2370 FM 1979, San Marcos, TX 78666  830-372-1031

# RULES AND REGULATIONS

## Rules and Regulations

CERTIFICATES OF CONVENIENCE AND NECESSITY NO. 0940015 and 21086

HAYS, GUADALUPE, COMAL and CALDWELL COUNTIES, TEXAS

Amended August 22, 2019

Effective Date October 1, 2019

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# SECTION A: ADOPTION & AUTHORITY

1 **Effective Date.** These Rules and Regulations were originally adopted by the Board of Directors of the Crystal Clear Special Utility district on June 23, 2015, pursuant to Tex. S.B. 1116, 83rd Leg., R.S. (2013). These Rules and Regulations, as amended from time to time, supersedes all utility service policies, rates, rules and tariffs adopted or passed by the Board of Directors prior to the date of adoption of these Rules and Regulations. These Rules and Regulations shall take effect immediately upon approval.

2 **Pre-Existing Tariff.** The District adopted these Rules and Regulations to replace and supersede the tariff that was in effective prior to, and carried forward after, the conversion of Crystal Clear Water Supply Corporation to Crystal Clear Special Utility District prior to the effective date of the adoption of these rules and Regulations.

3 **Pre-Existing Penalties and Vested Rights.** The adoption of these Rules and Regulations shall not affect any offense or act committed or done, or any penalty or forfeiture incurred, or any contract or vested right established or accrued prior to the effective date or adoption of these Rules and Regulations.

4 **Official Copy Available.** An official copy of the Rules and Regulations shall be available to the customers of the District during regular office hours of the District. Requests for copies shall be subject to reproduction charges. The reproduction charge shall be $20.00. The Business Manager of the District shall maintain the original copy as approved, and clearly exhibit all additions, deletions and amendments hereto.

5 **Conflicts.** Rules and regulations of state and federal agencies having applicable jurisdiction, promulgated under any applicable state or federal law, shall supersede all terms of the Rules and Regulations that directly conflict with such State and Federal rules or regulations. If any section, paragraph, sentence, clause, phrase, word or words of these Rules and Regulations are declared unconstitutional or in violation of law, the remainder of the Rules and Regulations shall not be affected thereby and shall remain in full force and effect.

| | |
|---|---|
| _____ | _____ |
| President | Secretary |
| _____ | _____ |
| Signature | Signature |
| _____ | _____ |
| Date | Date |

# SECTION B: STATEMENTS

1. **Organization.** The District was created pursuant to TEX. S.B. 1116, 83rd Leg., R.S. (2013), further codified in TEX. SPEC. DIST. LOC. LAWS CODE Chapter 7206, enacted under the authority granted to the Texas Legislature in TEX. CONST. art. XVI, § 59. The District exists for the purpose of furnishing potable water and wastewater utility service. The District was organized on January 18, 2013, following the confirmation election by the voters within the geographic area as specified by Senate Bill 1116. The District is managed by the Board of Directors, the members of which are elected by qualified voters residing within the District's boundaries.

2. **Non-Discrimination Policy**. Service is provided to all applicants that comply with the provisions of these Rules and Regulations regardless of race, creed, color, national origin, sex, disability or marital status.

3. **Policy and Rule Application.** These policies, rules and regulations apply to the water and wastewater services provided by the District. Failure on the part of a customer or applicant to observe these policies, rules and regulations gives the District the authority to deny or discontinue service.

4. **Fire Protection.** It is not a primary responsibility of the District to provide "fire flows" from the District's water system. As the District's system grows from a rural system to an urban system, the District's facilities will accommodate "fire-flows" as required by municipal or County regulations for future developments or projects. All hydrants or flush valves are for the operation and maintenance of the system and may be used for refill only by authorized fire departments. The District reserves the right to remove any hydrant due to improper use or detriment to its water system, as determined by the District, at any time without notice, refund or compensation to the contributors unless such hydrants are installed pursuant to the terms of a Non-Standard Service Contract, in which event the terms and conditions of the contract shall apply.

5. **Damage Liability.** Pursuant to State Law, the District is not liable for damages caused by service interruptions due to waterline breaks or equipment failure, tampering by third persons or customers of the District, normal system failures, system maintenance or repairs, or other events beyond the District's control, or for damages caused by negligent acts of the District, its employees, designated representatives and contractors.

6. **Public Information Disclosure.** The records of the District shall be kept at the District's office at 2370 FM 1979, San Marcos, Texas 78666. All information collected, assembled or maintained by or for the District shall be disclosed to the public in accordance with the Texas Public Information Act. An individual customer may request in writing that the District keep the customer's name, address, telephone number or social security number confidential. Such confidentiality does not prohibit the District from disclosing this information to an official or employee of the state or a political subdivision of the state acting in an official capacity or an employee of the District acting in connection with the employee's duties. A reasonable charge as established pursuant to the Texas Public Information Act may be assessed to any person requesting copies of District records.

7. **Notice of Change in Rates.** The District will give written notice of a change to monthly rates by publication or mail to all affected customers at least thirty (30) days prior to the effective date of the new rate. The notice shall contain the old rates, new rates, effective date of the new rates, date of Board authorization, and the name and telephone number of the District representative designated to address inquiries about the rate change. Failure of the District to give the notice shall not invalidate the changed rate or any change based on the changed rate.

8. **Customer Service Inspections.** The District requires that a customer service inspection certificate from a licensed inspector, assigned by the District, be completed prior to providing water service to completed new construction and for all new customers as part of the activation of standard and some non-standard service. Customer service inspections are also required on any existing service when the District has reason to believe that cross-connections or other potential contaminant hazards exist, or after any material improvement, correction or addition to the customers' water distribution facilities. This inspection is limited to the identification and prevention of cross connections, potential contaminant hazards and illegal lead materials. [30 TAC § 290.46(I-j)].

9. **Public Works Standards.** The District adopts applicable sections of the most current edition of the Standard Specifications for Public Works Construction, as amended as guidance in the design, installation and maintenance of line extensions and service facilities. In addition to the aforementioned guidance document, all work will be designed, installed, and maintained in accordance with the TCEQ regulations, local and State standards and applicable plumbing codes in effect at the time work is performed.

10. **Sub metering Responsibility**. Sub metering and non-sub metering by Master Metered Accounts may be allowed in the District's water/wastewater system provided the Master Metered Account customer registers with the Texas Commission on Environmental Quality and complies with its rules on sub metering at Title 30, Chapter 291, Subchapter H of the Texas Administrative Code. The District has no jurisdiction over or responsibility to tenants receiving water under a Master Metered Account, and such tenants are not considered customers of the District. Any interruption or impairment of water service to the tenants is the responsibility of the Master Metered Account customer. Any complaints regarding sub metering should be directed to the Texas Commission on Environmental Quality.

11. **District Forms Policy.** The sample forms in Appendices A and B of these Rules and Regulations are the same or similar in form to those used by the District and are attached hereto for informational purposes only. The District reserves the right to amend, revise and discontinue use of any of the attached forms, and to create and use new forms, at its sole discretion, for purposes that include, without limitation, complying with federal and state laws and regulations, improving District administrative efficiency, providing better service to customers, fulfilling the unique and facilities needs of sub-dividers, developers and nonstandard service applicants, and meeting the future system demands of the District.

12. **Threats to Utility Personnel or Property.** Threats to utility personnel or other actions which prevent the lawful conduct of utility business on utility property, easements or right of entry shall result in immediate discontinuance of utility service until the condition is corrected or the threat is permanently removed. Threats to or assaults upon utility personnel shall result in criminal prosecution.

# SECTION C: DEFINITIONS

The following words and terms, when used in these rules and Regulations, shall have the following meanings unless the context clearly indicates otherwise:

**Applicant** — A person applying to the District for service.

**Board of Directors** (or) **Board** — The governing body of the District elected by qualified voters residing within the District's boundaries in accordance with applicable election laws.

**Certificate of Convenience and Necessity** (or) **CCN** — The authorization granted under Chapter 13, Subchapter G, of the Texas Water Code for the District to provide water and/or wastewater service within a defined territory. The District has been issued Certificate Nos. 10297 and 21086 to provide water and wastewater service.

**Certificated service areas (or) service areas — see** Section D, Certificated Service Area Maps.

**Customer** — Any person receiving services from the District.

**Designated representative** (or) **district representative** — The General Manager of the District or a representative or employee of the District engaged in carrying out the terms of or performing services prescribed by these rules and Regulations pursuant to either general or specific authorization to do so from the General Manager or the Board of Directors.

**Developer** — Any person that subdivides land, requests two (2) or more water or wastewater service connections on a single contiguous tract of land or who is developing a non-residential project that has a water demand that cannot be served through a standard 5/8 or 3/4 water meter. [*See* Texas Water Code § 13.2502(e) (1)].

**Disconnection of service** — The discontinuance of water or wastewater service to a customer of the District.

**District** — The Crystal Clear Special Utility District.

**Easement** — A private perpetual dedicated right-of-way for the installation of water and/or wastewater service lines and facilities that allows access to property for future operation, maintenance, replacement, facility upgrades, and/or installation of additional pipelines (if applicable), and may include restrictions on the adjacent area to limit installation of other pipelines or structures that would restrict the District's use of any area of the easement.

**Final plat** — A complete and exact plan for the subdivision and/or development of a tract of land which has been approved by all local governments having jurisdiction pursuant to Chapters 212 or 232 of the Texas Local Government Code. The District shall determine if a plat submitted under these rules and Regulations qualifies as a final plat. [*See* 30 TAC § 291.85].

**General Manager** — The General Manager of the District appointed by the Board of Directors.

**Hazardous condition** -A condition that jeopardizes the, safety, health and/or welfare of District customers or employees as determined by the District or any other regulatory authority with jurisdiction.

**Low Pressure Wastewater System** (or) **LPWS** — The wastewater collection system installed by or on behalf of the District.

**Non-Payment Fee** – A fee assessed when a customer's account is in default for non-payment in full by the 7:00 a.m. CST deadline on Disconnect Day.

**Person** — Any natural person, firm, corporation, cooperative, limited liability company, partnership, unincorporated association, public agency or governmental entity, or any other public or private organization or entity of any type or character.

**Proof of Ownership**—Texas Water Code 67.016(d) gives authority to the District to require ownership of real estate designated to receive service as a condition of becoming a customer and receiving service. For the purpose of these rules and regulations, applicants for service shall provide proof of ownership by deed of trust, warranty deed, or other recordable documentation of fee simple title to real estate to be served. Renters may receive service only through owner of the property to be served.

**Public Utility Commission of Texas (PUC)** -— The state regulatory agency that generally regulates water and sewer utilities' rates, and CCN matters.

**Re-Service** — Providing service to an applicant at a location at which service previously existed and at which there is an existing facilities for a meter. Costs of such re-servicing shall be as established in these rules and Regulations or based on justifiable expenses in connection with such re-servicing.

**Septic Tank Effluent Pumping Unit (STEP Unit)** — The individual facility located at each building or residence which is owned, and maintained by the District as part of the District's Low Pressure Wastewater System. The STEP Unit includes a pump, treatment/tank, controls, control panel, valves, piping, electric wiring and related facilities.

**Service** — Any act performed, anything furnished or supplied, and any facilities used by the District in the performance of its duties under the Texas Water Code, the Texas Administrative Code, or applicable municipal ordinance or Commissioner's Court Order to its customers, employees, other retail public utilities, and the public, as well as the interchange of facilities between the District and one or more retail public utilities.

**Service application and agreement** (or) **service agreement** — A written agreement on the current service application and agreement form between an applicant and the District defining the specific type of service requirements requested, and the responsibilities of each party regarding the service to be provided.

**Service classification/unit** — The type of water service required by an applicant as may be determined by the District based on specific criteria such as usage, meter size, demand, type of application, and other relevant factors related to the applicant's request. The base service unit

of residential water service used by the District in facilities design and rate making in these rules and Regulations is a 5/8" x 3/4" water meter.

**Service Investigation Fee (Residential)** — a non-refundable fee of $50.00 for residential units for one (1) meter, paid to the District at the time of filing the standard service application for the purpose of determining the feasibility and capability of the system of providing service to the location of the applicant's residential unit. This fee covers administrative, legal fees and engineering expenses incurred by the District at the time of application. After review of the application, the Engineer will provide an estimate of the cost of their Engineering Study. The customer will be notified of any additional fees to be paid before the application/investigation will be finalized.

**Service Investigation Fee (Commercial, Industrial and Developers)** — A non-refundable fee in the amount of $50.00 for developments up to 250 meters or meter equivalent, paid to the District at the time of filing a nonstandard service application for the purpose of determining the feasibility of providing service to a proposed project. This fee covers administrative, legal fees engineering expenses incurred by the District at the time of application. After review of the application, the Engineer will provide an estimate of the cost of their Engineering Study. The customer will be notified of any additional fees to be paid before the application/investigation will be finalized.

**Subdivide** — To divide the surface area of land into lots or tracts of land. [*See* Local Gov't Code § 232.021(11)].

**Subdivision** — An area of land that has been subdivided into lots or tracts. [*See* Local Gov't Code § 232.021(13)].

**Temporary service** — The classification for water service assigned to any applicant that is in the process of constructing a residential or commercial structure. The District may also apply this classification to other nonpermanent service uses (e.g., agricultural, road construction, drilling, livestock, etc.). The District may provide temporary water service for up to six (6) months from the date of application for temporary service. Temporary service may be extended upon request and approval of the District on a case-by-case basis. As a prerequisite to receiving temporary service, the applicant must pay the applicable Temporary Service Charges, pursuant to Section G of these Rules and Regulations.

**Texas Commission on Environmental Quality** (**TCEQ)** — The State regulatory agency having jurisdiction of water and wastewater service utilities and appellate jurisdiction over the regulations regarding the health and safety of operating water and wastewater services in the state.

**Wastewater System** -The wastewater collection, disposal and treatment facilities operated by or constructed by or for the District, and any wastewater system extensions, improvements or facilities that may be built within the District's boundaries or service area in the future.

**Water system** -The water production, treatment, supply, storage and distribution facilities operated by or constructed by or for the District, and any water system extensions,

improvements or facilities that may be built within the District’s boundaries or service area in the future.

# SECTION D: GEOGRAPHIC AREA SERVED
# CERTIFICATE OF CONVENIENCE AND NECESSITY

To Provide Water Service Pursuant to the Texas Water Code, the Public Utility Commission of Texas, and/or the Texas Commission on Environmental Quality Rules

Certificate No. 10297

1. Certificate Holder

   Name: Crystal Clear Special Utility District
   Address: 2370 FM 1979
   San Marcos, TX 78666

2. General Description and Location of Service Area:

   Comal County, Guadalupe County, Hays County and Caldwell County

3. Certificated Service Area Maps:

   The certificate holder is authorized to provide water service in the area identified on the Public Utility Commission of Texas' official service area map maintained in the offices of the Public Utility Commission of Texas, William B. Travis Bldg., 1701 N. Congress Avenue, 7th Floor, Austin, TX 78701.

This certificate, as amended from time to time, has been issued pursuant to applications of the District and is subject to the rules and orders of the TCEQ, the laws of the State of Texas and conditions contained in the certificate. The certificate is valid until amended or revoked by the TCEQ.

The following two (2) pages contain a copy of Certificate No. 10297 and a map of the District's water service area.

# Public Utility Commission of Texas

## By These Presents Be It Known To All That

CRYSTAL CLEAR WATER SUPPLY CORPORATION

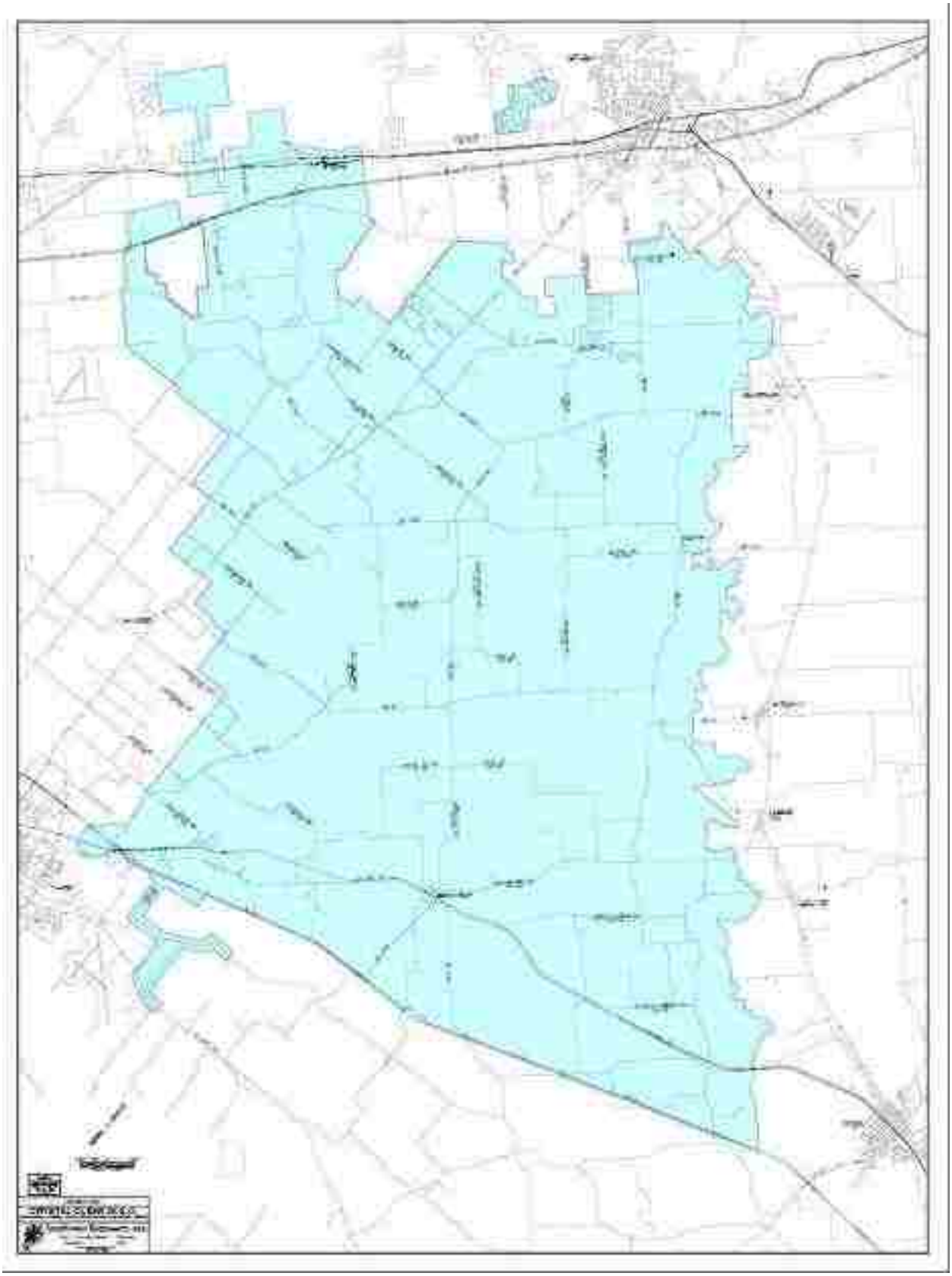
having duly applied for certification to provide water utility service for the convenience and necessity of the public, and it having been determined by this Commission that the public convenience and necessity would in fact be advanced by the provision of such service by this Applicant, is entitled to and is hereby granted this

## Certificate of Convenience and Necessity

numbered 10967, to provide water utility service to that service area or those service areas designated by final Order or Orders duly entered by this Commission, which Order or Orders are on file at the Commission offices in Austin, Texas; and are matters of official record available for public inspection; and be it known further that these presents do evidence the authority and the duty of this Grantee to provide such utility service in accordance with the laws of this State and the Rules of this Commission, subject only to any power and responsibility of this Commission to revoke or amend this Certificate in whole or in part upon a subsequent showing that the public convenience and necessity would be better served thereby.

**Issued** at Austin, Texas, this 1st day of November, 1979.

Philip F. Ricketts
SECRETARY OF THE COMMISSION



# SECTION D.1: GEOGRAPHIC AREA SERVED
# CERTIFICATE OF CONVENIENCE AND NECESSITY FOR WASTEWATER

To Provide Water Service Pursuant to the Texas Water Code, the Public Utility Commission of Texas, and the Texas Commission on Environmental Quality Rules

Certificate No. 21086

1. Certificate Holder

   Name: Crystal Clear Special Utility District
   Address: 2370 FM 1979
   San Marcos, TX 78666

2. General Description and Location of Service Area:

   Comal County

3. Certificated Service Area Maps:

   The certificate holder is authorized to provide wastewater service in the area identified on the Public Utility Commission of Texas' official service area map maintained in the offices of the Public Utility Commission of Texas, William B. Travis Bldg., 1701 N. Congress Avenue, 7th Floor, Austin, TX 78701.

This certificate, as amended from time to time, has been issued pursuant to applications of the District and is subject to the rules and orders of the TCEQ, the laws of the State of Texas and conditions contained in the certificate. The certificate is valid until amended or revoked by the TCEQ.

The following two (2) pages contain a copy of Certificate No. 21086 and a map of the District's water service area.

S/C

# Public Utility Commission

# Of Texas

## By These Presents Be It Known To All That

# CRYSTAL CLEAR WSC

having duly applied for certification to provide sewer utility service for the convenience and necessity of the public, and it having been determined by this Commission that the public convenience and necessity would in fact be advanced by the provision of such service by this Applicant, is entitled to and is hereby granted this

## Certificate of Convenience and Necessity No. 21086

to provide continuous and adequate sewer utility service in that service area or those service areas in Comal County as by final Order or Orders duly entered by this Commission, which Order or Orders resulting from Docket No. 44695 are on file at the Commission offices in Austin, Texas; and are matters of official record available for public inspection; and be it known further that these presents do evidence the authority and the duty of the Crystal Clear WSC to provide such utility service in accordance with the laws of this State and Rules of this Commission, subject only to any power and responsibility of this Commission to revoke or amend this Certificate in whole or in part upon a subsequent showing that the public convenience and necessity would be better served thereby.

