues between the parties that might entitle CONTRACTOR to be paid additionally by OWNER or entitle OWNER to withhold payment to CONTRACTOR.

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 to supervise, direct, or control the Work or for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for CONTRACTOR's failure to comply with Laws and Regulations applicable to CONTRACTOR's performance of the Work. Additionally, said review or recommendation will not impose responsibility on ENGINEER to make any examination to ascertain how or for what purposes CONTRACTOR has used the moneys paid on account of the Contract Price, or 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 referred to in paragraph 14.02.B.2. ENGINEER may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in ENGINEER's opinion to protect OWNER from loss because:

a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;

b. the Contract Price has been reduced by Written Amendment or Change Orders;

c. OWNER has been required to correct defective Work or complete Work in accordance with paragraph 13.09; or

d. ENGINEER has actual knowledge of the occurrence of any of the events enumerated in paragraph 15.02.A.

C. *Payment Becomes Due*

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

D. *Reduction in Payment*

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

a. claims have been made against OWNER on account of CONTRACTOR's performance or furnishing of the Work;

b. Liens have been filed in connection with the Work, except where CONTRACTOR has delivered a specific Bond satisfactory to OWNER to secure the satisfaction and discharge of such Liens;

c. there are other items entitling OWNER to a set-off against the amount recommended; or

d. OWNER has actual knowledge of the occurrence of any of the events enumerated in paragraphs 14.02.B.5.a through 14.02.B.5.c or paragraph 15.02.A.

2. If OWNER refuses to make payment of the full amount recommended by ENGINEER, OWNER must give CONTRACTOR immediate written notice (with a copy to ENGINEER) stating the reasons for such action and promptly pay CONTRACTOR any amount remaining after deduction of the amount so withheld. OWNER shall promptly

pay CONTRACTOR the amount so withheld, or any adjustment thereto agreed to by OWNER and CONTRACTOR, when CONTRACTOR corrects to OWNER's satisfaction the reasons for such action.

3. If it is subsequently determined that OWNER's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by paragraph 14.02.C.1.

14.03 *CONTRACTOR's Warranty of Title*

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

14.04 *Substantial Completion*

A. When CONTRACTOR considers the entire Work ready for its intended use CONTRACTOR shall notify OWNER and ENGINEER in writing that the entire Work is substantially complete (except for items specifically listed by CONTRACTOR as incomplete) and request that ENGINEER issue a certificate of Substantial Completion. Promptly thereafter, OWNER, CONTRACTOR, and ENGINEER shall make an inspection of the Work to determine the status of completion. If ENGINEER does not consider the Work substantially complete, ENGINEER will notify CONTRACTOR in writing giving the reasons therefor. If ENGINEER considers the Work substantially complete, ENGINEER will prepare and deliver to OWNER a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. OWNER shall have seven days after receipt of the tentative certificate during which to make written objection to ENGINEER as to any provisions of the certificate or attached list. If, after considering such objections, ENGINEER concludes that the Work is not substantially complete, ENGINEER will within 14 days after submission of the tentative certificate to OWNER notify CONTRACTOR in writing, stating the reasons therefor. If, after consideration of OWNER's objections, ENGINEER considers the Work substantially complete, ENGINEER will within said 14 days execute and deliver to OWNER and CONTRACTOR a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as ENGINEER believes justified after consideration of any objections from OWNER. At the time of delivery of the tentative certificate of Substantial Completion ENGINEER will deliver to OWNER and CONTRACTOR a written

recommendation as to division of responsibilities pending final payment between OWNER and CONTRACTOR with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless OWNER and CONTRACTOR agree otherwise in writing and so inform ENGINEER in writing prior to ENGINEER's issuing the definitive certificate of Substantial Completion, ENGINEER's aforesaid recommendation will be binding on OWNER and CONTRACTOR until final payment.

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

14.05 *Partial Utilization*

A. Use by OWNER at OWNER's option of 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, may be accomplished prior to Substantial Completion of all the Work subject to the following conditions.