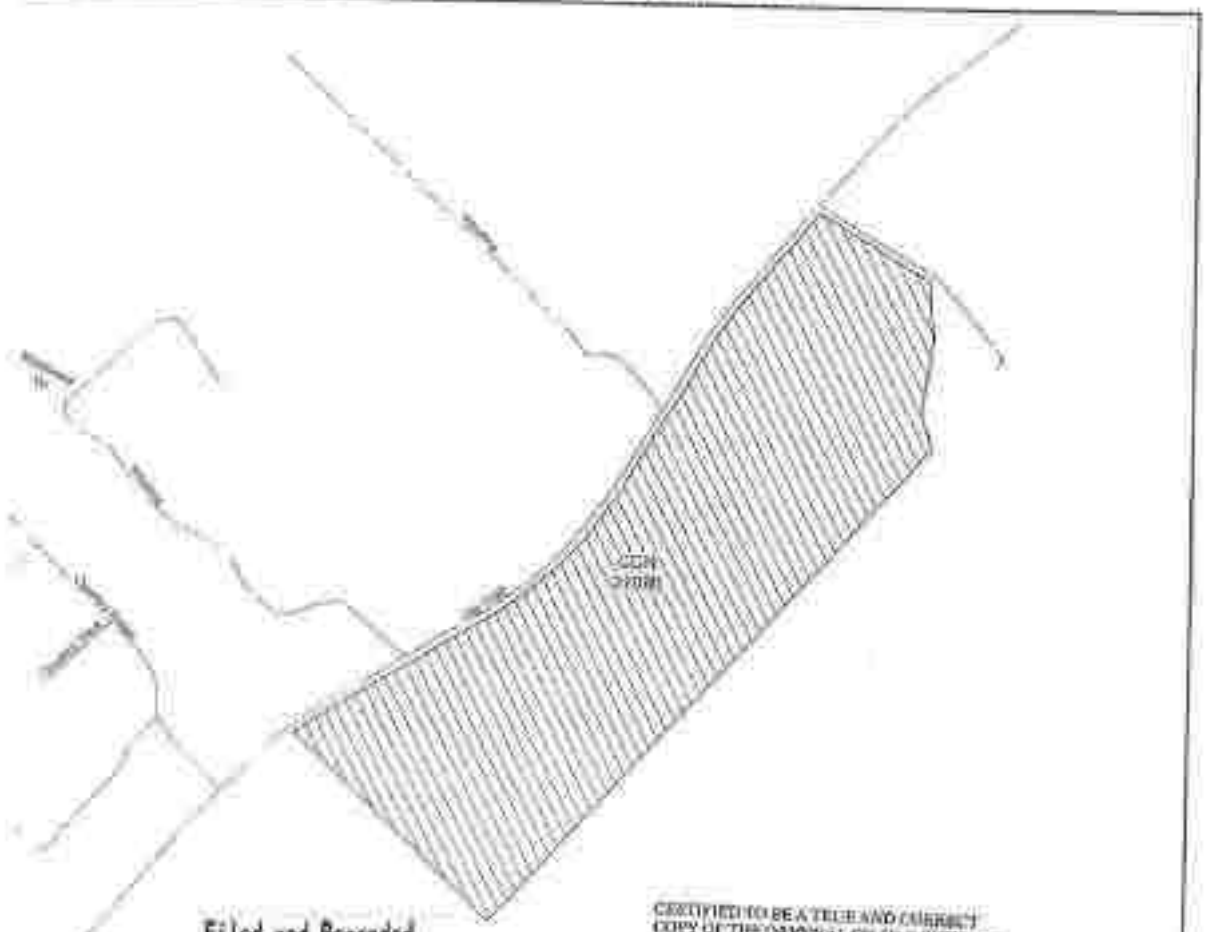
Issued at Austin, Texas, this 12th day of February 2016

CERTIFIED TO BE A TRUE AND CORRECT COPY OF THE ORIGINAL ON FILE WITH THE PUBLIC UTILITY COMMISSION OF TEXAS CENTRAL RECORDS DIVISION

BY: [signature]

DATE: 3-10-16

Crystal Clear WSC
Sewer Service Area
CCN No. 21086
PUC Docket No. 44693
Obtained New CCN in Comal County




Filed and Recorded
Official Public Records
Bobbie Koepp, County Clerk
Comal County, Texas
03/22/2016 03:07:47 PM
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Bobbie Koepp

CERTIFIED TO BE A TRUE AND CORRECT COPY OF THE ORIGINAL ON FILE WITH THE PUBLIC UTILITY COMMISSION OF TEXAS CENTRAL RECORDS DIVISION

BY: _____

DATE: 3-10-16

CCN Sewer Service Area

21086 - Crystal Clear WSC

Public Utility Commission of Texas
1701 N. Congress Ave.
Austin, TX 78701

# SECTION E: SERVICE RULES AND REGULATIONS

## 1. Service Entitlement

An applicant requesting service to real property located within the District's service area shall be considered qualified and entitled to water and/or wastewater service when a proper application has been filed with the District, the terms and conditions of service have been met and continue to be met, and all fees have been paid as prescribed. An applicant requesting service to real property located outside the boundaries of the District's service area and/or political boundaries may be considered for service in accordance with current District policies on providing service outside the District's service area.

## 2. Application Procedures and Requirements

(A) Service Classifications. Applications to the District for service shall be divided into the following two (2) classes:

(1) Standard Service. Standard service is defined as service from an existing service line where line or service facility extensions are not required and special design and/or engineering considerations are not necessary in the District's discretion. Standard water service is provided through a 5/8" x 3/4" meter set on an existing water line. Standard wastewater service is provided via minimum 1.1/4" wastewater tap connected to Low Pressure Force Main collection lines three (3) feet in depth in a properly bedded trench.

(2) Non-Standard Service. Non-standard water service is defined as any service request that requires a larger than 5/8 " x 3/4" meter for service, temporary water service, service to a Master Metered Account pursuant to Section E.2(c)(4) below, or an addition to or extension of the District's water system or wastewater system. Except for temporary service applicants, a non-standard service applicant must comply with the service requirements prescribed by Section F of these Rules and Regulations prior to receiving service.

(B) Requirements for Mandatory Wastewater Connection.

(1) Effective June 23, 2015, the Board of Directors adopted the following requirements for mandatory wastewater connections:

(a) The installation of any private on-site wastewater treatment or holding facility on land within the District's certificated service area and less than three hundred feet (300') from the nearest wastewater collection point of the District's wastewater system (measured from boundary line of the land along public right-of-ways or utility easements) may be prohibited and the District may provide wastewater service to any such property.

(b) All new developments and subdivisions on land within the District's certificated service area shall be required to connect to the District's wastewater system when feasible and in the District's discretion. The provision of water service by the District to any new subdivision or development without requiring wastewater collection facilities to be constructed therein shall be considered an exception, requiring compelling evidence that the public health and environment will be protected for the long term.

(c) The District may require an owner of land located within the District's certificated service area to connect to the District's wastewater system, when feasible and in the District's discretion, even if an on-site wastewater holding or treatment facility was installed on said land prior to January 18, 2014, provided the District's wastewater collection system is contiguous or adjacent to the boundary of said land.

(2) All costs for connecting to the District's wastewater system in excess of the standard costs required under Section G below must be paid for by the wastewater service applicant. The District must review and approve all plans and specifications for any connection to the wastewater system prior to construction. [Texas Water Code § 65.201(a) and Texas Water Code § 49.277].

(C) Requirements for Standard and Non-Standard Service.

(1) The applicant shall complete and sign a Service Application and Agreement or Non-Standard Service Application as applicable. [*See* Appendix A, Form A-01; Appendix B, Form B04].

(2) As a condition for service, the applicant shall complete and execute an Easement and Right-of-Way, Sanitary Control Easement and/or such other easement form(s) required by the District to obtain a dedicated easement(s) to allow the District a right of access to construct, install, maintain, replace, upgrade, inspect or test any facility necessary to serve the applicant's, as well as the District's, purposes in providing system-wide service. [*See* Tex. Water Code § 49.218; Appendix A, Form B-05]. This requirement may be delayed for non-standard service applicants. New meters shall be located within a utility easement at or near the boundary line (usually nearest a road) of the property designated for service.

(3) At the request of a property owner or an owner's authorized agent, the District shall install an individual Master Meter owned by the District in an apartment house, manufactured home rental community, multiple use facility, or condominium on which construction begins after June 23, 2015, unless the District determines that the installation of individual meters is not feasible. If the District determines that installation of individual Master Meter is not feasible, the property owner or manager shall install a plumbing system that is compatible with the installation of sub meters or individual meters. The District shall be entitled to

the payment of reasonable costs to install individual meters pursuant to 30 TAC § 291.122(d) and Section F of these Rules and Regulations. The cost of individual meter installations shall be prepaid by the property owner as well as the cost of any additional facilities or system improvements required to satisfy the total water/ wastewater service demand of the property at full occupancy, as determined under applicable provisions of Section F. The District shall consider master metering and/or non-standard wastewater service to apartments, condos, trailer/RV parks, or business centers and other similar type enterprises at an applicant's request provided the total number of units to be served are all:

(a) Owned by the same person, partnership, cooperative, corporation, agency, or public or private organization of any type, but not including a family unit;

(b) Directly inaccessible to a public right-of-way; and

(c) Considered a commercial enterprise (*i.e*., for business, rental or lease purposes).

(4) Notice of application approval and costs of service as determined by the District shall be presented to the applicant in writing and shall remain in effect for a period not to exceed thirty (30) days. After that time the applicant must re-apply for service. [*See* 30 TAC § 291.81(a) (1)].

(5) The Applicant shall provide proof of ownership to property for which service has been requested in a manner acceptable to the District. Proof of ownership shall consist of warranty deed, deed of trust or other recordable documentation of fee simple title to the real estate designated to receive service. (Texas Water Code 13.002 (11) and 67.016(d)).

(6) If a water main has been located in the public right-of-way and is adjacent to applicant's property, prior to receiving the requested service, the applicant shall grant an easement as required under these Rules and Regulations. In addition to the normally required fees for new customer service, the applicant may be asked to pay such sums as are reasonably necessary to remove or cap the existing water main in the public right-of-way and to construct the appropriate line or lines within that easement for the District's system-wide service [Texas Water Code § 49.212(a) and Texas Water Code § 65.205].

(7) If a transferee fails to provide all documentation or information required at the time of application, the District will issue written notice that the applicant must provide the documentation and/or information within ten (10) days or service will be terminated. This provision applies to both standard and non-standard service requests.

## 3. Activation of Standard Service

(A) New Service Connection. The District shall charge a Connection Fee/Impact Fee/Capital Recovery Fee and other applicable fees as required under Section G of these Rules and Regulations. The Connection Fee/Impact Fee/Capital Recovery Fee and other fees shall be quoted in writing to the applicant. The Connection Fee/Impact Fee/Capital Recovery Fee is non-refundable unless the following circumstances exist: The customer will have one year from the date of the application to pay to install the meter. At the end of the year, the customer must pay to have the meter installed. If the customer fails to pay, CCSUD will refund the Deposit and Impact Fee/Capital Recovery Fee less any balance owed on the account and close the account. The customer will immediately forfeit their claim to water capacity.

An applicant must pay all fees as a condition to consideration for service. Upon initiation of account (Service Application completed and Connection Fee/Impact Fee/Capital Recovery Fee and Deposit both paid), the customer will begin receiving a monthly bill for all applicable fees. Services applications will not be accepted without payment from the customer.

(B) Re-Service. On property where service previously existed, the District may charge a deposit and all fees applicable to restoration of service. In addition, the District may charge accumulated Reserved Service Fees which have been assessed to the inactive account on a monthly basis. This will allow the District to recover the costs of reserving capacity to the location for which re-service has been requested. If restoration of service is not requested, this fee will accumulate monthly until the total balance of the Reserved Service Fees equals the amount of the connection fee initially paid for new service to the property. After this time the service equipment may be removed by the District and any future request for service to the property shall be treated as an application for new service.

(C) Performance of Work. The District shall install all taps and equipment necessary to provide service within twenty (30) working days after approval and receipt of payment of all quoted fees and charges. This time may be extended for installation of facilities and equipment necessary to serve a request for non-standard service or due to weather or other emergencies. The District may not install a water meter, unlock a water meter or otherwise establish or re-establish water service to any property without the owner of such property or other person who has management or control of the subject property being physically present at the time that water service is established in order to inspect or observe the property for possible water leaks or water usage that, if left unattended, could cause water or other damage to the property.

(D) Customer Service Inspections. The District shall require a customer service inspection of an applicant's property and private water distribution facilities to insure compliance with state required Minimum Acceptable Operating Practices for Public Drinking Water Systems as promulgated by the Texas Commission on Environmental Quality or successor agency. [*see* Section B.8]. A Customer Service Inspection (CSI) Fee will be charged at the time of the inspection per Section G of these Rules and Regulations. (1) As a result of such an inspection, the District may require that a customer properly install a backflow prevention device, and inspect, and test the device, and provide all required documentation to the District, all at the customer's expense. [*see* 30 TAC § 290.46(j)]. (2) After the backflow prevention device has

been installed, the District must have documentation that a qualified person has inspected/tested the installation prior to activation of service. Thereafter the homeowner shall have annual inspections performed by a qualified person and provide a copy of the testing and recertification to the District. Should the homeowner fail to provide proof of testing and recertification after proper notice from the District, The District may schedule the testing and recertification by District personnel. The homeowner shall be billed, on their monthly water/wastewater bill, the Inspection Fee per Section G.

## 4. Activation of Non-Standard Service

(A) Activation of Non-Standard Service. Activation of non-standard service shall be conducted pursuant to Section F of these Rules and Regulations.

(B) Re-Service. The provisions applicable to standard re-service requests under the previous subsection 3(B) shall also apply to non-standard re-service requests.

## 5. Changes in Service Classification

If at any time the District determines that the service classification of a customer has changed from that originally applied for and that additional or different facilities are necessary to provide adequate service, the District shall require the customer to re-apply for service under the terms and conditions of these rules and Regulations. Customers failing to comply with this provision shall be subject to Disconnection with Notice under subsection 13(A) below.

## 6. Owners and Tenants

The owner of property designated to receive service according to the terms of these Rules and Regulations is responsible for all fees and charges due the District for service provided to such property. If an owner has an existing alternate billing agreement for rental accounts, the District may bill a tenant for service as a third party, but the owner remains fully responsible. No new alternate billing agreements will be allowed.

## 7. Refusal of Service

(A) The District may refuse to serve an applicant for the following reasons:

(1) Failure of an applicant to complete all required easement forms and pay all required fees and charges;

(2) Failure of an applicant to comply with the rules, regulations and policies of the District, including but not limited to the failure to pay amounts due the District for at another location in the District.

(3) Existence of a hazardous condition at the applicant's property which would jeopardize the welfare of other customers of the District upon connection;

(4) Failure of an applicant to provide representatives or employees of the District reasonable access to property, for which service has been requested;

(5) Failure of Applicant or Transferee to provide proof of ownership, to the

satisfaction of the District, of property for which the tap has been requested;

(6) Failure of an applicant to comply with all rules and regulations of the District which are in these Rules and Regulations on file with the state regulatory agency governing the service applied for by the applicant; or

(7) The District has determined that the applicant's service facilities are known to be inadequate or of such character that satisfactory service cannot be provided.

## 8. Applicant's Recourse

In the event the District refuses to serve an applicant under the provisions of this section, the District shall inform the applicant in writing of the basis of its refusal and that the applicant may file a written complaint pursuant to the District's grievance procedures. See Section 18 of this Section E.

## 9. Deferred Payment Agreement

The District may enter into a Deferred Payment Agreement, not to exceed a term of six (6) months. **These payment arrangements must be set up prior to 5PM on the due date (10th) for the month when the payment is due. These payment arrangements may be made for water consumption only.** The customer must pay the base rate and applicable fees prior to a Deferred Payment Agreement being initiated. There will be a $10 per month administrative fee for each month the arrangement exists. There is no penalty for paying the arrangement off early. All Deferred Payment Agreement payments and the current bill must be paid before 5PM on the due date (10th monthly) or the agreement will be considered broken and all applicable amounts will be due or the customer will be subject to disconnect immediately.

## 10. Charge Distribution and Payment Application

(A) Base Rate. The applicable Base Rate shall be charged for the billing period from the first day of the billing cycle to the last day of the billing cycle. Charges may be prorated for meter installations and service terminations falling during the billing period. Billings for this amount shall be mailed on or about the twenty-eighth (28th) day of the month preceding the month for which this charge is due. All active service connections shall be subject to this charge whether or not there is use of service.

(B) Gallonage Charge. A Gallonage Charge shall be billed at the rate specified in Section G and shall be calculated to the gallon. Charges for water and wastewater usage are based on monthly meter readings and are calculated from reading date to reading date. The District shall take all meter readings used in calculating billing.

(C) Posting of Payments. All payments shall be posted against previous balances prior to posting against current billings.

## 11. Due Dates, Delinquent Bills, and Service Disconnection Date

(A) Billing Cycle. The District shall mail all bills and/or send ebill notifications on or about the twenty-eighth (28th) day of the month. All bills shall be due and payable upon receipt and are past due after 5:00 pm on the 10th day of the month or the next business day after a weekend or District Holiday, after which time a penalty shall be applied pursuant to Section G. Payment for utility service is delinquent if the full payment, including the late fees and regulatory assessments, is not received by 5:00 pm on the due date regardless of the payment method. Payment made using the District's online service or phone payment (IVR) must post by 5:00 pm on due date in order to be considered paid by due date. If the twenty-eighth falls on a weekend or holiday, bills shall be mailed by the immediately preceding workday. If the tenth falls on a weekend or holiday, the due date shall be the next day the District office is open for business after said weekend or holiday.

(B) Delinquent Billing Cycle. Delinquent notices shall be mailed after the payment due date (10th of each month) allowing approximately ten (10) additional days for payment prior to disconnection. The disconnect date shall generally be during the fourth week of the month. A schedule of all disconnection dates will be posted on the District's website, at the administrative offices and on at least one billing statement. A non-payment fee shall be applied and service shall be subject to disconnection if payment is not received at the District office before **7:00 a.m. CST** on the day of disconnect indicated on the delinquent bill. Payments made regardless of payment method must post before **7:00 a.m. CST** on the day of disconnect to avoid disconnect and non-payment fee.

## 12. Rules for Disconnection of Service

The following describes the rules and conditions for disconnection of service. For the purpose of disconnecting wastewater service under these policies, water service will be terminated in lieu of disconnecting wastewater service. In instances of non-payment of wastewater service charges or other wastewater service violations by a customer that does not receive water service from the District, the District has the option to disconnect the wastewater tap or take other appropriate actions as determined by the District.

(A) Disconnection with Notice. Water service may be disconnected after proper notice for any of the following reasons:

(1) Failure to pay a delinquent account for utility service provided by the District, failure to timely provide a deposit, or failure to comply with the terms of a Deferred Payment Agreement;

(2) Violation of the District's rules pertaining to the use of service in a manner which interferes with the service of others;

(3) The operation of non-standard equipment, if a reasonable attempt has been made to notify the customer and the customer is provided with a reasonable opportunity to remedy the situation;

(4) Failure to comply with the terms of a service agreement, Non-Standard Service Contract or these rules and Regulations;

(5) Failure to provide District personnel or designated representatives access to a meter or to property at which water service is received for purposes of inspecting and verifying the existence of potential hazardous conditions or policy violations;

(6) Any misrepresentation of fact by an applicant or customer on any form, document or agreement required by the District;

(7) Or failure to re-apply for service upon notification by the District that customer no longer meets the service classification originally applied for under the original service application.

(B) Disconnection Without Notice. Water service may be disconnected without prior notice for the following reasons:

(1) Where a known dangerous or hazardous condition exists for which service may remain disconnected for as long as the condition exists, including but not limited to a violation of Chapter 341 of the Health and Safety Code and regulations adopted pursuant thereto, or where the District has reason to believe a dangerous or hazardous condition exists and the customer refuses to allow access for the purpose of confirming the existence of such condition and/or removing the dangerous or hazardous condition [*see* Sections E.3(d), E.22; 30 TAC § 290.46 (j)];

(2) Where service is connected without authority by a person who has not made application for service;

(3) Where service has been reconnected without authority following termination of service for nonpayment; or

(4) In instances of tampering with the District's meter or equipment, by-passing the meter or equipment, or other diversion of service.

(5) A threat to perform or actual performance of: (a) bodily injury to any District employee, agent or representative or (b) damage to any District property. The display of any firearm or other weapon in a confrontational, menacing or threatening manner shall be deemed to be a threat to perform bodily injury regardless of the condition of said firearm or weapon.

Service shall be discontinued without further notice when installations of new facilities or repair of existing facilities are found to be in violation of this regulation until such time as the violation is corrected.

(C) Disconnection Prohibited. Utility service may not be disconnected for any of the following reasons:

(1) Failure to pay for merchandise or charges for non-utility service provided by the District, unless there is an agreement whereby the customer guaranteed payment of non-utility service as a condition of service or the District has a contract with another governmental unit to collect for services rendered to the customer by such other government unit such as water, wastewater, or solid waste services, etc.;

(2) Failure to pay for a different type or class of utility service unless a fee for such service is included in the same bill;

(3) Failure to pay charges arising from an under billing due to any misapplication of rates more than six (6) months prior to the current billing;

(4) Failure to pay the account of another customer as guarantor thereof, unless the District has in writing the guarantee as condition precedent to service;

(5) Failure of the customer to pay charges arising from an under billing due to any faulty metering, unless the meter has been tampered with or unless such under billing charges are due under subsection 20 below (Inoperative Meters);

(6) Failure of the customer to pay estimated bill other than a bill rendered pursuant to an approved meter reading plan, unless the District is unable to read the meter due to circumstances beyond its control; or

(7) In response to a request for disconnection by an owner of rental property where the tenant is billed directly by the District as authorized by the owner, and the renter's account is not scheduled for disconnection under the rules for disconnection of service in these rules and Regulations.

(D) Disconnection on Holidays and Weekends. Unless a dangerous condition exists or the customer requests disconnection, service shall not be disconnected on a day, or on a day preceding a day, when District personnel are not available to the public for the purpose of making collections and reconnecting service.

(E) Disconnection Due to Utility Abandonment. The District may not abandon a customer or a certificated service area without written notice to its customers and all similar neighboring utilities, and obtained approval from the TCEQ. However, any customer whose service has been cut for failure to pay a delinquent account for utility service for 30 days or more will be considered to have permanently surrendered that meter. The meter will be pulled, the deposit applied and the account closed. Any outstanding balances will go to collections. CCSUD may engage a third party collector to pursue outstanding balances and credit reporting as applicable. Any attempt to reestablish the account will start over with an application and payment of all fees and charges required of a new customer, including impact fees if none were paid for the previous meter. If the prior owner is the applicant, all past fees, penalties and charges must be made current.

(F) Disconnection Due to Illness or Disability. The District may not discontinue service to a delinquent residential customer permanently residing in an individually metered dwelling unit

when that customer establishes that discontinuance of service will result in some person at that residence becoming seriously ill or more seriously ill if service is discontinued. To avoid disconnection under these circumstances and waiver of the late fee, the customer must provide an original written statement from a treating physician to the District the day prior to the due date (10th of the month). Service may be disconnected in accordance with subsection 12 (a&b) of section E if the next month's bill and the past due bill are not paid by the due date of the next month's bill, unless the customer enters into a Deferred Payment Agreement with the District.

(G) Disconnection of Master-Metered Accounts. When a bill for service to a master-metered account customer is delinquent, the following shall apply:

(1) The District shall send a notice to the customer as required. This notice shall also inform the customer that notice of possible disconnection will be provided to the customer's tenants or occupants of the master metered property in five (5) days if payment is not rendered before that time.

(2) At least five (5) days after providing notice to the customer, and at least five (5) days prior to disconnection, the District shall post notices stating "Termination Notice" in public areas of the master-meter property to notify tenants or occupants of the scheduled date for disconnection of service. The tenants or occupants may pay the District for any delinquent bill on behalf of the customer/account to avert disconnection or to reconnect service to the master-meter property.

(H) Disconnection of Temporary Service. When an applicant with temporary service fails to comply with the conditions stated in the service agreement or provisions of these rules and Regulations, the District may terminate temporary service with notice.

(I) Payment During Disconnection. The District is not allowed to accept payment of a bill when a District employee or designated representative is at the customer's property for the purpose of disconnecting service. Employees in the field are not allowed to collect.

## 13. NSF/Return Payment/Check Policy

Crystal Clear Special Utility District (CCSUD) does not accepted post-dated checks. Payment by check and/or bank draft which has been rejected for insufficient funds, closed account, or for which a stop payment order has been issued is not deemed to be payment to the District. The District shall call number or send an email to the contact information on file in an attempt to resolve the matter. The District may also mail, via the U.S. Postal Service, notice that the returned instrument must be redeemed and an additional returned check fee paid at the District office within ten (10) days of the date of the notice or the District shall file charges with the County District Attorney. Redemption of the returned instrument and payment of the returned check fee shall be made by credit card, cash, money order, or certified check. Failure to meet these terms shall result in disconnection of service. A customer shall be considered a bad credit risk for having an instrument returned as insufficient or non-negotiable for any reason for any two billing periods within a 12-month period, and shall be placed on a "cash-only" basis for a 12-month period during

which the District will only accept payment by means of a credit card, certified check, money order or cash.

In the event that a payment by check which has been rejected for insufficient funds, closed account, or for which a stop payment order has been issued was presented to avoid disconnection or to reconnect a disconnected account, the water service shall be disconnected unless the customer can be contacted and the matter resolved within one business day.

## 14. Billing Cycle Changes

The District reserves the right to change its billing cycles if the workload requires such practice. After a billing period has been changed, bills shall be sent on the new change date unless otherwise determined by the District.

## 15. Back-Billing

If a customer was undercharged, the District may back bill the customer for the amount which was under billed. The back billing shall not exceed six (6) months unless such undercharge was the result of meter tampering, bypass, or diversion of service by the customer as defined in subsections 22 and 23 below. If the under billing is $25 or more, the District shall offer to enter into a Deferred Payment Agreement with such customer for the same length of time as that of the under billing. In cases of meter tampering, bypass, or diversion of service, the District may, but is not required to, offer a customer a deferred payment plan.

## 16. Disputed Bills

In the event of a dispute between a customer and the District regarding any monthly bill, the dispute shall be resolved or disposed of in accordance with the Grievance Procedures set forth in the following Subsection 18, except as follows:

(A) Notice of the bill dispute must be submitted to the District, in writing, and a payment equal to the customer's average monthly usage at current rates must be received by the District prior to the due date posted on the disputed bill.

(B) The customer shall not be required to pay the disputed portion of a bill which exceeds the amount of that customer's average monthly usage at current rates pending the completion of the determination of the dispute. For purposes of this subsection, the customer's average monthly usage shall be the average of the customer's usage for the preceding 12-month period. Where no previous usage history exists, consumption for calculating the average monthly usage shall be estimated on the basis of usage levels of similar customers under similar conditions.

(C) Notwithstanding any other section of these Rules and Regulations, a utility customer's service shall not be subject to discontinuance for nonpayment of that portion of a bill under dispute pending the completion of the determination of the dispute. The customer is obligated to pay any billings not disputed as established in subsection 13 of these rules and Regulations (relating to Disconnection of Service).

## 17. Grievance Procedures

The District's standard policy for any and all claims filed is that the District is a political subdivision of the State of Texas and as such enjoys immunity from suit and liability for alleged claims; the District does not intend to waive its immunity protections beyond and waiver pursuant to the Texas Tort Claims Act. In addition to the procedure provided in sections 101.101-101.107 of the Texas Civil Practice and Remedies Code, any aggrieved party will have an opportunity to voice concerns or grievances to the District by the following means and procedures:

(A) The aggrieved party must first submit written notice to the General Manager or authorized staff member stating the concern or grievance and the desired result. The General Manager shall investigate the matter and provide a response to the aggrieved party within fourteen (14) days after receipt the written notice of grievance.

(B) If the General Manager does not resolve the grievance to the satisfaction of the aggrieved party, the party may appeal the General Manager's decision, in writing, to the President of the Board of Directors for disposition. The written notice of appeal must be submitted to the District within seven (7) days after the date of the General Manager's written response to the notice of grievance.

(C) Upon receipt of an appeal, the President of the Board of Directors shall review the request and determine the best means by which the grievance shall be resolved. The President may direct that a grievance be heard by the Board of Directors for final disposition, or initially by District staff appointed by the President and serving in an advisory capacity to the Board of Directors. The President shall also determine a reasonable time and place for the grievance to be heard by the Board of Directors, but such hearing shall take place within sixty (60) days of the date that the President received the written notice of appeal. Final disposition by the Board of Directors shall be reported to the aggrieved party in writing.

(D) If under this subsection an aggrieved party contests a charge or fee as sole or partial basis of a grievance, the contested charge or fee shall be suspended until such time as the grievance is satisfactorily resolved by the General Manager, the deadline for delivering an appeal to the President of the Board of Directors has passed, or the Board of Directors has rendered its final disposition of the dispute. This provision does not apply to disputed monthly bills pursuant to subsection 17 above.

## 18. Inoperative Meters

Water meters found inoperative will be repaired or replaced by the District within a reasonable time. If a meter is found not to register for any period, unless by-passed or tampered

with, the District shall make a charge for units used, but not metered, for a period not to exceed three (3) months, based on amounts used under similar conditions during the period preceding or subsequent thereto, or during corresponding periods in previous years.

## 19. Bill Adjustment Due To Meter Error

The District shall test any customer's meter upon written request of the customer. In the event the meter tests within the accuracy standards of The American Water Works Association, a meter test fee as prescribed in Section G of this Order shall be imposed. In the event the test results indicate that the meter is faulty or inaccurate (has over charged the customer), the test fee shall be waived, the meter shall be calibrated or replaced, and a billing adjustment may be made as far back as six (6) months. The billing adjustment shall be made to the degree of the meter's inaccuracy as determined by the test. The customer must complete and sign a Meter Test Authorization and Test Report prior to the test. [see Appendix A, Form A-08].

## 20. Leak Adjustment Policy

In the event that the amount of a customer's monthly bill is higher than normal due to leakage, the customer may submit a written leak adjustment request to the District to be billed for water used at the posted per thousand rates. The District may choose to bill for leakage at an adjusted rate. The District may grant an adjustment if each of the following apply:

(A) The amount of excess water usage reflected in the contested bill must be at least two (2) times the average monthly usage for that customer;

(B) The customer must submit documentary evidence that the leak has been repaired, such as a statement from a plumber and/or receipt(s) for parts purchased to repair the leak; and

(C) The customer has not requested a leak adjustment during the previous twelve (12) months regardless of the number of meters serving the customer's property or properties.

## 21. Meter Tampering and Diversion of Service

All meters connected to the District's water system are the sole property of the District and shall be provided, owned, installed and maintained by the District. Meter tampering, bypassing a meter or service equipment, and diversion of service are prohibited. Meter tampering, bypass, or diversion shall be defined as tampering with the a meter or service equipment causing damage or unnecessary expense to the District, bypassing a meter or service equipment, or other instances of diversion of service, such as:

(A) Installing a meter or service equipment without authorization from the District;

(B) Removing or altering locks or shut-off devices installed by the District to discontinue service;

(C) Removing, altering or physically disorienting a meter or service equipment; inserting or attaching objects to a meter or service equipment to bypass or divert service;

(D) Other electrical and/or mechanical means of tampering with, by-passing, or diverting service;

(E) Connecting or reconnecting service without District authorization; or connecting to the service line of an adjacent customer of the District.

In addition to any other penalties or remedies provided for in these Rules and Regulations or under Texas civil law, persons who tamper with meters or divert service and unauthorized users of District services may be prosecuted to the extent allowed by law under Texas Penal Code § 28.03 (Criminal Mischief) or § 31.04 (Theft of Service) as appropriate.

## 22. Damage to District Facilities

(A) Damage to Meter and Appurtenances. No person other than a duly authorized employee or agent of the District shall be permitted to tap or make any connection to the water distribution lines of the District's water system, except for emergency fire-fighting purposes, or make any repairs or additions to or alterations in any meter, meter box, tap, pipe, cock or other fixture connected with the water system, or any manhole, main, trunk or appurtenance of the District's wastewater system. The District reserves the right, immediately and without notice, to remove the meter or disconnect water service to any Customer whose meter has been tampered with and to assess an equipment damage fee to the Customer under Section G of these rules and Regulations.

(B) Right to Repair. The District reserves the right to repair any damage to the water and wastewater systems without prior notice and to assess against any Customer causing the damage such penalties as is provided for by law and these rules and Regulations, in addition to those charges necessary to repair system damage.

## 23. Meter Relocation

The District shall permit the relocation of meters or services provided that:

(A) The relocation is limited to the requesting customer's existing property designated to receive service;

(B) A current easement for the proposed location has been granted to the District;

(C) Service capacity is available at the proposed location; and

(D) The customer pays a Meter Relocation Fee and any additional costs that may be incurred by the District to relocate the meter. [*see* Section G]. In order to improve the operations of the District, the District may relocate a meter at any time at no cost to the customer.

## 24. Prohibition of Multiple Connections to a Single Tap

No more than one (1) residential, commercial or industrial service connection is allowed per meter per Texas Administrative Code (30 TAC) [291.44(d)(4)]. The District may require the owner of an apartment building, mobile home/RV park or other commercial account to apply for a single meter as a "Master Metered Account" pursuant to Section E.2(C)(3) of these Rules and

Regulations. Any unauthorized sub metering or diversion of service shall be considered a "multiple connection" and subject to disconnection of service. If the District has sufficient reason to believe a multiple connection exists, the District shall discontinue service under the Disconnection with Notice provisions in subsection 14(a) above.

## 25. Customer Responsibilities

(A) District Access to Meters. Customers shall allow District employees and designated representatives access to meters for the purpose of reading, testing, installing, maintaining and removing meters and using utility cutoff valves. If access to a meter is hindered so that the District is prevented from the reading of the meter, an estimated bill shall be rendered to the customer for the month and a notice of the hindrance shall be sent to the customer. If access is denied for three (3) consecutive months after notice to the customer, then service shall be discontinued and the meter removed with no further notice. [*see* Section E.3 (d)].

(B) Compliance with On-Site Service and Plumbing Requirements for Water. Customers shall be responsible for complying with all District, local, state and federal codes, requirements and regulations concerning on-site service and plumbing facilities.

(1) All connections shall be designed to ensure against back-flow or siphonage into the District's water system. In particular, livestock water troughs shall be plumbed above the top of the trough with an air space between the discharge and the water level in the trough. [30 TAC § 290.46].

(2) The use of pipe and pipe fittings that contain more than 0.25% lead or solder and flux that contain more than 0.2% lead is prohibited for any plumbing installation or repair of any residential or non-residential facility providing water for human consumption and connected to the District's facilities. Customer service pipelines shall be installed by the applicant. [30 TAC § 290.46].

(C) Compliance with On-Site Service and Plumbing Requirements for Wastewater. Each Development has its own unique design, engineering needs and requirements. Therefore, the Requirements for Compliance with the Specific Development's On-Site Service and Plumbing are contained in Exhibit B of these Rules and Regulations.

(D) Payment on Multiple Accounts. A customer owning more than one service connection shall keep all payments current on all accounts. Failure to maintain current status on all accounts shall be enforceable as per the Service Application and Agreement executed by the customer.

(E) Extent of District Ownership and Maintenance. The District's ownership and maintenance responsibility of water distribution and metering equipment shall end at a customer's meter nipple. Therefore, all water usage registering upon and/or damages occurring to the metering equipment owned and maintained by the District shall be subject to charges pursuant to these rules and Regulations.

(F) Cut-off Valve Requirement. The District shall require each customer to have a cut-off valve on the customer's side of the meter for purposes of isolating the customer's service

pipeline and plumbing facilities from the District's water pressure. The valve shall meet AWWA standards (a ball valve is preferred). The customer's use of the District's curb stop or other similar valve for such purposes is prohibited. A customer shall be subject to charges for any damage to the District's meter or other service equipment. A cut-off valve may be installed as a part of the original meter installation by the District.

## 26. Prohibited Plumbing Practices

(A) No direct connection between the public drinking water supply and a potential source of contamination is permitted. Potential sources of contamination will be isolated from the public water system by an air gap or an appropriate backflow prevention device.

(B) No cross-connection between the water supply and a private water system is permitted. These potential threats to the public drinking water supply must be eliminated at the service connection by the installation of an air-gap or a reduced pressure-zone backflow prevention device.

(C) No connection which allows water to be returned to the public drinking water supply is permitted.

(D) No pipe or pipe fitting which contains more than two-tenths of one percent (0.02%) lead may be used for the installation or repair of plumbing at any connection which provides water for human use.

(E) No solder of flux which contains more than two-tenths of one percent (0.02%) lead can be used for the installation or repair of plumbing at any connection which provides water for human use.

(F) District added latest version of unified plumbing code or locality rules.

## 27. Excluded Flow and Waste

(A) No waste material, which is not biologically degradable, will be permitted to be discharged into the district's facilities, including mud and debris accumulated during service line installation.

(B) No industrial wastes other than domestic sewage shall be discharged into the District's wastewater system unless approved in writing by the Board of Directors. No toxic wastes, backwash wastes from water softener(s), wastes which would damage the collection and treatment facilities or wastes which would interfere with the waste treatment process shall be discharged into the District's wastewater system.

(C) Industrial wastes shall not be discharged into the District's wastewater system. No cooling water shall be discharged into the District's wastewater system.

(D) No downspouts, yard or street drains, or gutters will be permitted to be connected into the District's wastewater system.

(E) No ground water drains, water softener drains, foundation drains, or other subsurface drains shall be connected in the District's wastewater system.

(F) No effluent drains from existing and/or abandoned septic tanks or field lines will be permitted to remain in service.

## 28. Water Service Connections

(A) Applications for water service connections shall be filed with the District on approved forms. Applicants shall meet all District requirements for service, including the grant of any necessary water and wastewater easements (as determined by the District) and the installation of a cut-off valve at the expense of the service applicant.

(B) No person, other than District employees or designated representatives, shall be permitted to tap or make any connection with the mains or service lines of the District's water system, or make any repairs or additions to or alterations in any tap, pipe, cock or other fixture connected to a water service line.

(C) A customer must allow his or her property to be inspected for possible cross-connections and other undesirable plumbing practices. These inspections will be conducted by the District prior to initiating service and may be conducted periodically thereafter. All inspections will be conducted during the District's normal business hours. The customer must, at the customer's expense, properly install a backflow prevention device as required by the District.

(D) All costs to extend or oversize District water mains or service lines to serve any residential or commercial user or any undeveloped area within the District shall be the sole responsibility of the property owner and/or developer requesting service.

## 29. Standards for Water Service Lines

The following standards govern the installation of customer service lines for water service to residences or commercial buildings within the District:

(A) All new residential or commercial connections to the District's water system shall be made in accordance with previous subsection 29 and the Rules and Regulations for Public Water Systems issued by the TCEQ as set forth in Subchapter D, Chapter 290, Title 30 of the Texas Administrative Code. In the event of a conflict between the provisions of subsection 29 and the TCEQ's Rules and Regulations for Public Water Systems, the more stringent shall apply.

(B) Water service lines shall be of Type "K" copper or polyvinyl chloride PVC DR 18 as approved by the District. Fittings used with Type "K" copper service lines shall be of the flared or compression type. Fittings used with PVC service lines shall be in accordance with the pipe manufacturer's specifications.

(C) Separation distances between water and wastewater service lines shall be in accordance with 30 TAC §290.44(e).

(D) Installation of water and wastewater service lines in a "shared' trench is prohibited.

(E) A minimum of four feet (4') of Type "K" soft copper pipe shall be installed at the end of the water service line at the connection to the water meter.

(F) Water service lines shall be bedded with a minimum of 6" of well graded crushed stone or pea gravel below the pipe. The trench bottom and walls shall be cleared of all protruding rocks which could damage the pipe before the crushed stone bedding is placed.

(G) A District-owned water meter and a District-approved meter box shall be installed by the District or its designated representative.

(H) Potable water supply piping, water discharge outlets, backflow prevention devices, or similar equipment shall not be located so as to make possible the submergence of such equipment in any contaminated or polluted substance.

(I) Lawn sprinkling systems shall be equipped with an approved vacuum breaker or backflow prevention device installed in the discharge side of each of the last valves. The vacuum breaker shall be installed at least six inches (6") above the surrounding ground and above a sufficient number of heads so at no time will the vacuum breaker be subjected to back pressure or drainage.

(J) The District's water system shall be protected from swimming pool makeup water by means of an approved backflow prevention device or an adequate air gap.

(K) Upon the installation of a service line, a request for inspection shall be made to the District's office, and the line shall not be back-filled or placed into service until the District has inspected and approved of the installation. The District shall perform the inspection within forty-eight (48) hours of receiving the request.

(L) Back filling of service line trenches must be accomplished within twenty-four (24) hours of inspection and approval, and no debris will be permitted in any service line trench.

## 30. Wastewater Service Connections

(A) Applications for wastewater service connections shall be filed with the District on approved forms. All applicants for wastewater service shall grant an easement to the District which shall own and maintain the "on property" wastewater facilities as shown in Appendix "A" and associated discharge piping from the Septic Tank Effluent Pump (STEP) station to the wastewater low pressure force main or service line. The property owner or Developer shall be required to construct the customer service line from the foundation of the residence or commercial building to the STEP station "on property" wastewater facilities.

(B) The Property Owner or Developer shall construct all wastewater service facilities from the "on property" STEP station of a residence or commercial building to the District's wastewater service line, which installation shall include the all necessary equipment necessary to properly collect, treat, and discharge the wastewater stream received from the property.

(C) The applicant shall grant an easement to the District and such access to the property designated to receive service as may be reasonably necessary for the District to maintain the

“on property” STEP station and low pressure wastewater connection to the force main to serve the residential or commercial building thereon. The District shall designate the locations of the “on property” wastewater facilities on the property.

(D) The District may remove all grass, bushes, shrubs, soil and other fixtures necessary to maintain the “on property” wastewater facilities. The District shall have no obligation to repair, replace or replant any grass, bushes, shrubs, soil or fixtures removed or damaged during maintenance of the “on property” wastewater facilities.

(E) The District shall inspect all physical connections of a residence or commercial building to the District’s wastewater system prior to release for service. Pursuant to these Rules and Regulations, a property owner or developer requesting service shall be responsible for payment of the following fees and charges relative to the connection of wastewater lines:

(1) all costs for the acquisition and/or installation of the “on property” wastewater facilities located at each property to the District’s main wastewater line, located within an easement granted by the property owner to the District, including but not limited to wastewater pumps, tanks, fittings, valves, piping and electrical service;

(2) the monthly electrical service costs to provide electrical service to the “on property” wastewater facilities, said electrical costs are included in the monthly Operations and Maintenance Base Rate per Section G; and

(3) a tap inspection fee per Section G for connection of the “on property” wastewater facilities to the District’s main wastewater line, which inspection shall be made solely by the District or the District’s designated representative.

(G) “On property” wastewater facilities shall be placed within fifty feet (50’) of the foundation of the residence or commercial building to be served. The District shall make a reasonable attempt to consult with each property owner about locations for the “on property” wastewater facilities; however, the final location of the “on property” wastewater facilities shall be made solely by the District in consultation with the property owner or Developer, based on the practical limitations of construction.

(H) All costs to extend or oversize District wastewater mains or service lines to serve any residential or commercial user or any undeveloped area within the District shall be the sole responsibility of the property owner and/or developer requesting service. From and after June 23, 2015, all new customers of the District shall connect to wastewater facilities that are available within three hundred feet (300’) of the property of any new customer. In addition, such new customer is prohibited from the installation of private on-site wastewater holding or treatment facilities.

(I) From and after June 23, 2015 all new developments within the District’s service area shall be required to connect to the District’s wastewater collection system, when feasible and appropriate. Providing water service to any new subdivision or development by the District without requiring wastewater collection facilities to be constructed therein shall be considered an

exception, requiring compelling evidence that the public health and environment will be protected for the long term.

(J) A property owner that has already installed an on-site wastewater holding or treatment facility on land within the District's service area is required to connect to the District's wastewater collection system when the District's wastewater collection system is contiguous or adjacent to the property owner's property line. Costs for any and all modifications or changes to the existing on-site wastewater holding or treatment system to accommodate the District's wastewater treatment facility shall be the responsibility of the property owner or Developer.

## 31. Standards for Wastewater Service Lines

(A) All new residential or commercial connections to the District's wastewater system shall be made in accordance with previous subsection 31 and the Rules and Regulations for Public Water Systems issued by the TCEQ as set forth in Subchapter D, Chapter 217, Title 30 of the Texas Administrative Code. In the event of a conflict between the provisions of subsection 31 and the TCEQ's Rules and Regulations for Public Water Systems, the more stringent shall apply.

## 32. Standards Details for Service Facilities

All water and wastewater service facilities shall be constructed in accordance with the Water Standard Details and Wastewater Standard Details attached to these rules and Regulations in Appendix C and incorporated herein by reference. In the event of a conflict between these standard details and any other provision of these rules and Regulations, the standard details shall apply. In the instance that a standard detail is required for a portion of the installation of a water or wastewater service facility, the District or District's authorized representative shall be notified and such standard detail shall be provided.

## 33. Penalties and Enforcement

(A) Penalties. Any person violating any provision of this Section E, as amended, may be subject to a fine of $500.00 or more for each violation. Each day that a violation of this Section E is permitted to exist shall constitute a separate violation. A penalty under this section is in addition to any other penalty or remedy provided by the laws of the State of Texas or these rules and Regulations [Texas Water Code § 49.004(a) and Texas Gov't Code § 27.03)a)(1)].

(B) Liability for Costs. Any person violating any provision of this Section E shall become liable to the District for any expense, loss or damage occasioned by the District by reason of such violation and the District's enforcement thereof. If the District prevails in any suit to enforce these rules and regulations, it may, in the same action, recover any reasonable fees for attorneys, expert witnesses, and other costs incurred by the District before the court.

(C) No Waiver. The failure on the part of the District to enforce any section, clause, sentence, or provision of these rules and Regulations shall not constitute a waiver of the right of the District later to enforce any section, clause, sentence, or provision of these rules and Regulations.