1. OWNER at any time may request CONTRACTOR in writing to permit OWNER to use any such part of the Work which OWNER believes to be ready for its intended use and substantially complete. If CONTRACTOR agrees that such part of the Work is substantially complete, CONTRACTOR will certify to OWNER and ENGINEER that such part of the Work is substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. CONTRACTOR at any time may notify OWNER and ENGINEER in writing that CONTRACTOR considers any such part of the Work ready for its intended use and substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. Within a reasonable time after either such request, OWNER, CONTRACTOR, and ENGINEER shall make an inspection of that part of the Work to determine its status of completion. If ENGINEER does not consider that part of the Work to be substantially complete, ENGINEER will notify OWNER and CONTRACTOR in writing giving the reasons therefor. If ENGINEER considers that part of the Work to be substantially

complete, the provisions of paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

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

14.06 *Final Inspection*

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

14.07 *Final Payment*

A. *Application for Payment*

1. After CONTRACTOR has, in the opinion of ENGINEER, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, Bonds, certificates or other evidence of insurance certificates of inspection, marked-up record documents (as provided in paragraph 6.12), and other documents, CONTRACTOR may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by: (i) all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by subparagraph 5.04.B.7; (ii) consent of the surety, if any, to final payment; and (iii) complete and legally effective releases or waivers (satisfactory to OWNER) of all Lien rights arising out of or Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in paragraph 14.07.A.2 and as approved by OWNER, CONTRACTOR may furnish receipts or releases in full and an affidavit of

CONTRACTOR that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which OWNER or OWNER's property might in any way be responsible have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, CONTRACTOR may furnish a Bond or other collateral satisfactory to OWNER to indemnify OWNER against any Lien.

B. *Review of Application and Acceptance*

1. If, on the basis of ENGINEER's observation of the Work during construction and final inspection, and ENGINEER's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, ENGINEER is satisfied that the Work has been completed and CONTRACTOR's other obligations under the Contract Documents have been fulfilled, ENGINEER will, within ten days after receipt of the final Application for Payment, indicate in writing ENGINEER's recommendation of payment and present the Application for Payment to OWNER for payment. At the same time ENGINEER will also give written notice to OWNER and CONTRACTOR that the Work is acceptable subject to the provisions of paragraph 14.09. Otherwise, ENGINEER will return the Application for Payment to CONTRACTOR, indicating in writing the reasons for refusing to recommend final payment, in which case CONTRACTOR shall make the necessary corrections and resubmit the Application for Payment.

C. *Payment Becomes Due*

1. Thirty days after the presentation to OWNER of the Application for Payment and accompanying documentation, the amount recommended by ENGINEER will become due and, when due, will be paid by OWNER to CONTRACTOR.

14.08 *Final Completion Delayed*

A. If, through no fault of CONTRACTOR, final completion of the Work is significantly delayed, and if ENGINEER so confirms, OWNER shall, upon receipt of CONTRACTOR's final Application for Payment and recommendation of ENGINEER, and without terminating the Agreement, make payment of the balance due for that portion of the Work fully completed and accepted. If the

remaining balance to be held by OWNER for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if Bonds have been furnished as required in paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by CONTRACTOR to ENGINEER with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 *Waiver of Claims*

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by OWNER against CONTRACTOR, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from CONTRACTOR's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by CONTRACTOR against OWNER other than those previously made in writing which are still unsettled.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

15.01 *OWNER May Suspend Work*

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

15.02 *OWNER May Terminate for Cause*

A. The occurrence of any one or more of the following events will justify termination for cause:

1. CONTRACTOR's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the progress schedule established under paragraph 2.07 as adjusted from time to time pursuant to paragraph 6.04);

2. CONTRACTOR's disregard of Laws or Regulations of any public body having jurisdiction;

3. CONTRACTOR's disregard of the authority of ENGINEER; or

4. CONTRACTOR's violation in any substantial way of any provisions of the Contract Documents.

B. If one or more of the events identified in paragraph 15.02.A occur, OWNER may, after giving CONTRACTOR (and the surety, if any) seven days written notice, terminate the services of CONTRACTOR, exclude CONTRACTOR from the Site, and take possession of the Work and of all CONTRACTOR's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by CONTRACTOR (without liability to CONTRACTOR for trespass or conversion), incorporate in the Work all materials and equipment stored at the Site or for which OWNER has paid CONTRACTOR but which are stored elsewhere, and finish the Work as OWNER may deem expedient. In such case, CONTRACTOR shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by OWNER arising out of or relating to completing the Work, such excess will be paid to CONTRACTOR. If such claims, costs, losses, and damages exceed such unpaid balance, CONTRACTOR shall pay the difference to OWNER. Such claims, costs, losses, and damages incurred by OWNER will be reviewed by ENGINEER as to their reasonableness and, when so approved by ENGINEER, incorporated in a Change Order. When exercising any rights or remedies under this paragraph OWNER shall not be required to obtain the lowest price for the Work performed.