# SECTION F: DEVELOPER, SUBDIVISION AND NON-STANDARD SERVICE REQUIREMENTS

## 1. District Limitations

All applicants shall recognize that the District must comply with state and federal laws and regulations as promulgated from time-to-time, and with covenants of current indebtedness. The District is not required to extend retail utility service to any applicant requesting standard service to a lot or tract in a subdivision where the developer responsible for the subdivision has failed to comply with the requirements of the District's subdivision service extension policies and non-standard service requirements set forth in this section.

## 2. Purpose

It is the purpose of this section to define the process by which the specific terms and conditions for service to subdivisions and other kinds of non-standard service are determined, including the non-standard service applicant's and the District's respective costs. For purposes of this section, the term "applicant" shall refer to a developer or person that desires to secure non-standard service from the District. The applicant must be the same person or entity that is authorized to enter into a contract with the District setting forth the terms and conditions pursuant to which non-standard service will be furnished to the property. In most cases, the applicant will be the owner of the property for which non-standard service is sought. An applicant other than the property owner must furnish evidence to the District that the applicant has authority to request non-standard service on behalf the owner, or that it otherwise has authority to request non-standard service for the property.

## 3. Application of Rules

This section is applicable to subdivisions, additions to subdivisions, commercial, industrial and governmental developments, and any situation where additional service facilities are required to serve a single tract of property. Examples of non-standard service to a single tract of land include, without limitation, service requests that require road bores, extensions to the District's distribution system, service lines exceeding two inches (2") internal diameter in size, service lines exceeding twenty feet (20') in length, or which require a meter larger than " 5/8 x 3/4" for service. Most nonresidential service applications will be considered non-standard by the District at its sole discretion. For purposes of these Rules and Regulations, applications subject to this section shall be defined as "non-standard." This section may be altered or suspended for facility expansions constructed by the District at its expense. The District's General Manager shall interpret, on an individual basis, whether or not an applicant's service request shall be subject to all or part of the conditions of this section. For purposes of this section the term "project" includes subdivisions, additions to subdivisions, and commercial, industrial and governmental developments.

This section sets forth the general terms and conditions pursuant to which the District will process non-standard service requests. The specific terms and conditions pursuant to which the District will provide non-standard service in response to any request will depend upon the nature of such request and may be set forth in a contractual agreement to be entered between the District and applicant. Unless specifically approved by the District's Board of Directors, a

non-standard service contract may not contain any terms or conditions that conflict with these Rules and Regulations.

## 4. Non-Standard Service Application Process

(A) Project Packet. The Applicant contacts the District to receive planning requirements for water and/or wastewater service and general information about the District's service capability. The Applicant will receive a copy of the District's Rules and Regulations, non-standard service application form and a form contract for non-standard service [see Appendix B, Form B-04].

(B) Application Submission and Fees. The Applicant submits three (3) copies of its non-standard Service Application with all supporting documentation and data (plats, engineering studies etc.) to the District office for initial review. At this time, the Applicant may be required to pay to the District the District's non-refundable Service Investigation Fee of $3,000.00 for a project with up to 250 meter or meter equivalents, plus $10.00 for each additional meter or meter equivalent to complete build-out of the project. [NOTE: After the District has been paid the estimated fee for Engineering review, the District will transmit plat/plans to the District engineer for review.] In addition, a non-refundable fee of $1,500 may be required to be paid with each re-submittal of plans to correct deficiencies as identified by the District staff or engineers. All plans and re-submittals shall only be delivered to the District offices where the Applicant will receive a receipt for such plans or re-submittals. Under no circumstance shall the Applicant deliver plans directly to the District engineer. The District reserves the right to increase the review payment for non-typical applications requiring additional administrative, engineer or legal review.

(C) Staff Review. The District staff and the District engineers will review the nonstandard service application together with plans, schedules, data or other materials filed with the District supporting the application and provide feedback to the Applicant regarding service capability, development fees within Rules and Regulations, and any necessary changes in plans. The Applicant should expect at least 30 days for this process.

(D) Non-Standard Contract or ("NSC"). Following the completion of staff review, the District's Board of Directors may review and vote on approval of the NSC during a public meeting of the District Board of Directors. Construction of water and /or wastewater improvements shall not commence until the District approves the Applicant's NSC and all fees required to be paid pursuant to the NSC are paid to the District. The balance of all applicable fees shall be paid upon the District's inspection and approval of construction and prior to the District's acceptance of the improvements constructed by the Applicant and the installation of any water meters within the project.

(E) District Water Use Prohibition. Under no circumstances shall the District provide any water to the project for construction, testing, or other purposes until the District has approved a NSC for the project, and the Applicant has paid all fees and costs then due and payable pursuant to these rules and Regulations and the NSC.

## 5. Facilities Design

Design Requirements. Upon receipt of a completed Non-Standard Service Application and Service Investigation Fee, the District shall study the design requirements of the applicant's required facilities before preparing a Non-Standard Service Contract in accordance with the following:

(A) The District's consulting engineer may design, or review and approve, plats and plans for all on-site and off-site service facilities for the applicant's requested service in accordance with the District's specifications and any applicable municipal or other governmental codes and specifications. The consulting engineer shall notify the applicant in writing of any necessary changes to applicant's proposed plats and/or plans. Allow a minimum of thirty (30) days for the review process.

(B) The Applicant's consulting engineer shall ensure that all facilities to be constructed by the Applicant meet the demands for service as requested by the Applicant. The District reserves the right to upgrade and/or oversize the planned service facilities to meet future customer demands on condition that the Applicant shall be reimbursed the additional expense of such upgrading and/or over sizing in excess of the Applicant's facility requirements by payment by the District of the actual construction cost of the upgrade, the allowance of credits against connection fees payable by the Applicant equal to the actual construction cost of the upgrade or providing for prorated payments to the Applicant by future Applicants who utilize such upgrades. The method of reimbursement is in the sole discretion of the District.

(C) Water and wastewater line size and location will be determined by the District, whose determination is final.

(D) All potable water distribution systems including pump stations, mains and both ground and elevated storage tanks, shall be designed, installed and constructed in accordance with applicable regulatory agency standards and current American Water Works Association (AWWA) standards with reference to materials to be used and construction procedures to be followed. In the absence of AWWA standards, commission review may be based upon standards of the American Society for Testing and Materials (ASTM), commercial and other recognized standards utilized by licensed professional engineers.

(E) All newly installed pipes and related products must conform to the American National Standards Institute/National Sanitation Foundations (ANSI/NSF) Standard 61 and must be certified by an organization by the ANSI.

(F) All plastic pipe for use in public water systems must also bear the National Sanitation Foundation Seal of Approval (NSF-pw) and have an ASTM design pressure rating of at least 150 pounds per square inch (psi) or a standard dimension ratio of 18 or less.

(G) Any water line extensions constructed by an Applicant shall be constructed completely across (property line to property line) the side of the subdivision or development which is contiguous and adjacent to the road or street on which the main entrance to the project is located.

(H) The water system shall be designed to afford effective circulation of water with a minimum of dead ends. All dead-end mains shall be provided with acceptable flush valves and discharge piping, and all temporary dead-ends should have flush valves. The District may permit dead ends when necessary as a stage in the growth of the water system, but they shall

be located and arranged to ultimately connect the ends to provide circulation. [30 TAC § 290.44(d)(6)].

## 6. Prepayment of Certain Fees Required

An applicant for non-standard service shall pre-pay certain fees in accordance with the following:

(A) On or before the date that a Non-Standard Service Contract is executed for the construction of service facilities required to provide service to the Applicant's project or a phase thereof, the Applicant shall deposit with the District a sum of money equal to the following: one-half (½) of the Connection Fee, required by Section G of these rules and Regulations, multiplied by the total number of meters or meter equivalents to be developed or located in the project or phase, as applicable. Payment of the foregoing sum is a mandatory prerequisite to the commencement of construction of the water and/or wastewater infrastructure of the project.

(B) Before the Applicant's project or a phase thereof is approved and accepted by the District, the applicant shall pay to the District the remaining fees due the District which have not been paid by the Applicant, including without limitation the remaining balance of the Connection Fees due under the previous subsection (a). This requirement is a mandatory prerequisite to the initiation of water and/or wastewater service to the project pursuant to a Non-Standard Service Contract.

(C) Subsequent purchasers of individual lots shall pay a meter installation fee and a deposit upon applying to the District for activation of service to individual lots.

## 7. Non-Standard Service Contract

Applicants requesting or requiring non-standard service shall be required to execute a written Non-Standard Service Contract prepared by the District's attorney. [*see* Appendix B, Form B-04]. The District shall prepare and deliver the Non-Standard Service Contract to the Applicant within a reasonable time period as determined by the complexity of the project. The Non-Standard Service Contract shall define the terms of service prior to construction of required service facilities for the project and may include, without limitation, provisions for the following:

(A) Payment of all costs associated with required administration, design, construction and inspection of facilities for water and/or wastewater service to the project;

(B) Procedures by which the applicant shall accept or deny a contractor's bid, thereby committing to continue or discontinue the project;

(C) Amount and payment of capital contributions required by the District in addition to other costs required under this section;

(D) Reservation of service capacity for the applicant and duration of reserved service with respect to the impact the applicant's service demand will have upon the District's system capability to meet other service requests;

(E) Terms by which the applicant shall indemnify the District from all third party claims or lawsuits arising from or related to the project;

(F) Terms by which the applicant shall dedicate all constructed service facilities to the District and by which the District shall assume operation and maintenance responsibility, including any enforcement of warranties related to construction of the service facilities;

(G) Terms by which the applicant shall grant title or easements to the District for right-of-ways, constructed service facilities, and service facility sites, and/or terms by which the applicant shall provide for the securing of required right-of-ways and sites;

(H) Terms by which the District shall review and approve any applicable Non-Standard Service Contract, Three-Way Contract or any other contract related to the project pursuant to current rules, regulations and policies of the District; and

(I) Terms by which the District shall administer the applicant's project with respect to:

(1) The design of the applicant's service facilities;

(2) Securing and qualifying bids;

(3) Execution of the contract;

(4) Selection of a qualified bidder for construction;

(5) Dispensing advanced funds for construction of facilities required for the applicant's service;

(6) Inspecting construction of facilities; and

(7) Testing facilities and closing the project.

The District and Applicant must execute a Non-Standard Service Contract before construction of service facilities for the project is commenced. In the event that the Applicant commences construction of any such facilities prior to execution of the contract, the District may refuse to provide service to the applicant (or require full costs of replacing/repairing any facilities constructed without prior execution of the contract from any person buying a lot or home from applicant), require that all facilities be uncovered by the applicant for inspection by the District, require that any facilities not approved by the District be replaced, or take any other lawful action determined appropriate by the Board of Directors.

## 8. Property and Easement Acquisition

With regard to construction of facilities, the District shall require private utility easements on private property as per the following conditions:

(A) If the District determines that easements or facility sites outside the Applicant's property are required, the Applicant shall use all due diligence to secure easements or facility sites in behalf of the District. All easements and property titles shall be researched, validated, and recorded by the District at the expense of the Applicant.

(B) All costs associated with facilities that must be installed in public right-of-ways on behalf of the Applicant, due to the inability of the applicant to secure private utility easements, shall be paid by the Applicant. The District reserves the right to secure utility easements or facility sites by eminent domain on its own initiative. The Applicant shall pay all costs, including legal and other professional fees and the condemnation award in the event the District determines that a public necessity exists to secure private utility easements or facility sites in order to provide service to the Applicant's project through eminent domain proceedings.

(C) The District shall require an exclusive dedicated utility easement on the applicant's property (as required by the size of the planned facilities and as determined by the District) and title to property required for other on-site facilities.

(D) Easements and facilities sites shall be prepared by the applicant for the construction of the District's pipeline and facility installations in accordance with the District's requirements and at the expense of the Applicant.

## 9. Contractor Selection and Qualification

(A) Selection.

Applicants shall choose one of the following methods for selection of a contractor to construct water or wastewater facilities required by the District to serve a project:

(1) The applicant may select a qualified contractor. The District reserves the right to reject any contractor selected by the applicant in accordance with the criteria set forth in the following subsection 9 (B); or

(2) The District's consulting engineer shall advertise for bids for the construction of the applicant's proposed facilities in accordance with generally accepted practices. The applicant shall provide the District with a sufficient number of plans and specifications, without charge, for prospective bidders. The District reserves the right to reject any bid or contractor, the District shall generally award the contract to the lowest and best bidder in accordance with the criteria set forth in the following subsection (B). After the applicant has executed the Non-Standard Service Contract, the applicant shall pay to the District all costs necessary for completion of the project's service facilities prior to construction and in accordance with the terms of the Non-Standard Service Contract.

(B) Qualification Criteria.

(1) The Applicant shall sign the Non-Standard Service Contract noting applicant's willingness to proceed with the project and shall pay all costs in advance of construction associated with the project.

(2) The contractor shall provide an adequate bid bond under terms acceptable to the District;

(3) The contractor shall secure adequate performance and payment bonding for the project under terms acceptable to the District;

(4) The contractor shall supply favorable references acceptable to the District;

(5) The contractor shall qualify with the District as competent to complete the work; and

(6) The contractor shall provide adequate certificates of insurance as required by the District.

## 10. Construction

(A) All road work shall be completed in accordance with applicable state, county and/or municipal standards prior to construction of project service facilities to avoid future problems resulting from road right-of-way excavation and completion. Subject to approval of the requisite authority, road sleeves may be installed prior to road construction to avoid road damage during construction of applicant's service facilities.

(B) The District shall, at the expense of the applicant, inspect the service facilities to ensure compliance with District standards. If the District determines that water or wastewater facilities are not being constructed in accordance with the plans and specifications approved by the District or the District's standards, then the District reserves the right to stop construction until the defective work has been corrected or replaced.

(C) Construction plans and specifications shall be strictly adhered to, but the District reserves the right to revise any specifications by change-order due to unforeseen circumstances during the design phase or to better facilitate construction and/or operation of the project service facilities. All change order amounts shall be charged to the applicant.

## 11. Dedication and Acceptance of Service Facilities

Upon proper completion and testing of an applicant's on-site and off-site service facilities, final inspection and approval thereof by the District, and applicant's payment to the District of all required fees and charges in connection therewith, the applicant shall dedicate the service facilities to the District by an appropriate legal instrument approved by the District's attorney, and the District shall accept the dedication. The District shall thereafter own the service facilities subject to applicant's maintenance bond in an amount of not less than twenty percent (20%) of the total construction cost of the service facilities and for a term of not less than two (2) years. The maintenance bond is subject to prior approval by the District's attorney.

## 12. Service within Subdivisions

The District's obligation to provide service to any customer located within a project governed by this Section F is limited to the service specified in the NSC. The Applicant is responsible for paying for all costs necessary to provide non-standard service to a project as determined by the District under the provisions of these rules and Regulations, and in particular, the provisions of this section and the NSC. Should the applicant fail to pay these costs, the District has the right to require payment of these costs by any one or more of the persons purchasing lots within such subdivision before the District is obligated to provide water or wastewater service to the subdivision. Applicant is required to notify respective buyers in writing of its failure to pay these costs. In addition, the District may elect to pursue any remedies provided by the Non-Standard Service Contract and the laws of Texas.

# SECTION G: RATES AND SERVICE FEES

**(UNLESS SPECIFICALLY DEFINED IN THESE RULES AND REGULATIONS, ALL FEES, RATES, AND CHARGES AS STATED SHALL BE NON-REFUNDABLE.)**

## 1. Classes of Users

(A) All users of the District's water and wastewater services shall be grouped into the following classes:

(1) Standard, which consists of Residential users located within the District or served by the District on an existing pipeline where pipeline or service facility extensions are not required and special design and/or engineering considerations are not necessary.

(2) Non-Standard, which consists of any Residential user whose service in not referenced in (1) above, and Developments, Commercial and Industrial users located within the District or served by the District and to which service to a non-residential structure is provided or existing standard users whose condition of service has caused their condition to be changed to Non-Standard per Section E.5.

(B) The intent of the billing is to assess water charges in such a manner that each class of users generally pays its share of debt service and operation and maintenance expenses for water service. The District may create additional classes of users in the future at its discretion.

(C) All classes of users may be grouped into sub-classes according to the meter size provided to their residence and/or commercial/Industrial establishment.

## 2. Service Investigation Fee

The District shall conduct a service investigation for each service application submitted to the District. An initial determination shall be made by the District as to whether the request is for standard or non-standard service. An investigation shall then be conducted by the District and the results reported under the following terms:

(A) Standard Service Requests. All standard service requests shall be investigated with a charge based on all applicable costs for providing service and shall be quoted in writing to the applicant within ten (10) working days of application. Applicant shall pay a fee which is dependent and determined by the depth of the study required as well as an administration fee due at time of submitting an application. Quote will contain investigation/Engineering fee and time to complete study.

(B) Non-Standard Service Requests. All non-standard service requests shall be investigated with a charge based on all applicable costs for providing service and shall be quoted in writing to the applicant within fifteen (15) working days of application. Applicant shall pay a fee of $50.00 administration fee at time of submitting application. Quote will contain investigation/Engineering fee and time to complete study.

(1) Providing cost estimates of the project;

(2) Presenting detailed plans and specifications as per final plat;

(3) Advertising and accepting bids for the project;

(4) Preparing a Non-Standard Service Contract between the District and applicant; and

(5) Providing other services as required by the District for such investigation.

The Service Investigation Fee is to cover the District' s expenses related to a service application, including but not limited to, District staff time and legal and engineering expenses. Any costs related to a non-standard service application that exceed the initial Service Investigation Fee paid will be billed to the Applicant with payment due within 30 days from the date of invoice. Any costs incurred by the District arising from the District's use of independent consultants (including, but not limited to engineers and attorneys acting on behalf of the District) to review, approve or prepare a non-standard service contract and any supporting plans and specification will be billed to the Applicant at the District's actual cost plus an administrative fee equal to 15% of such actual costs. All such fees, costs or expenses of the District will be due and payable by the Applicant within 30 days following the District's date of invoice.

## 3. Deposits

(A) Initial Payment and Amount. At the time an application for service is approved, the applicant shall pay a Deposit to be held by the District, without interest, until settlement of the customer's final bill. The Deposit will be used to offset unpaid charges or bills.

(1) Residential Service Applicants.

(a) The Deposit for residential water service connection is $300.00 for each service unit.

CCSUD customers may be subject to a deposit increase once their account has been charged a third (3rd) non-payment fee within a consecutive 24 month period. The increase will be incremental depending on the meter size as follows:

| | |
|---|---|
| 5/8" x 3/4" (standard) meter | $450 |
| 3/4" x 3/4" meter | $675 |
| 1" meter | $1,125 |
| 1 ½" meter | $2,250 |
| 2" meter | $3,600 |
| 3" meter | $7,200 |
| 4" meter | $11,250 |
| 6" meter | $22,500 |

In the event that the water service is physically disconnected (meter locked) for non-payment, the customer may be required to pay this increased deposit prior to restoring water service. Where the situation occurs in which a customer has been charged for the third (3rd) non-payment fee within a consecutive 24 month period and has paid their balance, including all applicable late and non-payment fees prior to a CCSUD Staff member physically disconnecting the service, the customer may also be required to pay the increased deposit or be subject to immediate physical disconnect.

(b) The Deposit for residential wastewater service connection is $100.00 for each service unit.

(2) Commercial and Nonresidential Service Applicants. The Deposits for commercial and nonresidential water and wastewater service, including Master Metered Accounts, shall be based on the equivalent to a residential water service connection or meter equivalent as determined by the District.

(B) Commercial and Nonresidential Customers. If actual monthly billings of a commercial or nonresidential customer are more than twice the amount of the estimated billings at the time service was established, a new deposit amount may be calculated and an additional deposit may be required to be made within thirty (30) days after the issuance of written notice.

(C) Re-establishment of Deposit. Every service applicant who has previously been a customer of the District whose service has been discontinued for nonpayment of bills, meter tampering, bypassing of meter or failure to comply with applicable state regulations or regulations of the District shall be required, before service is resumed, to pay all amounts due the District or execute a deferred payment agreement, if offered by the District, and shall be required to pay a deposit if the District does not currently have a deposit from the customer.

(D) Refund of Deposit. If service is not connected, or after disconnection of service, the District shall refund the Landowner's deposit, if any, within 45 days provided the customer has given the District written notice of a forwarding address and after the entire balance has been satisfied.. All requests for Deposit refunds shall be made in writing and must be delivered to the District within ninety (90) days of termination of service. In the event that an outstanding balance exists, the District shall attempt to collect the outstanding balance by all lawful means available. Any outstanding balances will go to collections. CCSUD may engage a third party collector to pursue outstanding balances and credit reporting as applicable.

(E) Transfer of Service. A transfer of service from one service location to another within the District's service area shall not be deemed a disconnection within the meaning of this subsection, and no additional deposit may be required unless permitted by this section. However, it is the Landowner's responsibility to notify the District, in writing, should the property be sold/transferred to another owner. Any transfer of service shall be instigated by the Owner, in writing.

## 4. Easement Fee

When the District determines that private way utility easements and/or easements for facility sites are necessary to provide service to an applicant, the applicant shall be required to secure such easements on behalf of the District or pay all costs incurred by the District to validate, clear and obtain such easements, including but not limited to legal fees and court costs, in addition to tap fees otherwise required pursuant to the provisions of these rules and Regulations. [*See* Sections E.2(c)(2) and F.7(G)].

## 5. Connection Fee

The District shall charge a Connection Fee for water service as follows:

(A) Standard Service:

(1) The Water Connection Fee for standard water service is $2500.00 Impact or Connection Fee plus $700.00 installation fee and shall include one 5/8 x 3/4 meter, all labor, materials for construction, installation, or inspection of a tap or connection to the District's water system, including all necessary service line and meter. The Impact or Connection Fees are assessed on a per LUE (Living Unit Equivalent) bases. One (1) LUE = 298 gallons per day of demand. The Water Connection Fee for water service through a meter larger than 5/8 x 3/4 meter will be increased by the multiples of the meter equivalents stated herein. For example, the water connection for a one inch (1") meter will be 2.5 x $2500.00 or $6250 plus $700 installation fee and any additional charges for larger meter. In regards to a 5/8 x 3/4 meter, if services have been previously paid for (Impact Fee and Meter Installation) and exist (meter box and an active CCSUD service line to the property) the cost to install a meter will be $350. If no services exist and/or were not previously paid for, then the meter installation fee remains at $700.

(2) The Wastewater Capacity Fee for standard wastewater service (1 ½ or 2 inch line) is $2,500.00 plus the actual costs of all labor, materials for construction, installation, or inspection of a tap or connection to the District's wastewater collection system unless otherwise negotiated in a NSSA.

(3) In addition to the charges assessed herein, the District may charge the applicant for any extraordinary expenses including but not limited to expenses such as, the cost of water meters larger than 5/8 x 3/4 , road bores, street crossings, line extensions and system improvements and pipeline relocations under Section E.2(c)(6) of these rules and Regulations.

(B) Non-Standard Service.

(1) The Connection Fee for non-standard water service which, for the purpose of this section, is defined to be retail water service by the District to land that is deemed as Non-Standard by the District as described in Sec.G.1.A.(1) or being developed pursuant to the Texas Local Government Code that at the time of platting was not being provided with water service by the District or any Commercial or Industrial customer, shall be $2,500 for each standard water service equivalent connection and plus $700 for each meter installation for Development Projects, or as determined by the District based on all relevant

factors including but not limited to the supply, pumping, storage and treatment capacity required for the Development compared to the amount of unrestricted capacity available in the District's system.

(2) The Wastewater Capacity Fee for non-standard wastewater service to each single family residence situated in an area developed or being developed for single family residential use that at the time of platting was not being provided with wastewater service by the District, shall be: Service Line Size Capacity Fee 1 ½" or 2" $2500 determined by the General Manager, based on all relevant factors including but not limited to the supply, pumping, storage and treatment capacity required for the Development compared to the amount of unrestricted capacity available in the District's system unless otherwise negotiated in a NSSA.

(3) Prior to the installation of any facilities to which Non Standard Connection Fees will apply, the applicant shall execute a non-standard service agreement with the District.

## 6. Monthly Charges

(A) Water Service. The District shall assess the following monthly charges for water service:

(1) Base Rate. The District's Base Rate for water service through a standard water meter is $41.21 per month. [The Base Rate is that portion of a customer's monthly bill which is paid for the opportunity of receiving utility service, excluding standby fees and reserved service charges, which does not vary due to changes in service consumption.] The standard 5/8" x 3/4" meter (as per American Water Works Association maximum continuous flow specifications) is used as a base multiplier for the Base Rate amount. Therefore, a customer's Base Rate charge is based on the number of 5/8" x 3/4" meters equivalent to the size of that customer's meter. The District's monthly Base Rates for water service and meter size equivalents are as follows:

(2)

| METER SIZE | METER EQUIVALENTS | MONTHLY RATE |
|---|---|---|
| 5/8" x 3/4" (standard) | 1.0 | $41.21 |
| 3/4" x 3/4" | 1.5 | $61.32 |
| 1" | 2.5 | $101.53 |
| 1½" | 5.0 | $202.05 |
| 2" | 8.0 | $322.68 |
| 3" | 16 | $644.34 |
| 4" | 25 | $1,006.22 |
| 6" | 50 | $2011.43 |

(2) Gallonage Charge. In addition to the Base Rate, customers with meters smaller than 2", shall be assessed a Gallonage Charge at the following rates for water usage during any one billing period:

| | |
|---|---|
| 1 to 5000 gallons | $5.09 per thousand gallons |
| 5000.1 to 10000 gallons | $5.60 per thousand gallons |
| 10000.1 to 20000 gallons | $6.66 per thousand gallons |
| 20000.1 to 50000 gallons | $9.00 per thousand gallons |
| 50000.1 to 70000 gallons | $11.50 per thousand gallons |
| More than 70000 gallons | $12.00 per thousand gallons |

(B) Wastewater Service. Refer to Appendix C for Monthly Base and Usage Service Rates. *See* named Development for rate information.

(C) Reserved Service Charge. The District may assess a monthly Reserved Service Charge for each active and inactive account at a specific location for which a meter has not been installed or but for which the District and an applicant have or have previously entered into a service agreement or Non-Standard Service Contract. This monthly charge generally shall be based on the District's fixed costs to service the applicant's dedicated facilities on a per service unit basis. This charge reserves service to the applicant's real property designated to receive service.

(D) Regulatory Assessment. In accordance with TCEQ regulations, the District shall collect from each customer a regulatory assessment equal to 0.5% of the monthly charges for water and wastewater service. [*See* 30 TAC § 291.76(d)(3)].

(E) Credit/Debit Card and/or ACH Payment Fee. All customers who use a credit/debit card, regardless of whether one time or a recurring auto-payment online or through the IVR to pay CCSUD will be subject to a convenience fee charged by the processing merchant. This fee will be solely the customers' responsibility and non-refundable by CCSUD. Any person that does not have or is not establishing an account with CCSUD, using a credit/debit card to pay for services or fees with CCSUD will be subject to a convenience fee charged directly by CCSUD for processing the credit/debit card payment per Texas State Code Sec. 49.2121.

(F) CRWA Bond Fee. $9.00 per customer account will be assessed to pay the bond debts the District is responsible for paying to the Canyon Regional Water Authority for our long term water.

(G) R&R Depreciation Fee. $6.95 per customer account will be assessed to pay for repair and replacement of assets of the District.

(H) Texas Water Development Board (TWDB) Bonds Fee. $5.00 per customer account will be assessed to pay the bond debts the District is responsible for paying to the TWDB for water system improvements and upgrades.

(I) Texas Commission on Environmental Quality (TCEQ) Regulatory Compliance Fee. $1.32 per customer account will be assessed to pay for costs incurred by the District to comply with TCEQ regulations and testing requirements.

## 7. Standby Fee

The Standby Fee is a monthly charge imposed on undeveloped property (a tract, lot or reserve in the District to which no water or wastewater connections have been made and for which water or wastewater facilities and services are available.). Upon adoption by the Board of Directors and approval by the Public Utility Commission, the District may charge a Standby Fee to owners of undeveloped property.

## 8. Late Payment Fee/Payment Arrangement Fee

A charge of $20.00 or 15.0%, whichever is greater, shall be applied to past due balances, if any, on each customer's monthly statement.

When a payment agreement is agreed upon, the last fees cease, and there will be a $10 a month fee till account is current.

## 9. Returned Check Fee

In the event a check, draft, or any other similar instrument is given by any person for payment of services provided for in these Rules and Regulations, and the instrument is returned by the bank or other similar institution as insufficient or non-negotiable for any reason, the account for which the instrument was issued shall be assessed a return check charge of $30.00. [*See* Appendix A, Form A-06].

## 10. Service Trip Fee

The District may charge a Service Trip Fee of $125.00 for any service call or trip to a customer's tap as a result of a request by the customer or tenant, unless the service call concerns damage to District or customer equipment or facilities, or for the purpose of disconnecting or collecting payment for services.

## 11. Equipment Damage Fee

The District shall charge for all labor, material, equipment, and all other actual costs necessary to repair or replace all equipment damaged due to negligence, meter tampering or bypassing, reconnecting service without authority or other service diversion, or the discharge of wastes which the District's wastewater system cannot properly treat. The utility may charge for all actual costs necessary to correct service diversion or unauthorized taps where there is no equipment damage, including incidents where service is reconnected without authority. An itemized bill of such charges shall be provided to the customer. In cases of meter tampering or service diversion, the District may disconnect the service of a customer refusing to pay damage charges. [*See* 30 TAC § 291.87(n)].

## 12. Customer History Report Fee

A fee of $10.00 shall be charged to provide a copy of the customer's record of past water purchases in response to a customer's request for such a record.

## 13. Meter Test Fee

The District shall test a customer's meter upon written request of the customer and a Service Trip Fee of $125.00 plus actual test charges shall be imposed on the affected account if the meter is determined to be within the accuracy limits per AWWA Standards and there will be no charge if it is found to be inaccurate.

## 14. Meter Relocation Fee

The fee for moving a meter from one location to another under the terms of Section E.24 shall be the actual costs incurred by the District plus administrative charges, or a minimum fee of $150.00.

## 15. Temporary Service Charges

A non-refundable fee of $300.00 shall be charged plus actual installation charges, if any for temporary water service (usually via a Fire Hydrant Meter issued to a contractor). Applicants shall also pay water rates defined in Section 6. (A.) (2) above until the initial $300 has been met and billed for any additional usage thereafter as well as any other applicable fees or charges set forth in these rules and Regulations.

## 16. Non-Disclosure Fee

To the extent allowed by law, a fee of $5.00 may be assessed to any customer requesting in writing that personal information under the terms of these rules and Regulations not be disclosed to the public.

## 17. Information Disclosure Fee

All public information except that which has been individually requested as confidential shall be available to the public for a fee to be determined by the District based on the level of service and costs to provide such information, but not to be inconsistent with the terms of the Texas Publication Information Act: Chapter 552, Texas Government Code.

## 18. Transfer Fee

The District shall charge a Transfer Fee of $50.00 when applicable to cover administrative costs and the cost of recording easements in the land records of the county. Applicants obtaining service due to Transfer, Merger or Acquisition of CCN Territory from an adjoining public utility's CCN shall not be charged a deposit upon the approval by the appropriate state agency of such Sale, Transfer or Merger (STM). No deposit or transfer fee shall apply as long as the account is and remains in good credit standing. However, should the account go into default for any reason and/or should service to the account be discontinued due to non-payment of water charges, the account must complete a new service application and pay all customer deposit fees in order to reinstate service to the property.

## 19. Franchise Fee Assessment

A fee as determined and contractually agreed upon by and between the District and the municipality and/or other government entities empowered to do so, of the amount billed for water service will be assessed each customer whose meter is located inside the corporate limits of a municipality that imposes a franchise tax on the District.

## 20. Additional Assessments

In the event any federal, state or local government imposes on the District a "per meter" fee or an assessment based on a percent of water/wastewater charges, this fee or assessment will be billed and collected as a "pass through" charge to the customer.

## 21. Other Fees

(a) All services outside the normal scope of utility operations that the District may be compelled to provide at the request of a customer shall be charged to the recipient based on the cost of providing such service.

(b) If an existing customer subdivides its property or otherwise transfers a portion of the customer's property to another, whether according to an approved plat or otherwise, the customer must notify the District. If the transferee of such property seeks service, the transferor customer shall pay all actual costs for the District to install a minimum 6" distribution line and road bore from the District's supply main if requested by the District. Customers failing to comply with this provision shall be subject to Disconnection with Notice under Section E.12.(A).

(c) If the District determines that an applicant's property is subdivided or otherwise transferred to the applicant from a single property tract within five years prior to making a standard service connection request, whether according to an approved plat or otherwise, the applicant must pay all actual costs for the District to install a minimum 6" distribution line and road bore from the District's supply main if requested by the District as a condition for standard service.

## 22. Voluntary Surrender Fee

The District shall charge a Voluntary Surrender Fee of $100.00 to cover administrative costs.

## 23. Non-payment Fee

The District shall charge a Non-Payment Fee of $150.00.

## 24. Customer Service Inspection Fee

The District shall charge a Customer Service Inspection Fee of $60.00 to cover inspection costs.

## 25. Backflow Prevention Assembly Test Fee

The District may charge a Backflow Prevention Assembly Test Fee of $125.00 to cover testing fees which are required annually. However, should the customer choose to have the Backflow Prevention Assembly Test performed as an annual, routine part of its service, then Crystal Clear will do so and include a Fee of $60 on their monthly invoice. The District allows the Customer to purchase private inspections from qualified sources.

In the event that a customer has a new meter installed, CCSUD may put in a shut off valve at the time of connection directly at the customer's side of the meter at no additional charge to the customer. This is a one-time occurrence. At any time that the valve quits working or becomes damaged, any further installation/replacement of this valve is solely at the customer's cost and responsibility.

In the event that the customer calls CCSUD to turn off the water for a customer to repair a leak, CCSUD may waive the normal $125 service fee if the customer has a shut off valve installed directly on their side of the meter. This is a one-time adjustment for this service and CCSUD must physically verify that the valve has been installed. At any time that the valve quits working or becomes damaged, any further installation/replacement of this valve is solely at the customer's cost and responsibility

If the customer touches the meter/meter box/CCSUD shut off or any other components of the meter equipment, and damage occurs, any costs associated with that damage are payable to CCSUD by the customer. These charges may be added to the customer's account and failure to pay the damages could result in disconnection of the customer's CCSUD provided services.

Installation of pressure reducers on the customer's side are solely the cost and responsibility of the customer.

## 26. Non-refundable Application Fee

A non-refundable application fee will be charged to all customers requesting service with Crystal Clear Special Utility District (CCSUD) for water and/or wastewater. This is required to be paid at the time of application or the documents may not be processed. CCSUD does not accept incomplete new service application packets.

# SECTION H: WATER CONSERVATION PLAN

Water supply has always been a key issue in the development of Texas. In recent years, the growing population and economic development of North Central Texas has led to increasing demands for water. Additional supplies to meet higher demands will be expensive and difficult to develop. Therefore, it is important that we make efficient use of our existing supplies to minimize the amount of new resources needed.

Effective water conservation can postpone or reduce the need for development of new water supplies, minimize the associated environmental impacts, and reduce the high cost of water supply development. Nonetheless, to respond to the growing population of our area, the planning for new water resources must continue. Crystal Clear considers water conservation an integral part of this planning process.

Recognizing the need for efficient use of existing water supplies, the Texas Commission on Environmental Quality ("TCEQ") has announced guidelines and requirements governing the development of water conservation plans for Public Water Suppliers. Crystal Clear has prepared this Water Conservation Plan (the "Plan") following the TCEQ guidelines, recommendations from UTRWD and certain best management practices by the TWDB.

The objectives of this Plan include:

- To reduce water consumption from levels that would prevail without conservation efforts;
- To reduce the loss and waste of water, as evidenced by per capita use;
- To improve efficiency in the use of water;
- To extend the adequacy of current water supplies by reducing the pace of per capita annual growth and demand water.

**1.2 Texas Commission on Environmental Quality Rules**

TCEQ rules governing the development of water conservation plans for Public Water Suppliers are contained in Title 30, Part 1, Chapter 288, Subchapter A, and Rule 288.2 of the Texas Administrative Code. Copies of these rules are included in Appendix A. The rules define a water conservation plan as:

> "A strategy or combination of strategies for reducing the volume of water withdrawn from a water supply source, for reducing the loss or waste of water, for maintaining or improving the efficiency in the use of water, for increasing the recycling and reuse of water, and for preventing the pollution of water."

(A) Minimum Water Conservation Plan Requirements: The minimum requirements for water conservation plans for municipal uses by Public Water Suppliers required by TCEQ are summarized below:

Utility Profile: Includes information regarding population and customer data, water use data, water supply system data, and wastewater system data. (Section 2.0)

Goals: Specific quantified five-year and ten-year targets for water savings to include goals for water loss programs and goals for municipal use, in gallons per capita per day (GPCD). The goals established by a Public Water Supplier are not enforceable under this subparagraph. (Section 3.0)

Accurate Metering Devices: TCEQ requires that metering devices have an accuracy of plus or minus five percent (5%) for measuring water diverted from the source of supply. (Section 4.1)

Universal Metering, Testing, Repair and Replacement: TCEQ requires that there be a program for universal metering of both customer and public uses of water, for meter testing and repair, and for periodic meter replacement. (Section 4.2)

Determination and Control of Unaccounted-for Water: Regulations require specific measures to determine and control unaccounted-for water. The measures may include periodic visual inspections along distribution pipelines, periodic audits of the water system for illegal connections or abandoned services. (Section 4.3)

Continuing Public Education Program: A continuing public education and information program regarding water conservation is required as part of the Plan. (Section 4.4)

Non-Promotional Water Rate Structure: Chapter 288 requires a water rate structure that is not "promotional"; that is, rates that discourage waste and excessive use of water such as increasing block rate instead of volume discounts. (Section 4.5)

Reservoir Systems Operational Plan: If applicable, this requirement is to provide a coordinated operational structure for operation of reservoirs owned by the water supply entity within a common watershed or river basin in order to optimize available water supplies.

Coordination with Regional Water Planning Group: Crystal Clear SUD is required to document that the Plan has been coordinated with the Regional Water Planning Group to insure consistency with the appropriate approved regional water plan. (Section 7.0)

Means of Implementation and Enforcement: The regulations require a strategy for implementing and enforcing the provisions of this Plan, as evidenced by an ordinance, resolution, or tariff, and a description of the authority by which the Plan is enforced. (Section 8.0)

(B) Additional Requirements for Larger Public Water Suppliers: Water conservation plans covering municipal uses by Public Water Suppliers that: (1) currently serve a population of 5,000 or more; or (2) a projected population of 5,000 or more within ten (10) years from the effective date of this Plan; or, (3) provide potable water service to 3,300 or more connections, are required to include the following additional strategies.

Program for Leak Detection & Repair, and Water Loss Accounting: The Plan must include a description of a program of leak detection and repair, and water loss accounting for the water transmission, delivery, and distribution system. (Section 5.1)

Record Management System: The Plan must include a record management system to record water pumped, water delivered, water sold and water lost, which allows for the

desegregation of water sold and used into user classes (residential, commercial, public and institutional, and industrial). (Section 5.2)

Wholesale Customer Requirements: If applicable, the Plan must include a requirement that every water supply contract entered into or renewed after official adoption of the water conservation plan, and including any contract extension, that each successive wholesale customer develop and implement a water conservation plan or water conservation measures using the applicable elements of Title 30 TAC Chapter 288. (Section 5.3)

(C) Additional Water Conservation Program Strategies: Landscape Water Management Measures are a strategy that can be used to reduce discretionary water use during summer months. It is an **optional** strategy within the TCEQ regulations. However, it is recommended that Crystal Clear implement a landscape water management ordinance as part of the Plan.

Landscape Water Management Measures: These regulations are minimal measures to reduce waste in landscape irrigation and peak water demand within the water distribution system. (Section 6.1)

Crystal Clear may also incorporate any or all of the following additional conservation strategies, **which are optional**, as needed to achieve the conservation goals stated in this Plan:

Adoption of ordinance, plumbing codes or rules requiring water-conserving fixtures (Section 6.3);

A program for replacement or retrofit of water-conserving plumbing fixtures in existing structures;

Reuse and/or recycling of wastewater and/or gray water (Section 6.2);

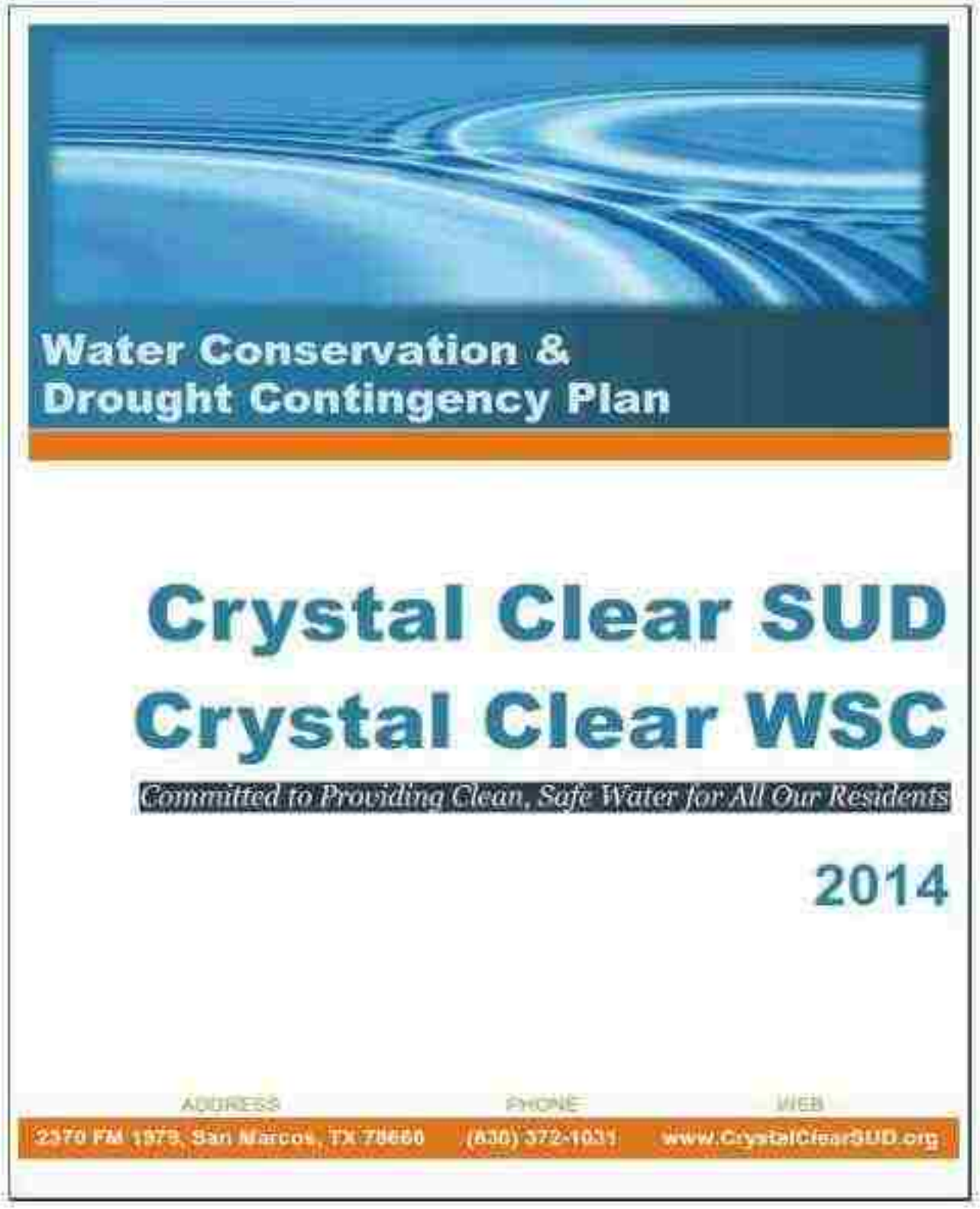
A program for pressure control and/or reduction in distribution system and/or customer connections;

A program for landscape water management (Section 6.1); or,

A method for monitoring the effectiveness and efficiency of the Plan.

This Plan sets forth a program of long-term measures under which Crystal Clear can improve the overall efficiency of water use and conserve its water resources. Short-term measures that respond to specific water management conditions (i.e., periods of drought, unusually high water demands, unforeseen equipment or system failure, or contamination of a water supply source) are provided in Crystal Clear's Drought Contingency Plan.

Crystal Clear reserves the right to update and/or amend the plan as needed.


Water Conservation &
Drought Contingency Plan
Crystal Clear SUD
Crystal Clear WSC
Committed to Providing Clean, Safe Water for All Our Residents
2014
ADDRESS
PHONE
WEB
2370 FM 1979, San Marcos, TX 78666
(830) 372-1031
www.CrystalClearSUD.org

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# CRYSTAL CLEAR

## Introduction

Crystal Clear Water Supply Corporation/Special Utility District "Crystal Clear" is a Public Water System (PWS) in South Central Texas that provides water service to approximately 15,000 residents and 4,500 retail connections over 165 square miles in portions of Comal, Guadalupe, and Hays Counties. The service area extends across Interstate Highway 35 to the northwest and is bordered by Interstate Highway 10 to the south, State Highway 46 to the southwest, and the San Marcos River to the northeast. Crystal Clear is currently undergoing a transition from a Water Supply Corporation to a Special Utility District.

Crystal Clear primarily serves single-family residential units including the communities of Hunter, Kingsbury, Redwood, and Zorn as well as portions of the extra territorial jurisdictions and within the city limits of the Cities of New Braunfels, San Marcos, Seguin, and Staples. Currently, 82.5% of the service area is located in Guadalupe County, 9.0% is in Hays County, and 8.5% is in Comal County. Crystal Clear has territory within the boundaries of the Edwards Aquifer Authority and the Guadalupe County Groundwater Conservation District. The entire service area is located in the Region L South Central Texas Regional Water Planning Group (SCTRWPG), which is administered by the Texas Water Development Board (TWDB).