C. Where CONTRACTOR's services have been so terminated by OWNER, the termination will not affect any rights or remedies of OWNER against CONTRACTOR then existing or which may thereafter accrue. Any

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

15.03 *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, elect to terminate the Contract. In such case, CONTRACTOR shall be paid (without duplication of any items):

1. for completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. for expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

3. for all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. for reasonable expenses directly attributable to termination.

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

15.04 *CONTRACTOR May Stop Work or Terminate*

A. If, through no act or fault of CONTRACTOR, the Work is suspended for more than 90 consecutive days by OWNER or under an order of court or other public authority, or ENGINEER fails to act on any Application for Payment within 30 days after it is submitted, or OWNER fails for 30 days to pay CONTRACTOR any sum finally determined to be due, then CONTRACTOR may, upon seven days written notice to OWNER and ENGINEER, and provided OWNER or ENGINEER do not remedy such suspension or failure within that time, terminate the Contract and recover from OWNER payment on the same terms as provided in paragraph 15.03. In lieu of terminating the Contract and without prejudice to any other right or

remedy, if ENGINEER has failed to act on an Application for Payment within 30 days after it is submitted, or OWNER has failed for 30 days to pay CONTRACTOR any sum finally determined to be due, CONTRACTOR may, seven days after written notice to OWNER and ENGINEER, stop the Work until payment is made of all such amounts due CONTRACTOR, including interest thereon. The provisions of this paragraph 15.04 are not intended to preclude CONTRACTOR from making a Claim under paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to CONTRACTOR's stopping the Work as permitted by this paragraph.

ARTICLE 16 - DISPUTE RESOLUTION

16.01 *Methods and Procedures*

A. Dispute resolution methods and procedures, if any, shall be as set forth in the Supplementary Conditions. If no method and procedure has been set forth, and subject to the provisions of paragraphs 9.09 and 10.05, OWNER and CONTRACTOR may exercise such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any dispute.

ARTICLE 17 - MISCELLANEOUS

17.01 *Giving Notice*

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

17.02 *Computation of Times*

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

17.03 *Cumulative Remedies*

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

17.04 *Survival of Obligations*

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

17.05 *Controlling Law*

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

SUPPLEMENTARY CONDITIONS

1. SUPPLEMENTS

1.01 THESE SUPPLEMENTARY CONDITIONS AMEND OR SUPPLEMENT THE STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT, EJCDC DOCUMENT 1910-8, 1996 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. DEFINITIONS

2.01 THE TERMS USED IN THESE SUPPLEMENTARY CONDITIONS WHICH ARE DEFINED IN THE STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT (NO. 1910-8, 1996 EDITION) HAVE THE MEANINGS ASSIGNED TO THEM IN THE GENERAL CONDITIONS.

2.02 ADD TO ARTICLE 1 - DEFINITIONS: [_____].

2.03 ADD TO ARTICLE 1 - DEFINITIONS: [_____].

3. 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 - [20] [__] SETS

ORIGINAL SIZE DRAWINGS - [10] [__] SETS OF PRINTS OR 1 SET OF SEPIAS

ONE-HALF ORIGINAL SIZE DRAWINGS - [10] [__] SETS

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. PHYSICAL CONDITIONS: EXPLORATIONS AND REPORTS

4.01 ADD THE FOLLOWING TO ARTICLE 4, PARAGRAPH 4.02 A.3.

A. SUBSURFACE EXPLORATION BY SOILS ENGINEER, [_____], HAS BEEN PERFORMED AND SOIL REPORT MAY BE INSPECTED AT OFFICE OF WILEY & WILSON, INC., 2310 LANGHORNE ROAD, LYNCHBURG, VIRGINIA 24501, BETWEEN THE HOURS OF 8:30 A.M. AND 4:30 P.M. ON NORMAL WORKING DAYS OR COPIES MAY BE OBTAINED UPON WRITTEN REQUEST.