Currently, Crystal Clear can use 4,073 acre-feet per year (AF/yr) of water supply from wells in the Edwards, Edwards/Uvalde and Carrizo aquifers as well as water supply contracts with the Guadalupe-Blanco River Authority (GBRA), Canyon Regional Water Authority (CRWA), and Springs Hill WSC. Additional water supply strategies include the development of groundwater in the Trinity and Wilcox aquifers.

Crystal Clear is also a member of the Hays Caldwell Public Utility Agency (PUA) owning a 10.3% share of the production dedicated and owned by CRWA in the Hays Caldwell PUA Phase 1 and 2 projects scheduled for the years 2022-2025 and 2030-2035 respectively. The Hays Caldwell PUA projects are located within the Gonzalez County Underground Water Conservation

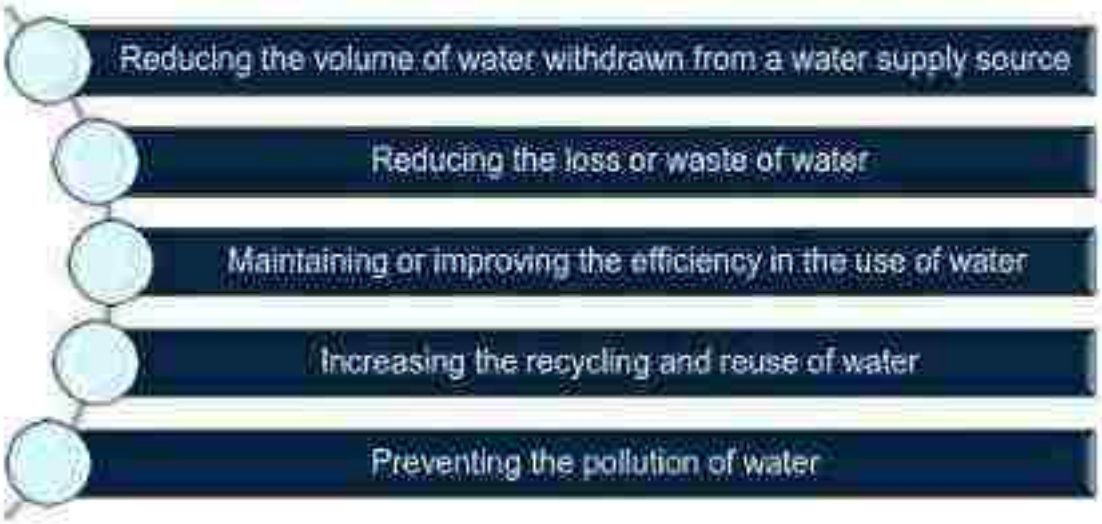
District (UWCD) boundaries and are specifically recommended for the District by the SCTRWPG's approved 2011 Regional Water Plan.

The SCTRWPG 2011 Regional Water Plan projects the population of the Crystal Clear's service area to increase to 32,804 by 2030 and to 55,673 by the year 2060. The corresponding projected total water demands are 3,344 AF/yr and 5,551 AF/yr respectively. The Regional Water Plan also recommends additional water supply from the Wilcox aquifer and CRWA as well as other sources including municipal water conservation.

# CRYSTAL CLEAR

## WATER CONSERVATION PLAN

A Water Conservation Plan is a combination of strategies for:




Crystal Clear recognizes that the amount of water available to supply its water utility customers may be limited and subject to depletion during periods of extended drought. Representing the best interests of its customers, Crystal Clear deems it expedient and necessary to establish certain rules and policies for the ongoing conservation of water and the orderly and efficient management of limited water supplies during drought and other water supply emergencies.

# Statutory & Rule Requirements

Texas Water Code §13.146

WATER CONSERVATION PLAN. The commission (TCEQ) shall require a retail public utility that provides potable water service to 3,300 or more connections to submit to the executive administrator of the board (TWDB) a water conservation plan based on specific targets and goals developed by the retail public utility and using appropriate best management practices, as defined by Section 11.002, or other water conservation strategies.

Title 30 Texas Administrative Code § 288.30(5)(A)

For retail public water suppliers providing water service to 3,300 or more connections, the drought contingency plan must be submitted to the executive director (TCEQ) not later than May 1, 2005. Thereafter, the retail public water suppliers providing water service to 3,300 or more connections shall submit the next revision of the plan not later than May 1, 2009, and every five years after that date to coincide with the regional water planning group.

# CRYSTAL CLEAR

## Utility Profile

A completed "TWDB Utility Profile for Retail Water Supplier" for Crystal Clear is attached in Appendix A.

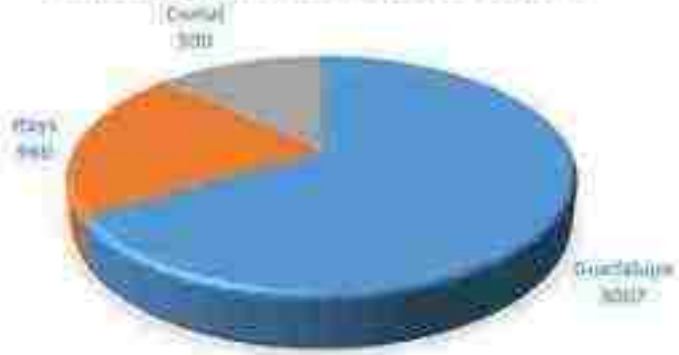
| | |
|---|---|
| Certificate of Convenience and Necessity No. | 10297 |
| Public Water Supply Nos. | 0940015, 0940017 |
| Groundwater Conservation Districts | Edward Aquifer Authority, Guadalupe Co. GCD, Gonzales Co. UWCD |
| Regional Water Planning Group | South Central Texas (Region L) |
| Counties | Comal, Guadalupe, Hays |
| Service Area | 165 Square Miles |
| Water Sources | Edwards Aquifer, Trinity Aquifer, Carrizo Aquifer, Wilcox Aquifer, Guadalupe River |
| System Capacity | 2.5 Million Gallons per Day (MGD) |
| Storage Capacity | 1.118 Million Gallons (MG) Ground, 1.15 MG Elevated |

**Population & Customer Use Data**

Crystal Clear serves retail customers in portions of Comal, Guadalupe, and Hays counties. The area is located on the northern edge of the south Texas plains and is characterized by an average of 32 inches of rain annually. Land use, historically predominated by agriculture is increasingly developing into rural and urbanized residential uses.

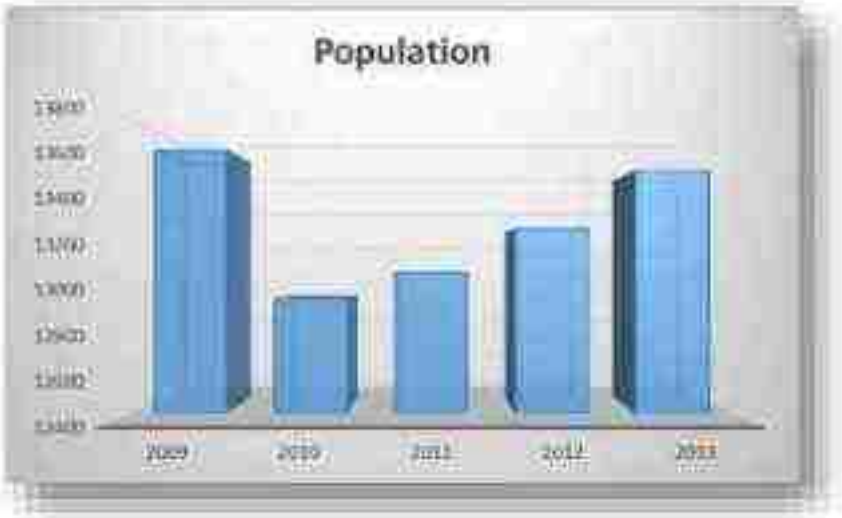
Based upon the TWDB 2012 Water Use Survey, Crystal Clear has 4,617 retail service connections. The majority (approximately 2/3) of the connections (3,067) are in Guadalupe County. There are 960 connections in Hays County and 590 in Comal County. The distribution of service connections by county is shown below.

SERVICE CONNECTIONS BY COUNTY

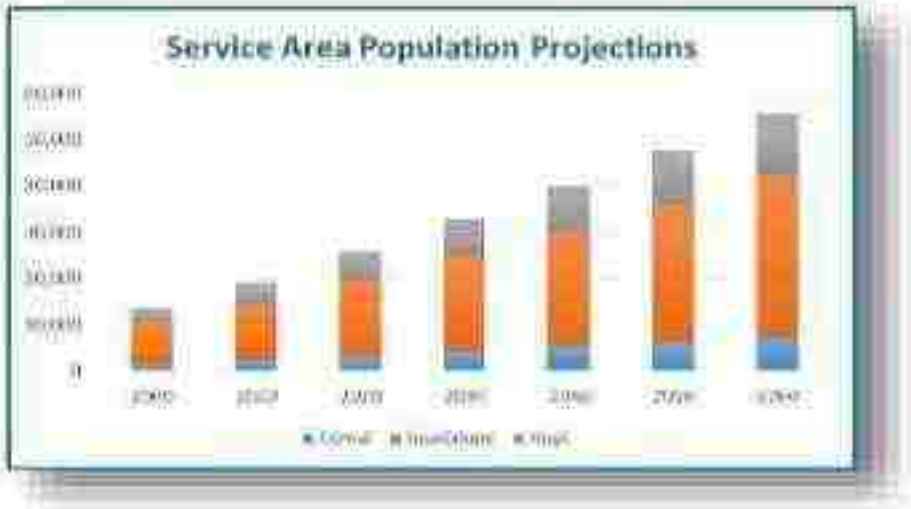


Due to the nature of the service area, identification of the actual population served can be challenging. With a service area located in portions of three counties, additional efforts are required to interpret United States Census data and county appraisal records. An independent population study was performed by the District in 2011 and concluded that the population for the entire service area was 14,932. Population projections in this Plan are calculated by estimating 3.0 people per residential connection.

# CRYSTAL CLEAR

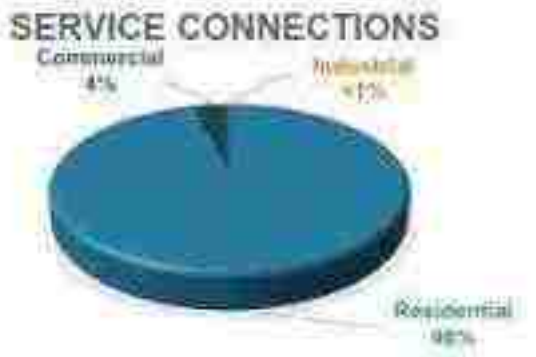


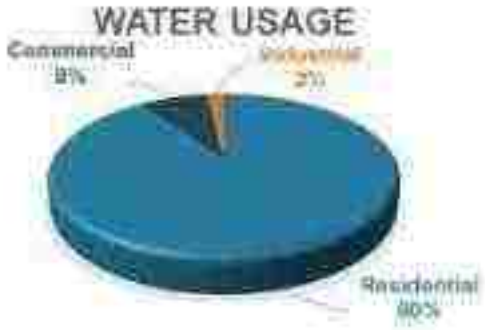

The population of Crystal Clear has fluctuated in recent years. The TWDB and Region L Water Planning Group population projections over the next 50 years, however, estimate that the Crystal Clear's population will nearly triple. TWDB and Region L Water Planning Group population projections are shown below.



# CRYSTAL CLEAR

The charts below show that the largest customer sector is residential and that most of the water is used by residential customers. Service is also provided to commercial and industrial users. The distribution of water-use sectors within Crystal Clear's service area and the distribution of water usage between the sectors is shown below. While commercial use represents 4% of connections, it represents 8% of water use; and while industrial use represents less than 1% of connections, it represents 2% of water use. Commercial and industrial connections have a higher per connection usage than residential connections.



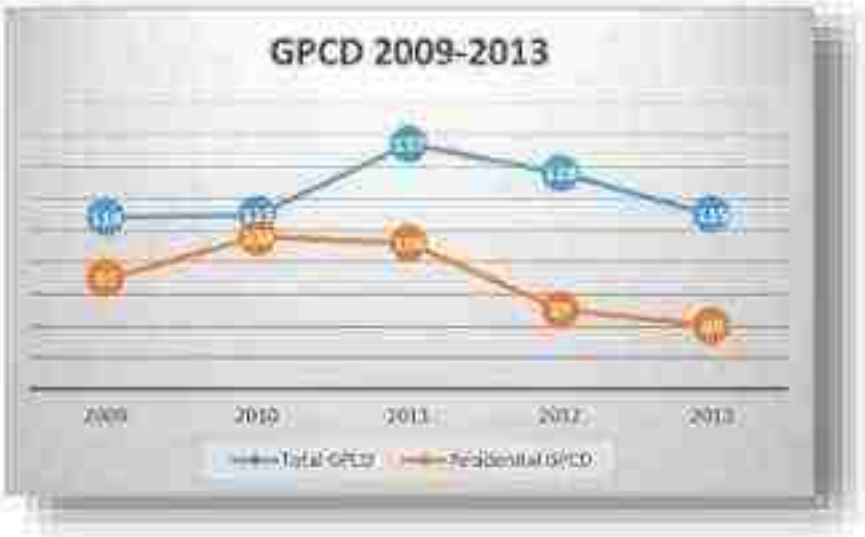



# CRYSTAL CLEAR

## Water Conservation Goals

Per capita water use is generally expressed in gallons per customer per day (GPCD) and is the average amount of water used by each person in the population served by a water utility. Variable factors that can influence GPCD include the amount of non-residential water uses, the rate and type of customer growth, economics, climatic conditions, and demographics. For Crystal Clear residential GPCD is a more appropriate metric for understanding how much water each customer is actually using because it comprises 98% of customer use not including commercial, industrial, and institutional uses.

For the previous five years, the average total GPCD for the Crystal Clear was 122. Single-Family Residential use for the District was 95 GPCD. The previous five years of per capita water use are shown below.



# CRYSTAL CLEAR

Crystal Clear's five and ten year water conservation goals are based upon the Texas Water Conservation Implementation Task Force's recommendation of a reduction in per capita water use of 1% per year. Per capita usage and water loss goals are shown below.

The General Manager will assess the effectiveness of water conservation activities and the District's progress in achieving the stated goals on an annual basis.

# CRYSTAL CLEAR

## Public Education (Conservation)

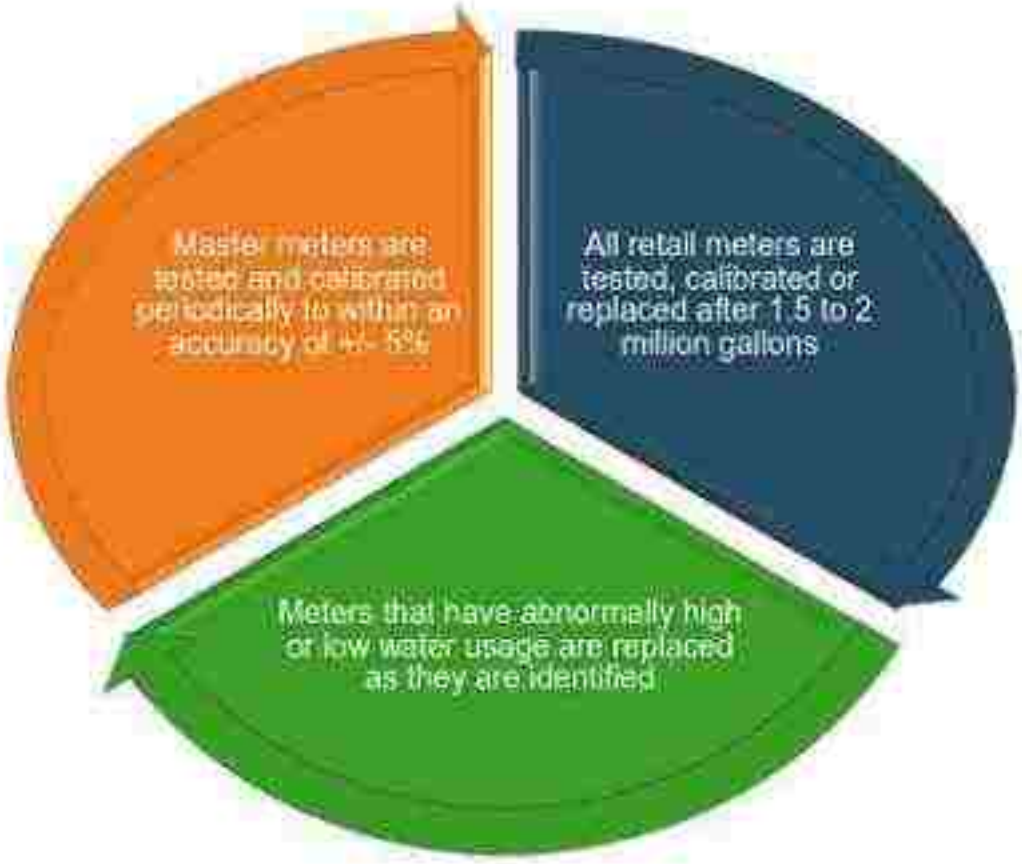
Crystal Clear conducts a program of ongoing public water conservation education that includes:

- Periodic distribution of water conservation brochures and information
- Provision of water conservation brochures and materials at the main office and other public places
- Informational presentations offered by Utility staff to local organizations, schools, and civic groups
- Information available to local newspaper, television, and radio outlets
- Water Conservation information posted on website
- Water conservation information provided to applicants for new service

# CRYSTAL CLEAR

## Metering Devices

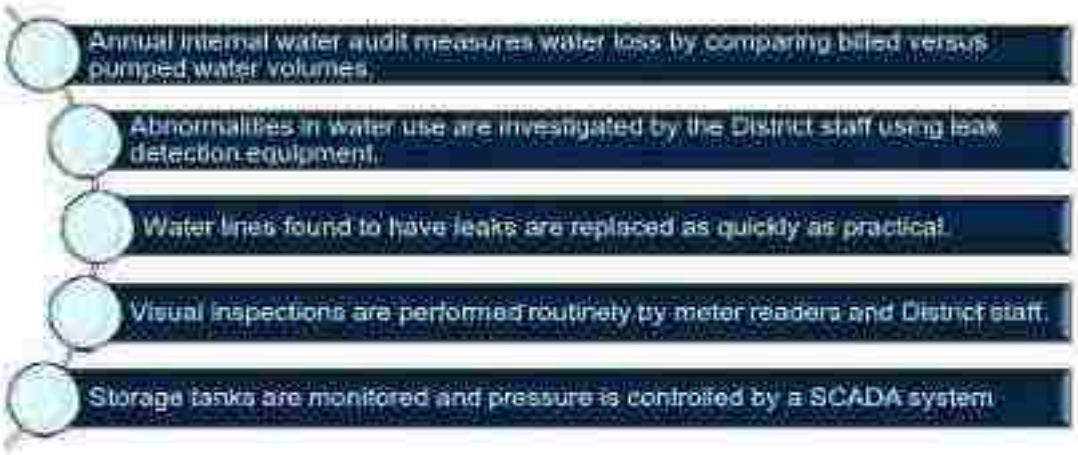
Crystal Clear meters 100% of the water used by residential, industrial, and commercial accounts. In 2013, the Crystal Clear completed a full meter replacement program exchanging old meters for smart meters. Meters are tested upon customer request. The diagram below describes the Crystal Clear's meter testing, repair, and replacement program.



# CRYSTAL CLEAR

## Water Loss

Crystal Clear maintains an ongoing program of leak detection and repair. In 2013, water loss for the District was calculated to be 25%. The long term goal is to maintain less than 15% water loss. The leak detection program for the District is shown below.




The District currently has seven field technicians training to identify water leaks with the use of sonic leak detection equipment. The system is divided into 11 zones that, within a five year planning window, will be equipped with pressure meters. Cloud-based software will instantly detect pressure losses within a zone and alert utility staff to the presence of a leak. Using asset management software, Crystal Clear will be able to identify the location of problem areas to make repairs. Crystal Clear continues to explore new practices and technologies to minimize the loss of water.

# CRYSTAL CLEAR

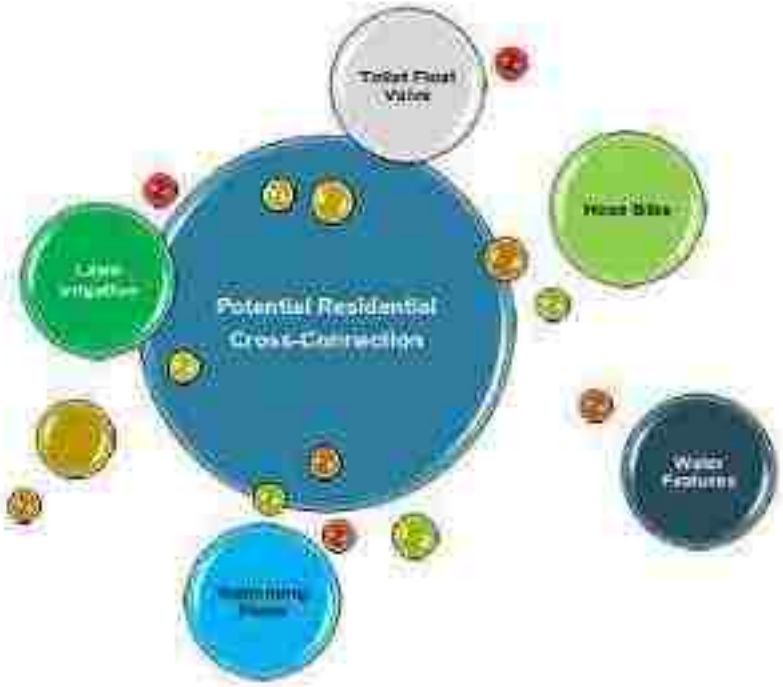
## Water Rates

Crystal Clear uses a cost based inclining block rate that discourages the excessive use of water. The residential base rate is $34.00. Six inclining usage blocks (tiers) are set up in increments of ten thousand gallons. The rates for each successive inclining block are designed to encourage the conservation of water by sending a strong price signal that charges incrementally higher rates per each increasing thousand gallons of water use.

# CRYSTAL CLEAR

## Cross Connection Control

Crystal Clear maintains required cross connection control. Risk of backflow is generally reduced by taking steps to ensure that system pressures do not fall during periods of emergency repairs and by performing periodic customer inspections for cross connections. Facilities and structures determined to have a high public health hazard are required to install devices that prevent back-siphonage of nonpotable water from a loss of pressure in water lines.