B. SUBSURFACE EXPLORATION BY SOILS ENGINEER, [_____], HAS BEEN PERFORMED AND SOIL REPORT IS APPENDED TO THIS PROJECT MANUAL FOR CONVENIENT REFERENCE ONLY AND WILL NOT BE PART OF CONTRACT DOCUMENTS.

(1) SOIL REPORT WAS OBTAINED FOR USE BY WILEY & WILSON, INC., IN DESIGN AND IS AVAILABLE FOR CONTRACTOR'S INFORMATION BUT IS NOT A WARRANTY OF SUBSURFACE CONDITIONS. CONTRACTOR SHALL BE RESPONSIBLE FOR HIS OWN INTERPRETATION FOR CONSTRUCTION PURPOSES.

(2) PRIOR TO BIDDING, CONTRACTOR MAY MAKE SUBSURFACE INVESTIGATIONS.

4.02 ADD THE FOLLOWING TO ARTICLE 4 SUBPARAGRAPH 4.06 A.:

4.06 A. [ASBESTOS SURVEY] [_____] BY [_____] HAS BEEN PERFORMED AND [_____] REPORT IS APPENDED TO THIS PROJECT MANUAL FOR CONVENIENT REFERENCE ONLY AND WILL NOT BE A PART OF CONTRACT DOCUMENTS.

5. BONDS

5.01 ADD THE FOLLOWING TO ARTICLE 5, PARAGRAPH 5.01.

5.01 D. 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.

6. INSURANCE: THE CONTRACTOR SHALL PURCHASE AND MAINTAIN THE INSURANCE, REQUIRED BY ARTICLE 5 OF THE GENERAL CONDITIONS, IN AT LEAST THE FOLLOWING AMOUNTS:

6.01 CONTRACTOR'S COMMERCIAL GENERAL LIABILITY (BODILY INJURY AND PROPERTY DAMAGE) SHALL BE PROVIDED FOR THE FOLLOWING LIMITS:

A. GENERAL AGGREGATE [_____] DOLLARS

B. PRODUCTS AND COMPLETED OPERATIONS AGGREGATE [_____] DOLLARS

C. PERSONAL AND ADVERTISING INJURY [_____] DOLLARS

D. EACH OCCURENCE [_____] DOLLARS

E. THE GENERAL LIABILITY INSURANCE SHALL INCLUDE THE FOLLOWING COVERAGES:

(1) COMPREHENSIVE FORM

(2) PREMISES - OPERATIONS

(3) EXPLOSION AND COLLAPSE HAZARD

(4) UNDERGROUND HAZARDS

(5) PRODUCTS/COMPLETED OPERATIONS HAZARD

(6) CONTRACTUAL LIABILITY INSURANCE

(7) BROAD FORM PROPERTY DAMAGE, INCLUDING COMPLETED OPERATIONS

(8) INDEPENDENT CONTRACTORS (CONTRACTOR'S PROTECTIVE LIABILITY)

(9) PERSONAL INJURY (ALL INSURING AGREEMENTS), DELETING THE EMPLOYEE EXCLUSION.

(10) OWNER'S PROTECTIVE LIABILITY, SEPARATE POLICY IN NAME OF OWNER.

(11) ADDITIONAL INSURED: [_____]