## Plumbing Fixtures

The State of Texas has recently adopted more stringent water saving performance measures for plumbing fixtures, found in the Texas Health and Safety Code Chapter 372. The following maximum flow standards are subsequently listed in the Texas Administrative Code Title 30 Chapter 290 Subchapter G:

Customers in existing buildings that do not have water saving plumbing fixtures are encouraged through educational materials to retrofit their old plumbing fixtures with lower gallons per minute (gpm) or gallons per flush (gpf) standards. Recently, the District has participated in a showerhead exchange program in conjunction with a local plumbing supplier.

An increasing number of water efficient clothes and dish washing machines are now available that provide the same performance, but use less water. A water efficient home can save more than 20% of annual indoor water use. Crystal Clear currently administers a program to provide free showerheads and faucet aerators for its customers.

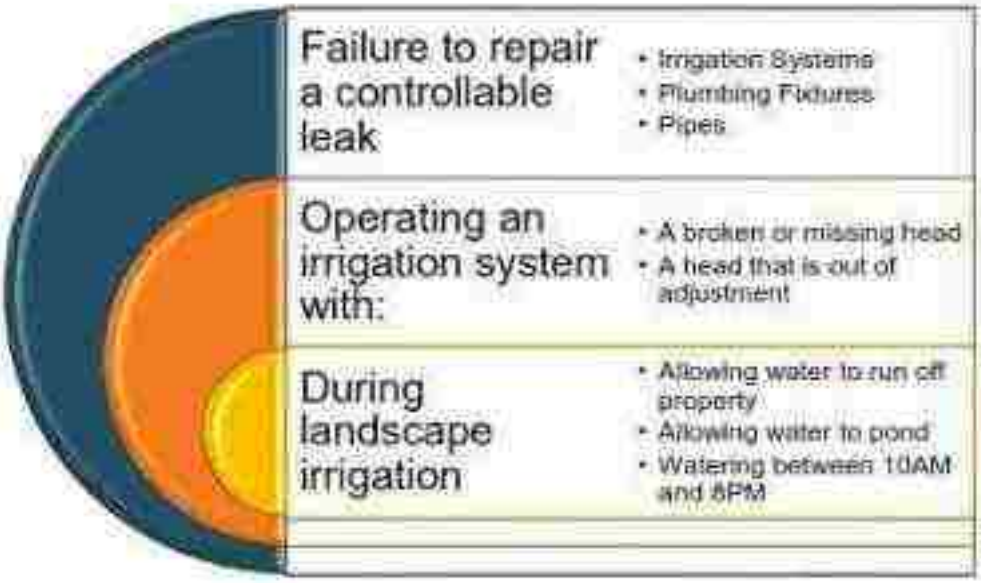
## Discretionary Uses

The following uses of water are considered to be discretionary or non-essential:

* Commercial car washes using Best Management Practices that include recycling of water are exempt.

## Water Waste

Water waste is prohibited at all times. Water waste is defined as:




Each instance of a violation is a separate offense and may be punishable as described in the Enforcement section of this plan.

# CRYSTAL CLEAR

## DROUGHT CONTINGENCY PLAN

*A strategy or combination of strategies for temporary supply and demand management responses to temporary and potentially recurring water supply shortages and other water supply emergencies.*

### Statutory & Rule Requirements

**Texas Water Code, Sec. 11.1272. ADDITIONAL REQUIREMENT: DROUGHT CONTINGENCY PLANS FOR CERTAIN APPLICANTS AND WATER RIGHT HOLDERS.**

The commission (TCEQ) shall by rule require wholesale and retail public water suppliers and irrigation districts to develop drought contingency plans consistent with the appropriate approved regional water plan to be implemented during periods of water shortages and drought.

**Title 30 Texas Administrative Code, §288.30. REQUIRED SUBMITTALS.**

For retail public water suppliers providing water service to 3,300 or more connections, the drought contingency plan must be submitted to the executive director (TCEQ) not later than May 1, 2005. Thereafter, the retail public water suppliers providing water service to 3,300 or more connections shall submit the next revision of the plan not later than May 1, 2009, and every five years after that date to coincide with the regional water planning group.

## Declaration of Policy, Purpose, and Intent

In order to conserve the available water supply and protect the integrity of water supply facilities, with particular regard for domestic water use, sanitation, and fire protection, and to protect and preserve public health, welfare, and safety and minimize the adverse impacts of water supply shortage or other water supply emergency conditions, Crystal Clear hereby adopts the following regulations and restrictions on the delivery and consumption of water by Resolution.

Water uses regulated or prohibited under this Drought Contingency Plan are considered to be non-essential or discretionary and continuation of such uses during times of water shortage or other emergency water supply conditions are deemed to constitute a waste of water which subjects the offender(s) to penalties as defined in the Enforcement of Drought Contingency Plan section of this Plan.

## Authorization

The Board of Directors and General Manager are hereby authorized and directed to implement the applicable provisions of this Plan upon determination that such implementation is necessary to protect public health, safety, and welfare. The Board of Directors and General Manager shall have the authority to initiate or terminate drought or other water supply emergency response measures as described in this Plan.

## Application

The provisions of this Plan shall apply to all persons, customers, and property utilizing water provided by Crystal Clear. The terms "person" and "customer" as used in the Plan include individuals, corporations, partnerships, associations, and all other legal entities.

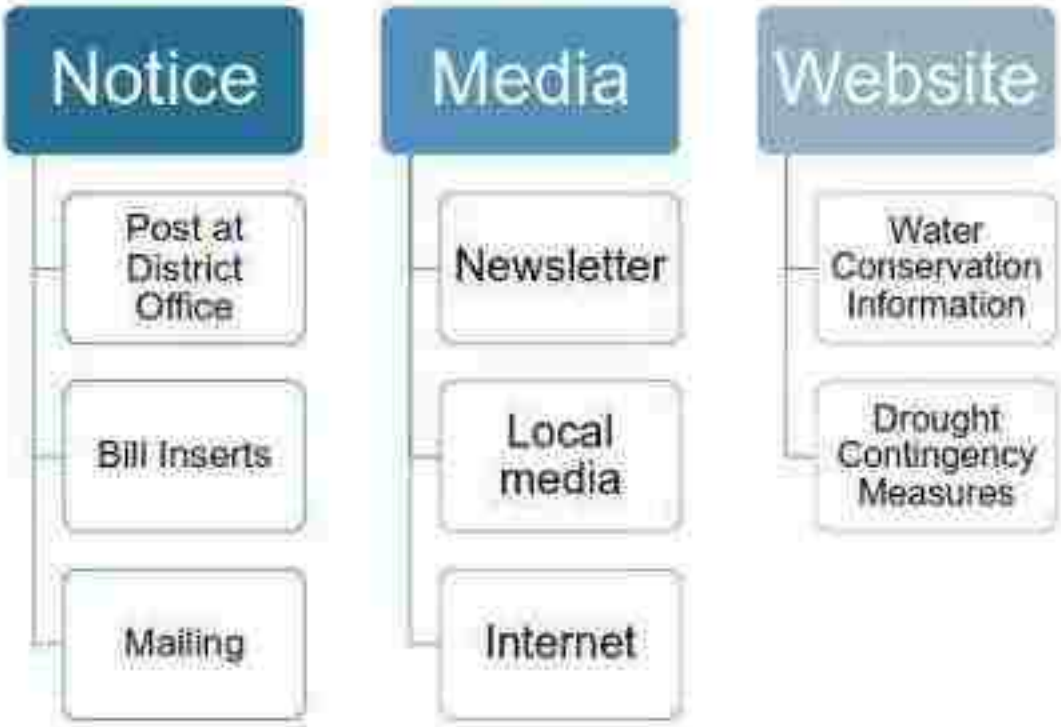
## Public Involvement

Opportunity for the public to provide input into the preparation and maintenance of this Drought Contingency Plan continues to be provided by the following:

| | |
|---|---|
| Mailing | 2370 FM 1979, San Marcos, TX 78666 |
| Telephone | (830) 372-1031 |
| Website | CrystalClearSUD.org |
| Events | Periodic water related activities |

## Public Education (Drought)

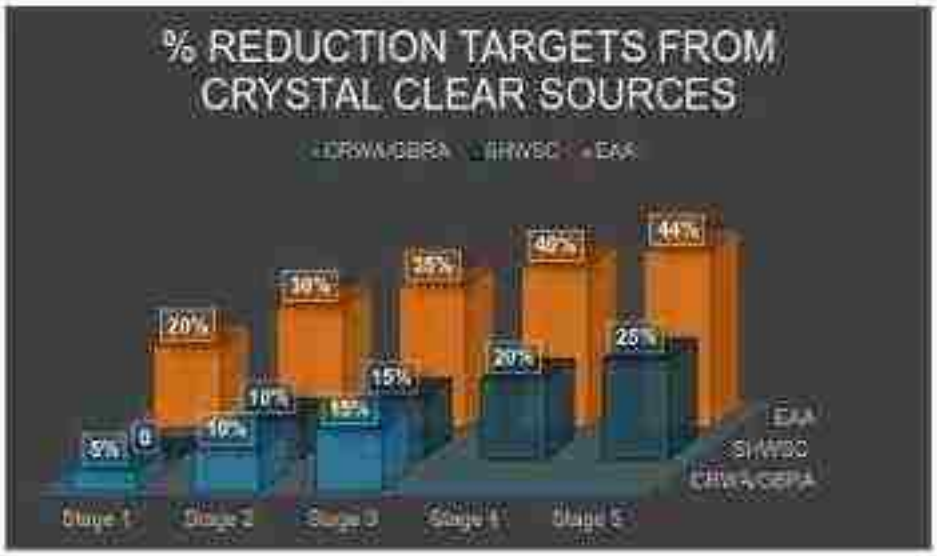
Crystal Clear will periodically provide the public with information about this Drought Contingency Plan, including information and/or notification about the conditions under which each stage of the Plan is to be initiated or terminated and the drought response measures to be implemented in each stage. Water conservation tips and information will also be provided. This information will be provided by means of:



# CRYSTAL CLEAR

## Supply Based Triggers

Crystal Clear obtains water from multiple sources. Each source has specific triggers and targets for water use reductions that apply. The figure below shows the targets for water use reductions for each water source. Stage 4 and Stage 5 reductions from CRWA and GBRA are variable, based upon a pro rata allocation of water between all CRWA and GBRA wholesale customers.




The triggering criteria for Crystal Clear are based upon the most restrictive targets from its multiple water sources.

## Demand Based Trigger

When tank levels reach 60% of capacity, the supervisory control and data acquisition (SCADA) system sends an alert to the District and triggers an email/phone notification program to ask customers to reduce water usage.

## Contamination Trigger

In the event of a contamination event, appropriate emergency procedures will be implemented and appropriate emergency response officials will be notified immediately. In the event of a backflow incident, loss of pressure, or an acute maximum contaminant level coliform violation, a "Boiled Water Notice" will be implemented as prescribed in Title 30 TAC Chapter 290.

## System Outage Trigger

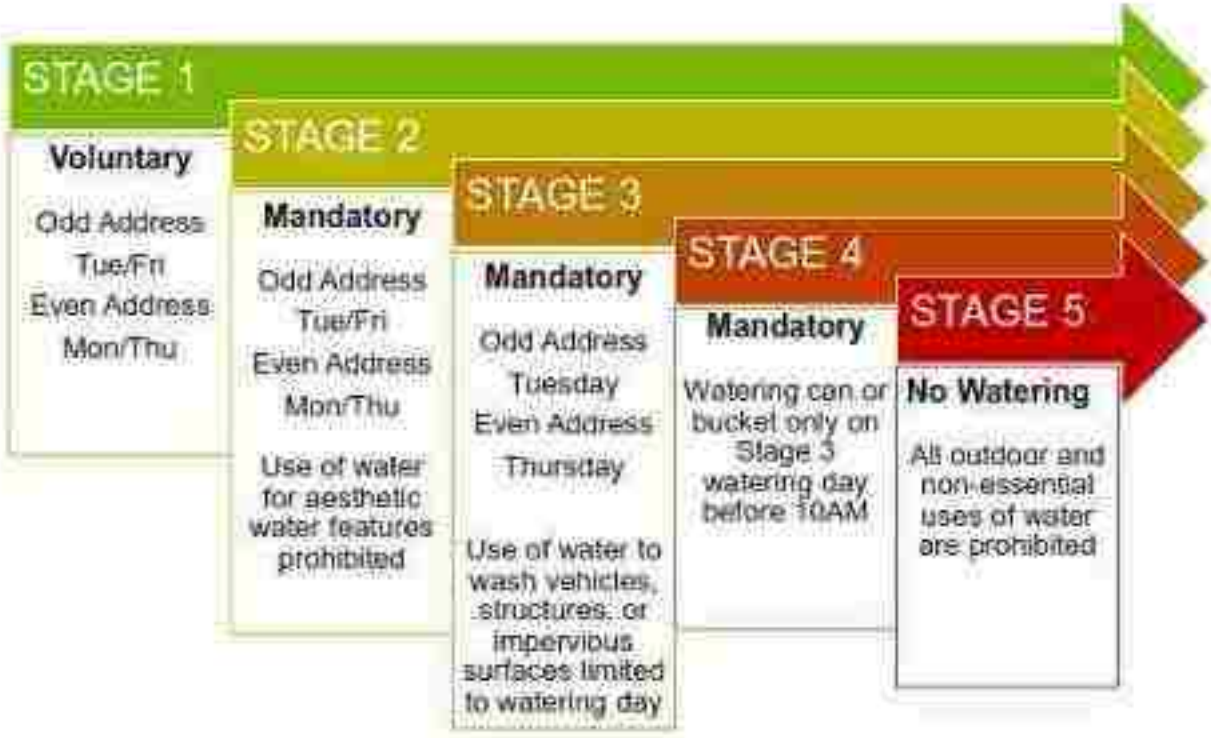
In the event of a catastrophic failure due to natural or man-made events, appropriate emergency procedures will be implemented and appropriate emergency response officials will be notified.

**Alternative Sources**

In the event of an emergency loss of water supply, the District will consider purchases of water by the truckload or in bottles for the health and public safety of the District's residents.

## Response Stages

Crystal Clear will notify TCEQ when implementing or rescinding any stage of this plan. Use of water for landscape irrigation shall be only performed between midnight and 10AM and from 8PM to midnight. Water-use restrictions applicable to aesthetic water features and the washing of vehicles, structures, or impervious surfaces are applicable to each successively higher stage. Irrigation between 10AM and 8PM is considered water waste and is enforceable as a violation at all times. The Crystal Clear outdoor water-use schedule is as follows:



## Variances

The General Manager or designee may, in writing, grant a temporary variance for existing water uses otherwise prohibited under this Plan if it is determined that failure to grant such variance would cause an emergency condition adversely affecting the health, sanitation, or fire protection for the public or the person requesting such variance, and if one or more of the following conditions are met:

1. Compliance with this Plan cannot be technically accomplished during the duration of the water supply shortage or other condition for which the Plan is in effect.

2. Alternative methods can be implemented which will achieve the same level of reduction in water use.

Persons requesting an exemption from the provisions of this Resolution shall file a petition for variance with Crystal Clear within five days after the Plan or a particular drought response stage has been invoked. All petitions for variances shall be reviewed by General Manager or designee, and shall include the following:

1. Name and address of the petitioner(s);
2. Purpose of water use;
3. Specific provision(s) of the Plan from which the petitioner is requesting relief;
4. Detailed statement as to how the specific provision of the Plan adversely affects the petitioner or what damage or harm will occur to the petitioner or others if petitioner complies with this Resolution;
5. Description of the relief requested;
6. Period of time for which the variance is sought;
7. Alternative water use restrictions or other measures the petitioner is taking or proposes to take to meet the intent of this Plan and the compliance date; and
8. Other pertinent information.

## Resolution

**RESOLUTION FOR ADOPTION OF A WATER CONSERVATION & DROUGHT CONTINGENCY PLAN**

**RESOLUTION NO. _____**

A RESOLUTION OF THE BOARD OF DIRECTORS OF CRYSTAL CLEAR SPECIAL UTILITY DISTRICT ADOPTING A WATER CONSERVATION & DROUGHT CONTINGENCY PLAN;

WHEREAS, the Board recognizes that the amount of water available to the Crystal Clear Special Utility District and its water utility customers is limited and subject to depletion during periods of extended drought;

WHEREAS, the Board recognizes that natural limitations due to drought conditions and other acts of God cannot guarantee an uninterrupted water supply for all purposes;

WHEREAS, the Water Code and the regulations of the Texas Commission on Environmental Quality (the "Commission") and the Texas Water Development Board (the "Board") require that the District adopt a water conservation and drought contingency plan;

WHEREAS, as authorized under law, and in the best interests of the customers of the Crystal Clear Special Utility District, the Board deems it expedient and necessary to establish certain rules and policies for the orderly and efficient management of limited water supplies during drought and other water supply emergencies;

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE CRYSTAL CLEAR SPECIAL UTILITY DISTRICT:

SECTION 1. That the Water Conservation and Drought Contingency Plan attached hereto as Exhibit "A" and made part hereof for all purposes is, and the same is hereby, adopted as the official policy of the Crystal Clear Special Utility District.

SECTION 2. That the General Manager is hereby directed to implement, administer, and enforce the Water Conservation & Drought Contingency Plan.

SECTION 3. That this resolution shall take effect immediately upon its passage.

DULY PASSED BY THE BOARD OF DIRECTORS OF THE CCSUD ON THIS 22 day of April 20 14.

President, Board of Directors _____

ATTESTED TO:

Secretary, Board of Directors _____

## Coordination with Region L Planning Group

The service area of the Crystal Clear is located within the South Central Texas (Region L) Regional Water Planning Group and the District will provide a copy of this Plan to the Region L Planning Group at:

San Antonio River Authority
P.O. Box 839980
San Antonio, TX 78238-9980

# CRYSTAL CLEAR

## Enforcement

**First Violation**

- The customer will be notified by written notice of their specific violation.
- Crystal Clear may assess a penalty.

**Second Violation**

- The customer may be assessed a penalty.
- Crystal Clear may install a flow restricting device for seven (7) days.
- Crystal Clear may charge the customer for the cost of installing and removing the flow restricting device.

**Third Violation**

- Crystal Clear may discontinue service at the meter for a period of seven (7) days.
- The normal reconnect fee of Crystal Clear will apply for restoration of service.

**RESOLUTION FOR ADOPTION OF A WATER CONSERVATION & DROUGHT CONTINGENCY PLAN**

**RESOLUTION NO. _____**

A RESOLUTION OF THE BOARD OF DIRECTORS OF CRYSTAL CLEAR WATER SUPPLY CORPORATION ADOPTING A WATER CONSERVATION & DROUGHT CONTINGENCY PLAN.

WHEREAS, the Board recognizes that the amount of water available to the Crystal Clear Water Supply Corporation and its water utility customers is limited and subject to depletion during periods of extended drought;

WHEREAS, the Board recognizes that natural limitations due to drought conditions and other acts of God cannot guarantee an uninterrupted water supply for all purposes;

WHEREAS, the Texas Water Code and the regulations of the Texas Commission on Environmental Quality (the "Commission") and the Texas Water Development Board (the "Board") require that the District adopt a water conservation and drought contingency plan;

WHEREAS, as authorized under law, and in the best interests of the customers of the Crystal Clear Water Supply Corporation, the Board deems it expedient and necessary to establish certain rules and policies for the orderly and efficient management of limited water supplies during drought and other water supply emergencies;

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE CRYSTAL CLEAR WATER SUPPLY CORPORATION:

SECTION 1. That the Water Conservation and Drought Contingency Plan attached hereto as Exhibit "A" and made part hereof for all purposes be, and the same is hereby, adopted as the official policy of the Crystal Clear Water Supply Corporation.

SECTION 2. That the General Manager is hereby directed to implement, administer, and enforce the Water Conservation & Drought Contingency Plan.

SECTION 3. That this resolution shall take effect immediately upon its passage.

DULY PASSED BY THE BOARD OF DIRECTORS OF THE CCWSC CWSC ON THIS 23 day of April, 2014.

President, Board of Directors

ATTESTED TO:

Secretary, Board of Directors

Texas Water Development Board

## D. Projected Demands

1. Estimate the water supply requirements for the next ten years using population trends, historical water use, economic growth, etc.

| Year | Population | Water Demands (gallons) |
|---|---|---|
| 2014 | 15,567 | 5,041,408,900 |
| 2015 | 15,792 | 517,781,705 |
| 2016 | 16,166 | 531,793,009 |
| 2017 | 16,626 | 546,103,103 |
| 2018 | 17,078 | 560,031,992 |
| 2019 | 17,537 | 576,930,188 |
| 2020 | 18,012 | 591,678,560 |
| 2021 | 18,498 | 607,578,226 |
| 2022 | 18,999 | 624,116,529 |
| 2023 | 19,513 | 640,987,171 |

2. Describe sources of data and how projected water demands were determined. Attach additional sheets if necessary.

Using internal population projections by H2O Analytics, which project nearly linear through the planning horizon, annual population for the next ten years was projected using the formula of x = y*(y+K) with y being the current year and the constant K being the growth factor of 2.274% annual historical growth, and using the Region L methodology water demands were calculated by projecting 90 gpcd.

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# CRYSTAL CLEAR

Texas Water Development Board

## B. System Input

Provide system input data for the previous five years.

Total system input = self-supplied + imported + exported

| Year | Self-supplied Water in Gallons | Purchased/Imported Water in Gallons | Exported Water in Gallons | Total System Input | Total GPCD |
|---|---|---|---|---|---|
| 2009 | 369,743,800 | 290,270,500 | 0 | 660,014,300 | 122 |
| 2010 | 277,755,400 | 264,886,400 | 0 | 542,643,800 | 110 |
| 2011 | 348,222,700 | 280,898,400 | 0 | 603,122,100 | 142 |
| 2012 | 380,777,400 | 254,025,700 | 0 | 620,003,100 | 147 |
| 2013 | 326,568,400 | 244,527,200 | 0 | 571,095,600 | 133 |
| Historic 5-year Average | 300,013,740 | 264,722,040 | 0 | 680,735,780 | 127 |

## C. Water Supply System (Attach description of water system)

1. Designed daily capacity of system 2,494,749 gallons per day
2. Storage Capacity
   Elevated 900,000 gallons
   Ground 3,896,530 gallons
3. List all current water supply sources in gallons.

| Water Supply Source | Source Type* | Total Gallons |
|---|---|---|
| Edwards Aquifer | Ground | 900,680,749 |
| CRWA | Ground | 241,455,591 |
| CRWA | Contract | 152,825,309 |
| GBRA | Contract | 250,590,800 |
| SHWSC | Contract | 7,925,903 |
| Staples Well | Ground | 70,057,750 |

*Select one of the following source types: Surface water, Groundwater, or Contract

4. If surface water is a source type, do you recycle backwash to the head of the plant?
   ○ Yes _____ estimated gallons per day
   ◉ No

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Texas Water Development Board

## Section I: Utility Data

### A. Population and Service Area Data

1. Current service area size in square miles: 183
(Attach or email a copy of the service area map.)

2. Provide historical service area population for the previous five years, starting with the most current year.

| Year | Historical Population Served By Crystal Clear Water | Historical Population Served By Wholesale Water Service | Historical Population Served By Wastewater Service |
|---|---|---|---|
| 2009 | 12,748 | 0 | 0 |
| 2010 | 13,586 | 0 | 0 |
| 2011 | 12,861 | 0 | 0 |
| 2012 | 11,583 | 0 | 0 |
| 2013 | 13,557 | 0 | 0 |

3. Provide the projected service area population for the following decades.

| Year | Projected Population Served By Crystal Clear Water | Projected Population Served By Wholesale Water Service | Projected Population Served By Wastewater Service |
|---|---|---|---|
| 2020 | 25,737 | 0 | 0 |
| 2030 | 32,804 | 0 | 0 |
| 2040 | 39,853 | 0 | 0 |
| 2050 | 47,709 | 0 | 0 |
| 2060 | 55,873 | 0 | 0 |

4. Describe the source(s)/method(s) for estimating current and projected populations.

Projected population estimates were obtained from the approved 2011 Region L Water Plan.