6.02 CONTRACTOR'S AUTOMOBILE LIABILITY (BODILY INJURY AND PROPERTY DAMAGE) SHALL BE PROVIDED FOR THE FOLLOWING LIMITS:

- A. BODILY INJURY LIABILITY [_____] DOLLARS EACH PERSON
[_____] DOLLARS EACH ACCIDENT
- B. PROPERTY DAMAGE LIABILITY [_____] DOLLARS EACH ACCIDENT
- C. OR COMBINED SINGLE LIMIT [_____] DOLLARS EACH ACCIDENT
- D. THE AUTOMOBILE LIABILITY INSURANCE SHALL INCLUDE THE FOLLOWING COVERAGES:
 - (1) COMPREHENSIVE FORM
 - (2) OWNED AUTOS
 - (3) HIRED AUTOS
 - (4) NONOWNED AUTOS
- 6.03 EXCESS LIABILITY (UMBRELLA) COVERAGE SHALL BE PROVIDED BY THE CONTRACTOR WITH A MINIMUM LIMIT OF [_____] DOLLARS EACH OCCURENCE AND [_____] DOLLARS AGGREGATE.
- 6.04 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.
 - A. INCLUDE U.S. LONGSHOREMEN AND HARBOR WORKERS ENDORSEMENT.
- 6.05 THE CONTRACTOR SHALL PURCHASE SPECIAL FORM COMPLETED VALUE BUILDER'S RISK INSURANCE AS REQUIRED BY THE GENERAL CONDITIONS, ARTICLE 5.6.. THE BUILDER'S RISK INSURANCE SHALL BE FOR THE BENEFIT OF THE OWNER, THE CONTRACTOR, AND THE SUBCONTRACTORS, AS THEIR INTEREST MAY APPEAR.
- 6.06 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 EFFECTED 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 WILEY & WILSON.
- 6.07 ALL INSURANCE SHALL BE WRITTEN BY INSURANCE COMPANIES LICENSED TO DO BUSINESS IN THE COMMONWEALTH OF VIRGINIA.
- 7. CONTRACTOR'S RESPONSIBILITIES
 - 7.01 LABOR, MATERIALS AND EQUIPMENT: ADD THE FOLLOWING TO PARAGRAPH 6.05:
 - "ALL MATERIAL INCORPORATED IN THE WORK OF THIS CONTRACT SHALL BE FREE OF ASBESTOS AND OTHER HAZARDOUS MATERIALS."
 - 7.02 PATENT FEES AND ROYALTIES: **[MODIFY PARAGRAPH 6.07 AS NEEDED.]**
 - 7.03 PERMITS: **[MODIFY PARAGRAPH 6.08 AS NEEDED.]**
 - 7.04 LAWS AND REGULATIONS: ADD THE FOLLOWING TO SUBPARAGRAPH 6.09:

6.09 D. CONTRACTOR SHALL BE [_____] IN THE [INSERT STATE NAME
_____] IN ACCORDANCE WITH [INSERT APPLICABLE CODE -
_____].

7.05 TAXES

A. ADD THE FOLLOWING TO PARAGRAPH 6.10.

"THIS PROJECT IS AN APPROVED POLLUTION CONTROL FACILITY AND HAS BEEN CERTIFIED TO THE VIRGINIA DEPARTMENT OF TAXATION FOR EXEMPTION FROM SALES AND USE TAXES ACCORDING TO THE CODE OF VIRGINIA 58.1-3660. THE CONTRACTOR SHALL REQUEST THE APPLICABLE SALES AND USE TAX EXEMPTION CERTIFICATE FROM THE VIRGINIA DEPARTMENT OF TAXATION THROUGH THE [WESTERN] REGIONAL OFFICE OF THE VIRGINIA [WATER CONTROL BOARD] LOCATED IN [ROANOKE,] VIRGINIA."

8. PROJECT REPRESENTATION

8.01 ADD THE FOLLOWING TO ARTICLE 9, PARAGRAPH 9.03:

9.03.1 WILEY & WILSON SHALL FURNISH A RESIDENT PROJECT REPRESENTATIVE (RPR), ASSISTANTS, AND OTHER FIELD STAFF TO ASSIST WILEY & WILSON IN OBSERVING 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, WILEY & WILSON SHALL ENDEAVOR TO PROVIDE FURTHER PROTECTION FOR OWNER AGAINST DEFECTS AND DEFICIENCIES IN THE WORK; BUT, THE FURNISHING OF SUCH SERVICES WILL NOT MAKE WILEY & WILSON RESPONSIBLE FOR OR GIVE WILEY & WILSON 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 OF WILEY & WILSON IN WILEY & WILSON'S AGREEMENT WITH THE OWNER AND IN THE CONSTRUCTION CONTRACT DOCUMENTS, AND ARE FURTHER LIMITED AND DESCRIBED AS FOLLOWS:

9.03.2 GENERAL: RPR IS WILEY & WILSON'S AGENT AT THE SITE, WILL ACT AS DIRECTED BY AND UNDER THE SUPERVISION OF WILEY & WILSON, AND WILL CONFER WITH WILEY & WILSON REGARDING RPR'S ACTIONS. RPR'S DEALINGS IN MATTERS PERTAINING TO THE ON-SITE WORK SHALL IN GENERAL BE WITH WILEY & WILSON 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. RPR SHALL GENERALLY COMMUNICATE WITH OWNER WITH THE KNOWLEDGE OF AND UNDER THE DIRECTION OF WILEY & WILSON.

9.03.3 DUTIES AND RESPONSIBILITIES OF RPR

9.03.3.1 SCHEDULES: REVIEW THE PROGRESS SCHEDULE, SCHEDULE OF SHOP DRAWING SUBMITTALS, AND SCHEDULE OF VALUES PREPARED BY CONTRACTOR AND CONSULT WITH WILEY & WILSON CONCERNING ACCEPTABILITY.

9.03.3.2 CONFERENCES AND MEETINGS: ATTEND MEETINGS WITH CONTRACTOR, SUCH AS PRECONSTRUCTION CONFERENCES, PROGRESS MEETINGS, JOB CONFERENCES, AND OTHER PROJECT-RELATED MEETINGS, AND PREPARE AND CIRCULATE COPIES OF MINUTES THEREOF.

9.03.3.3 LIAISON:

- A. SERVE AS WILEY & WILSON'S LIAISON WITH CONTRACTOR, WORKING PRINCIPALLY THROUGH CONTRACTOR'S SUPERINTENDENT AND ASSIST IN UNDERSTANDING THE INTENT OF THE CONTRACT DOCUMENTS; AND ASSIST WILEY & WILSON IN SERVING AS OWNER'S LIAISON WITH CONTRACTOR WHEN CONTRACTOR'S OPERATIONS AFFECT OWNER'S ON-SITE OPERATIONS.
- B. ASSIST IN OBTAINING FROM OWNER ADDITIONAL DETAILS OR INFORMATION, WHEN REQUIRED FOR PROPER EXECUTION OF THE WORK.

9.03.3.4 SHOP DRAWINGS AND SAMPLES:

- A. RECORD DATE OF RECEIPT OF SHOP DRAWINGS AND SAMPLES.
- B. RECEIVE SAMPLES WHICH ARE FURNISHED AT THE SITE BY CONTRACTOR, AND NOTIFY WILEY & WILSON OF AVAILABILITY OF SAMPLES FOR EXAMINATION.
- C. ADVISE WILEY & WILSON AND CONTRACTOR OF THE COMMENCEMENT OF ANY WORK REQUIRING A SHOP DRAWING OR SAMPLE IF THE SUBMITTAL HAS NOT BEEN APPROVED BY WILEY & WILSON.

9.03.3.5 REVIEW OF WORK, REJECTION OF DEFECTIVE WORK, INSPECTIONS, AND TESTS:

- A. CONDUCT ON-SITE OBSERVATIONS OF THE WORK IN PROGRESS TO ASSIST WILEY & WILSON IN DETERMINING IF THE WORK IS IN GENERAL PROCEEDING IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
- B. REPORT TO WILEY & WILSON WHENEVER RPR BELIEVES THAT ANY WORK IS UNSATISFACTORY, FAULTY OR DEFECTIVE OR DOES NOT CONFORM TO THE CONTRACT DOCUMENTS, OR HAS BEEN DAMAGED, OR DOES NOT MEET THE REQUIREMENTS OF ANY INSPECTION, TEST OR APPROVAL REQUIRED TO BE MADE; AND ADVISE WILEY & WILSON OF WORK THAT RPR BELIEVES SHOULD BE CORRECTED OR REJECTED OR SHOULD BE UNCOVERED FOR OBSERVATION, OR REQUIRES SPECIAL TESTING, INSPECTION, OR APPROVAL.
- C. VERIFY THAT TESTS, EQUIPMENT AND SYSTEMS STARTUPS, AND OPERATING AND MAINTENANCE TRAINING ARE CONDUCTED IN THE PRESENCE OF APPROPRIATE PERSONNEL, AND THAT CONTRACTOR MAINTAINS ADEQUATE RECORDS THEREOF; AND OBSERVE, RECORD, AND REPORT TO WILEY & WILSON APPROPRIATE DETAILS RELATIVE TO THE TEST PROCEDURES AND STARTUPS.
- D. ACCOMPANY VISITING INSPECTORS REPRESENTING PUBLIC OR OTHER AGENCIES HAVING JURISDICTION OVER THE PROJECT, RECORD THE RESULTS OF THESE INSPECTIONS, AND REPORT TO WILEY & WILSON.

9.03.3.6 INTERPRETATION OF CONTRACT DOCUMENTS: REPORT TO WILEY & WILSON WHEN CLARIFICATIONS AND INTERPRETATIONS OF THE CONTRACT DOCUMENTS ARE NEEDED AND TRANSMIT TO CONTRACTOR CLARIFICATIONS AND INTERPRETATIONS AS ISSUED BY WILEY & WILSON.

9.03.3.7 MODIFICATIONS: CONSIDER AND EVALUATE CONTRACTOR'S SUGGESTIONS FOR MODIFICATIONS IN DRAWINGS OR SPECIFICATIONS AND REPORT WITH RPR'S RECOMMENDATIONS TO WILEY & WILSON. TRANSMIT TO CONTRACTOR DECISIONS AS ISSUED BY WILEY & WILSON.

9.03.3.8 RECORDS:

- A. MAINTAIN AT THE JOB SITE ORDERLY FILES FOR CORRESPONDENCE, REPORTS OF JOB CONFERENCES, SHOP DRAWINGS AND SAMPLES, REPRODUCTIONS OF ORIGINAL CONTRACT DOCUMENTS INCLUDING ALL WORK DIRECTIVE CHANGES, ADDENDA, CHANGE ORDERS, FIELD ORDERS, ADDITIONAL DRAWINGS ISSUED SUBSEQUENT TO THE EXECUTION OF THE CONTRACT, WILEY & WILSON'S CLARIFICATIONS AND INTERPRETATIONS OF THE CONTRACT DOCUMENTS, PROGRESS REPORTS, AND OTHER PROJECT RELATED DOCUMENTS.
- B. KEEP A DIARY OR LOG BOOK, RECORDING CONTRACTOR HOURS ON THE JOB SITE, WEATHER CONDITIONS, DATA RELATIVE TO QUESTIONS OF WORK DIRECTIVE CHANGES, CHANGE ORDERS OR CHANGED CONDITIONS, LIST OF JOB SITE VISITORS, DAILY ACTIVITIES, DECISIONS, OBSERVATIONS IN GENERAL, AND SPECIFIC OBSERVATIONS IN MORE DETAIL AS IN THE CASE OF OBSERVING TEST PROCEDURES; AND SEND COPIES TO WILEY & WILSON.
- C. RECORD NAMES, ADDRESSES, AND TELEPHONE NUMBERS OF ALL CONTRACTORS, SUBCONTRACTORS, AND MAJOR SUPPLIERS OF MATERIALS AND EQUIPMENT.

9.03.3.9 REPORTS:

- A. FURNISH WILEY & WILSON PERIODIC REPORTS AS REQUIRED OF PROGRESS OF THE WORK AND OF CONTRACTOR'S COMPLIANCE WITH THE PROGRESS SCHEDULE AND SCHEDULE OF SHOP DRAWING AND SAMPLE SUBMITTALS.
- B. CONSULT WITH WILEY & WILSON IN ADVANCE OF SCHEDULED MAJOR TESTS, INSPECTIONS, OR START OF IMPORTANT PHASES OF THE WORK.
- C. DRAFT PROPOSED CHANGE ORDERS AND WORK DIRECTIVE CHANGES, OBTAINING BACKUP MATERIAL FROM CONTRACTOR AND RECOMMEND TO WILEY & WILSON CHANGE ORDERS, WORK DIRECTIVE CHANGES, AND FIELD ORDERS.
- D. REPORT IMMEDIATELY TO WILEY & WILSON AND OWNER UPON THE OCCURRENCE OF ANY ACCIDENT.

9.03.3.10 PAYMENT REQUESTS: REVIEW APPLICATIONS FOR PAYMENT WITH CONTRACTOR FOR COMPLIANCE WITH THE ESTABLISHED PROCEDURE FOR THEIR SUBMISSION AND FORWARD WITH RECOMMENDATIONS TO WILEY & WILSON, NOTING PARTICULARLY THE RELATIONSHIP OF THE PAYMENT REQUESTED TO THE SCHEDULE OF VALUES, WORK COMPLETED AND MATERIALS AND EQUIPMENT DELIVERED AT THE SITE BUT NOT INCORPORATED IN THE WORK.

9.03.3.11 CERTIFICATES, MAINTENANCE, AND OPERATION MANUALS: DURING THE COURSE OF THE WORK, VERIFY THAT CERTIFICATES, MAINTENANCE, AND OPERATION MANUALS AND OTHER DATA REQUIRED TO BE ASSEMBLED AND FURNISHED BY CONTRACTOR ARE APPLICABLE TO THE ITEMS ACTUALLY INSTALLED AND IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, AND HAVE THIS MATERIAL DELIVERED TO WILEY & WILSON FOR REVIEW AND FORWARDING TO OWNER PRIOR TO FINAL PAYMENT FOR THE WORK.

9.03.3.12 COMPLETION:

- A. BEFORE WILEY & WILSON ISSUES A CERTIFICATE OF SUBSTANTIAL COMPLETION, SUBMIT TO CONTRACTOR A LIST OF OBSERVED ITEMS REQUIRING COMPLETION OR CORRECTION.
- B. CONDUCT FINAL INSPECTION IN THE COMPANY OF WILEY & WILSON, OWNER AND CONTRACTOR, AND PREPARE A FINAL LIST OF ITEMS TO BE COMPLETED OR CORRECTED.
- C. OBSERVE THAT ALL ITEMS ON FINAL LIST HAVE BEEN COMPLETED OR CORRECTED AND MAKE RECOMMENDATIONS TO WILEY & WILSON CONCERNING ACCEPTANCE.

9.03.4 LIMITATIONS OF AUTHORITY

RESIDENT PROJECT REPRESENTATIVE:

- 9.03.4.1 SHALL NOT AUTHORIZE ANY DEVIATION FROM THE CONTRACT DOCUMENTS OR SUBSTITUTION OF MATERIALS OR EQUIPMENT, UNLESS AUTHORIZED BY WILEY & WILSON.
- 9.03.4.2 SHALL NOT EXCEED LIMITATIONS OF WILEY & WILSON'S AUTHORITY AS SET FORTH IN THE CONTRACT DOCUMENTS.
- 9.03.4.3 SHALL NOT UNDERTAKE ANY OF THE RESPONSIBILITIES OF CONTRACTOR, SUBCONTRACTORS, OR CONTRACTOR'S SUPERINTENDENT.
- 9.03.4.4 SHALL NOT ADVISE ON, ISSUE DIRECTIONS RELATIVE TO, OR ASSUME CONTROL OVER ANY ASPECT OF THE MEANS, METHODS, TECHNIQUES, SEQUENCES, OR PROCEDURES OF CONSTRUCTION UNLESS SUCH ADVICE OR DIRECTIONS ARE SPECIFICALLY REQUIRED BY THE CONTRACT DOCUMENTS.
- 9.03.4.5 SHALL NOT ADVISE ON, ISSUE DIRECTIONS REGARDING, OR ASSUME CONTROL OVER SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK.
- 9.03.4.6 SHALL NOT ACCEPT SHOP DRAWING OR SAMPLE SUBMITTALS FROM ANYONE OTHER THAN CONTRACTOR.
- 9.03.4.7 SHALL NOT AUTHORIZE OWNER TO OCCUPY THE PROJECT IN WHOLE OR IN PART.
- 9.03.4.8 SHALL NOT PARTICIPATE IN SPECIALIZED FIELD OR LABORATORY TESTS OR INSPECTIONS CONDUCTED BY OTHERS EXCEPT AS SPECIFICALLY AUTHORIZED BY WILEY & WILSON.

END OF SUPPLEMENTARY CONDITIONS