# Appendix A – TWDB Utility Profile

Texas Water Development Board

## UTILITY PROFILE FOR RETAIL WATER SUPPLIER

Fill out this form as completely as possible.
**If a field does not apply to your entity, leave it blank.**

CONTACT INFORMATION

Name of Utility: Crystal Clear SUD

Public Water Supply Verification Number (PWS ID): 1840015, 1940017

Certificate of Convenience and Necessity (CCN) Number: 10250

Surface Water Right ID Number: N/A

Wastewater ID Number: N/A

Completed By: Mike Fuentes Title: Administrator

Address: 2370 FM 1976 City: San Marcos Zip Code: 78666

Email: mike@crystalclearsuc.org Telephone Number:

Date:

Regional Water Planning Group: L Map

Groundwater Conservation District: 25, 32 Map

Check all that apply:

- ☐ Received financial assistance of $500,000 or more from TWDB
- ☑ Have 3,300 or more water connections
- ☐ Have a surface water right with TCEQ

## E. High Volume Customers

1. List the annual water use, in gallons, for the five highest volume **RETAIL customers**. Select one of the following water use categories to describe the customer: choose Residential, Industrial, Commercial, Institutional, or Agricultural.

| Retail Customer | Water Use Category* | Annual Water Use | Treated or Raw |
|---|---|---|---|
| NGM Construction | Industrial | 4,951,900 | Treated |
| Hays Energy | Industrial | 3,512,100 | Treated |
| Ameriko Pipe | Industrial | 3,207,400 | Treated |
| Montana Properties | Commercial | 1,647,000 | Treated |
| Homeowner POA | Commercial | 1,527,800 | Treated |

*For definitions on recommended customer categories for classifying customer water use, refer to the online Industrial and Institutional for Reporting on Water Conservation and Water Use.

2. If applicable, list the annual water use for the five highest volume **WHOLESALE customers**. Select one of the following water use categories to describe the customer: choose Municipal, Industrial, Commercial, Institutional, or Agricultural.

| Wholesale Customer | Water Use Category* | Annual Water Use | Treated or Raw |
|---|---|---|---|
| none | Choose One | | Choose One |
| | Choose One | | Choose One |
| | Choose One | | Choose One |
| | Choose One | | Choose One |
| | Choose One | | Choose One |

*For definitions on recommended customer categories for classifying customer water use, refer to the online Industrial and Institutional for Reporting on Water Conservation and Water Use.

## F. Utility Data Comment Section

Provide additional comments about utility data below.

Texas Water Development Board

## Section III: Wastewater System Data

If you do not provide wastewater system services then you have completed the Utility Profile. Save and Print this form to submit with your Plan. Continue with the Water Conservation Plan Checklist to complete your Water Conservation Plan.

**A. Wastewater System Data** (Attach a description of your wastewater system.)

1. Design capacity of wastewater treatment plant(s): N/A gallons per day

2. List the active wastewater connections by major water use category.

| Water Use Category* | Active Wastewater Connections | | | |
|---|---|---|---|---|
| | Metered | Unmetered | Total Connections | Percent of Total Connections |
| Municipal | | | 0 | 0% |
| Industrial | | | 0 | 0% |
| Commercial | | | 0 | 0% |
| Institutional | | | 0 | 0% |
| Agricultural | | | 0 | 0% |
| TOTAL | 0 | 0 | 0 | |

3. What percent of water is serviced by the wastewater system? ____%

4. For the previous five years, enter the number of gallons of wastewater that was treated by the utility.

| Month | Total Gallons of Treated Wastewater | | | | |
|---|---|---|---|---|---|
| | 2009 | 2010 | 2011 | 2012 | 2013 |
| January | | | | | |
| February | | | | | |
| March | | | | | |
| April | | | | | |
| May | | | | | |
| June | | | | | |
| July | | | | | |
| August | | | | | |
| September | | | | | |
| October | | | | | |
| November | | | | | |
| December | | | | | |
| TOTAL | 0 | 0 | 0 | 0 | 0 |

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Texas Water Development Board

2. For the previous five years, enter the gallons of raw water provided to SETAS customers.

| Month | Total Gallons of Raw Retail Water | | | | |
|---|---|---|---|---|---|
| | 2009 | 2010 | 2011 | 2012 | 2013 |
| January | 0 | 0 | 0 | 0 | 0 |
| February | 0 | 0 | 0 | 0 | 0 |
| March | 0 | 0 | 0 | 0 | 0 |
| April | 0 | 0 | 0 | 0 | 0 |
| May | 0 | 0 | 0 | 0 | 0 |
| June | 0 | 0 | 0 | 0 | 0 |
| July | 0 | 0 | 0 | 0 | 0 |
| August | 0 | 0 | 0 | 0 | 0 |
| September | 0 | 0 | 0 | 0 | 0 |
| October | 0 | 0 | 0 | 0 | 0 |
| November | 0 | 0 | 0 | 0 | 0 |
| December | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 0 | 0 | 0 | 0 | 0 |

3. Summary of seasonal and annual water use.

| Water Use | Seasonal and Annual Water Use | | | | | Average in Gallons |
|---|---|---|---|---|---|---|
| | 2009 | 2010 | 2011 | 2012 | 2013 | |
| Summer Retail (Treated + Raw) | 203,213,400 | 166,864,200 | 219,091,000 | 188,397,300 | 198,354,200 | 190,161,800 |
| | | | | | | 1st Average |
| TOTAL Retail (Treated + Raw) | 504,362,400 | 643,743,800 | 665,837,980 | 627,454,200 | 642,653,400 | 596,629,356 |
| | | | | | | 1st Average |

E. **Water Loss**

Provide Water Loss data for the previous five years.

Water Loss GPCD = (Total Water Loss in Gallons ÷ Permanent Population Served) ÷ 365

Water Loss Percentage = (Total Water Loss ÷ Total System Input) ÷ 100

| Year | Total Water Loss in Gallons | Water Loss in GPCD | Water Loss as a Percentage |
|---|---|---|---|
| 2009 | 92,103,300 | 20 | 16% |
| 2010 | 86,293,400 | 19 | 16% |
| 2011 | 88,654,500 | 19 | 14% |
| 2012 | 90,801,400 | 22 | 18% |
| 2013 | 139,864,300 | 26 | 25% |
| 5-year average | 98,743,420 | 21 | 11% |

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Texas Water Development Board

## F. Peak Water Use

Provide the Average Daily Water Use and Peak Day Water Use for the previous five years.

| Year | Average Daily Use (gal) | Peak Day Use (gal) | Ratio (peak/avg) |
|---|---|---|---|
| 2009 | 332 | 684 | 1.48 |
| 2010 | 330 | 387 | 1.17 |
| 2011 | 302 | 533 | 1.36 |
| 2012 | 300 | 427 | 1.22 |
| 2013 | 317 | 417 | 1.05 |

## G. Summary of Historic Water Use

| Water Use Category | Historic 5-year Average | Percent of Connections | Percent of Water Use |
|---|---|---|---|
| Residential W | 496,563,902 | 90% | 77% |
| Residential NF | 0 | 0% | 0% |
| Industrial | 2,247,770 | 0% | 1% |
| Commercial | 96,339,446 | 4% | 8% |
| Institutional | 0 | 0% | 0% |
| Agricultural | 0 | 0% | 0% |

## H. System Data Comment Section

Provide additional comments about system data below.

Page 8 of 12

Texas Water Development Board

### B. Accounting Data

For the previous five years, enter the number of gallons of RETAIL water provided in each major water use category.

| Water Use Category* | Total Gallons of Retail Water | | | | |
|---|---|---|---|---|---|
| | 2009 | 2010 | 2011 | 2012 | 2013 |
| Residential - Single Family | 476,275,760 | 472,648,800 | 486,704,900 | 476,094,800 | 396,743,761 |
| Residential - Multi-family | | | | | |
| Industrial | | | | 8,283,900 | 7,984,948 |
| Commercial | 19,252,060 | 22,955,200 | 63,638,800 | 34,691,400 | 33,955,179 |
| Institutional | | | | | |
| Agricultural | | | | | |
| TOTAL | 495,527,820 | 542,843,810 | 570,254,700 | 453,244,900 | 442,983,278 |

*For definitions of recommended customer categories for classifying customer water use, refer to the online Guidance and Methodology for Regional Water Conservation and Water Use.

### C. Residential Water Use

For the previous five years, enter the residential GPCD for single family and multi-family units.

| Water Use Category* | Residential GPCD | | | | |
|---|---|---|---|---|---|
| | 2009 | 2010 | 2011 | 2012 | 2013 |
| Residential - Single Family | 122 | 110 | 142 | 114 | 102 |
| Residential - Multi-family | | | | | |
| TOTAL | 122 | 110 | 142 | 114 | 102 |

### D. Annual and Seasonal Water Use

1. For the previous five years, enter the gallons of treated water provided to RETAIL customers.

| Month | Total Gallons of Treated Retail Water | | | | |
|---|---|---|---|---|---|
| | 2009 | 2010 | 2011 | 2012 | 2013 |
| January | 37,815,000 | 42,920,800 | 37,308,600 | 36,149,900 | 40,012,400 |
| February | 37,626,500 | 33,674,700 | 42,457,900 | 37,492,600 | 40,660,200 |
| March | 43,599,000 | 34,651,580 | 48,424,100 | 50,294,200 | 49,842,300 |
| April | 41,127,200 | 38,866,700 | 60,140,800 | 51,284,200 | 47,116,600 |
| May | 48,975,300 | 46,520,000 | 57,918,400 | 53,487,700 | 49,380,400 |
| June | 57,721,700 | 43,991,600 | 70,344,400 | 63,038,600 | 60,026,900 |
| July | 67,364,100 | 47,904,900 | 71,287,600 | 62,412,100 | 65,805,000 |
| August | 68,147,600 | 63,228,100 | 77,299,600 | 61,947,700 | 59,969,900 |
| September | 49,876,000 | 53,990,600 | 66,874,800 | 55,416,700 | 51,259,700 |
| October | 52,858,600 | 49,450,700 | 60,608,000 | 51,710,300 | 48,374,100 |
| November | 38,292,900 | 42,204,000 | 49,374,400 | 33,179,600 | 44,848,600 |
| December | 37,201,600 | 45,210,600 | 42,296,600 | 46,121,500 | 40,192,600 |
| TOTAL | 566,262,400 | 542,742,600 | 686,937,900 | 627,854,200 | 592,093,800 |

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Texas Water Development Board

# Section II: System Data

## A. Retail Connections

1. List the active retail connections by major water use category.

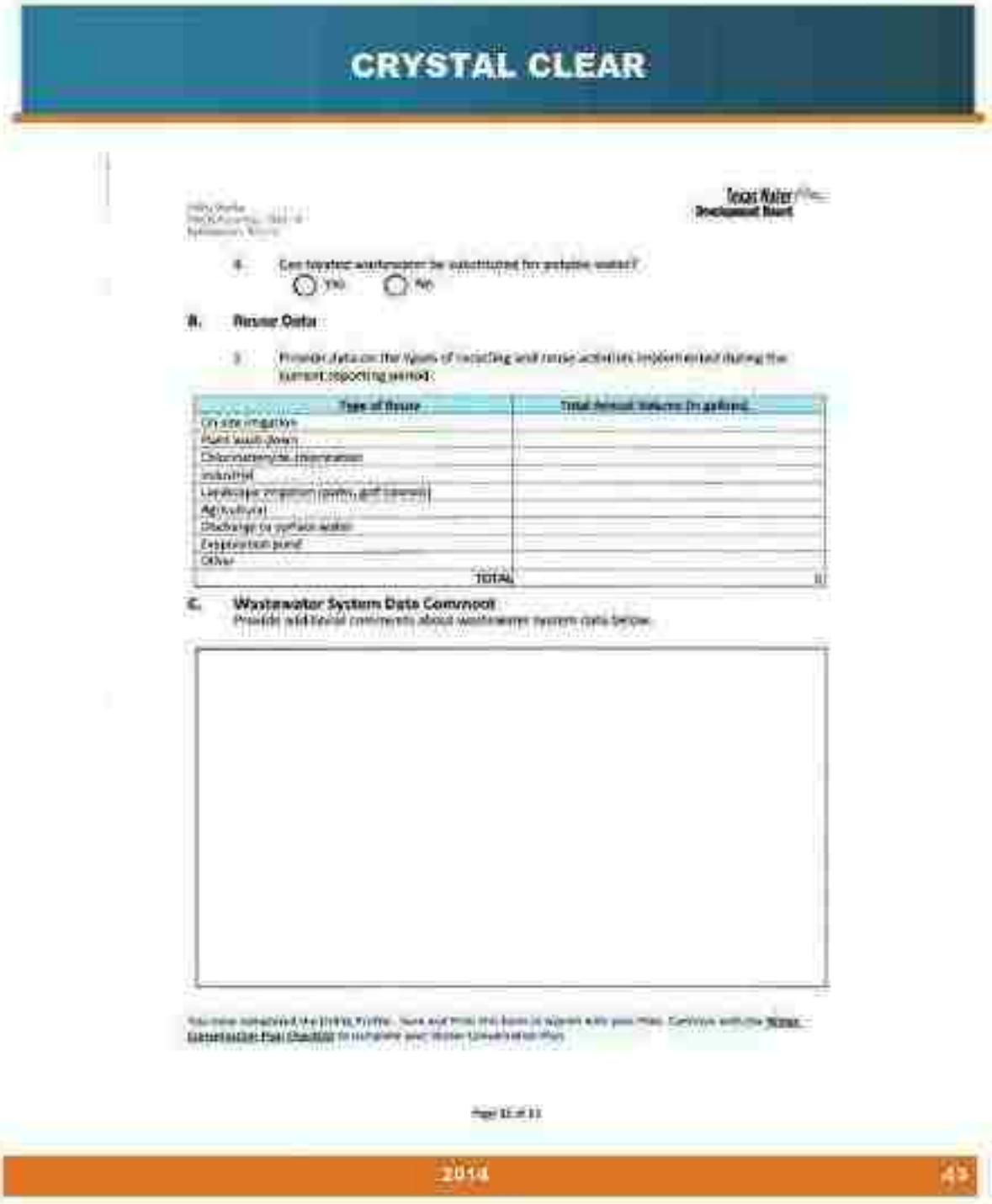
| Water Use Category* | Active Retail Connections | | | |
|---|---|---|---|---|
| | Metered | Unmetered | Total Connections | Percent of Total Connections |
| Residential – Single Family | 4,736 | 1 | 4,739 | 99% |
| Residential – Multi-family (units) | 1 | 0 | 1 | 0% |
| Industrial | 10 | 0 | 10 | 0% |
| Commercial | 194 | 0 | 194 | 4% |
| Institutional | 0 | | 0 | 0% |
| Agricultural | 0 | | 0 | 0% |
| TOTAL | 4,941 | 1 | 4,942 | |

*For definitions on recommended customer categories for classifying customer water use, refer to the online Submittal and Methodology for Reporting on Retail Connections and Water Use.

2. List the net number of new retail connections by water use category for the previous five years.

| Water Use Category* | Net Number of New Retail Connections | | | | |
|---|---|---|---|---|---|
| | 2009 | 2010 | 2011 | 2012 | 2013 |
| Residential – Single Family | 102 | -82 | 92 | 282 | 30 |
| Residential – Multi-family (units) | 1 | 0 | 0 | 0 | 0 |
| Industrial | 0 | 0 | 0 | 0 | 0 |
| Commercial | 1 | 0 | 0 | 0 | 1 |
| Institutional | 0 | 0 | 0 | 0 | 0 |
| Agricultural | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 102 | -82 | 92 | 282 | 30 |

*For definitions on recommended customer categories for classifying customer water use, refer to the online Submittal and Methodology for Reporting on Retail Connections and Water Use.




Crystal Clear reserves the right to amend and/or supplement the plan.

# APPENDIX A: CUSTOMER SERVICE FORMS

CRYSTAL CLEAR
SPECIAL UTILITY DISTRICT

# AGREEMENT FOR TEMPORARY WATER SERVICE

The service applicant indicated below ("Customer") has applied for water service from Crystal Clear Special Utility District ("District") at the service location indicated below. Under state public health and water utility service regulations [30 TAC 290.46(j)], District may not provide continuous potable water utility service to any new construction, to any existing service location where significant plumbing modifications have been made, or to any location where District has reason to believe that a cross-connection or other undesirable or unsafe condition exists until the service applicant or customer presents the District with an executed Customer Service Inspection Certificate ("C.S.I.") [30 TAC 290.47-Appendix D]. It is Customer's sole obligation and responsibility, at his/her expense, to have the necessary C.S.I. performed by a properly licensed inspector.

Notwithstanding this inspection requirement before permanent water service can be provided, District is allowed to provide Customer with temporary water service for construction purposes only. District agrees to prove such temporary construction water service as its standard rates and conditions of service upon Customer's agreement that:

1. The water service provided will be used for construction or landscaping purposes only.
2. The water provided **will not** be consumed by humans or animals.
3. Customer will notify District in writing when to initiate the temporary construction service.
4. Customer will notify District in writing when construction at the indicated service location has ended.
5. Customer agrees **not** to occupy or reside in the indicated service location until Customer has delivered a fully executed Customer Service Inspection Certificate to the District.

If Customer fails to abide by any provision of this agreement, water service to the indicated service location will be terminated and will not be restored under any circumstances until a fully executed Customer Service Inspection Certificate has been delivered to the District. Termination will be made without notice if, in the opinion of the District's licensed operator(s), Customer's service creates an immediate hazard to public health and safety. If no such hazard exists, Customer shall be notified and given a limited time to come into

compliance. District's state-approved reconnect fee will be charged as a condition of service restoration if temporary water service is terminated for breach of this agreement.

CUSTOMER NAME_____

CUSTOMER BILLING ADDRESS_____

_____

CUSTOMER PHONE NUMBER(S)_____

SERVICE LOCATION_____

Entered into in _____ County, Texas on the _____ day of _____, 20_____.

_____

Customer

_____

Crystal Clear SUD Representative

Non-Discrimination Statement

"This institution is an equal Opportunity provider and employer.

If you wish to file a Civil Rights program complaint of discrimination, complete the USDA Program Discrimination Complaint Form, found on line at http://www.ascr.usda.gov/complaint_filing_cust.html, or at any USDA office, or call (866) 632-9992 to request the form. You may also write a letter containing all of the information requested in the form. Send your completed complaint form or letter to us by mail at U.S. Department of Agriculture, Director, Office of Adjudication, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410, by fax (202) 690-7442, or email at program.intake@usda.gov."

CRYSTAL CLEAR
SPECIAL UTILITY DISTRICT

# SERVICE APPLICATION

CCSUD REP. _____

Please Print:

DATE _____

APPLICANT'S NAME _____

CO-APPLICANT'S NAME _____

CURRENT BILLING ADDRESS

_____

_____

PHONE NUMBER-HOME (___) ___-____ MOBILE (___) ___-____

EMAIL ADDRESS _____

CHECK BOX IF WE MAY EMAIL YOUR MONTHLY BILLS ☐ YES ☐ NO

LEGAL DESCRIPTION OF PROPERTY (include name of road, subdivision with lot and block number.):

_____

PREVIOUS OWNER'S NAME AND ADDRESS (IF TRANSFERRING MEMBERSHIP):

_____

ACREAGE _____ HOUSEHOLD SIZE _____

NUMBER IN FAMILY _____ LIVESTOCK & NUMBER _____

SPRINKLER SYSTEM ☐ YES ☐ NO

SPECIAL SERVICE NEEDS OF APPLICANT _____

_____

NOTE: FORM MUST BE COMPLETED BY APPLICANT ONLY. A MAP OF SERVICE LOCATION REQUEST MUST BE ATTACHED.

| The following information is requested by the Federal Government in order to monitor compliance with Federal laws prohibiting discrimination against applicants seeking to participate in this program. You are not required to furnish this information, but are encouraged to do so. This information will not be used in evaluating your application or to discriminate against you in any way. However, if you choose not to furnish it, we are required to note the race/ national origin of individual applicants on the basis of visual observation or surname. | |
|---|---|
| Ethnicity: ☐ Hispanic/ Latino<br>☐ Not Hispanic/ Latino<br>Gender: ☐ Male<br>☐ Female | Race: ☐ Black or African American<br>☐ White ☐ Asian<br>☐ Native Hawaiian/ Other Pacific Islander<br>☒ American Indian/ Alaska Native |

Non-Discrimination Statement

**PROOF OF OWNERSHIP PROVIDED BY** WARRANTY DEED (RECEIVED BY_____)

"This institution is an equal Opportunity provider and employer.

If you wish to file a Civil Rights program complaint of discrimination, complete the USDA Program Discrimination Complaint Form, found on line at http://www.ascr.usda.gov/complaint_filing_cust.html, or at any USDA office, or call (866) 632-9992 to request the form. You may also write a letter containing all of the information requested in the form. Send your completed complaint form or letter to us by mail at U.S. Department of Agriculture, Director, Office of Adjudication, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410, by fax (202) 690-7442, or email at program.intake@usda.gov."

**District Use Only**

Account Number:_____
Project Number:_____
Cost of Engineer Study:_____ $_____
Engineer Study Completion Date:_____
Service Classification:_____
Amount Paid:_____ $_____
Service Order Number:_____
Customer Service Inspection Date:_____
BPAT Required (Date):_____
Application Taken By:_____

Form RD-TX 442-8
(Rev. 6-06)

**UNITED STATES DEPARTMENT OF AGRICULTURE**
**Rural Utilities Service**

**RIGHT-OF-WAY EASEMENT**
**(Location of Easement Required)**

**KNOW ALL MEN BY THESE PRESENTS,** that _____, (hereinafter called "Grantors"), in consideration of one dollar ($1.00) and other good and valuable consideration paid by Crystal Clear Special Utility District, (hereinafter called "Grantee"), the receipt and sufficiency of which is hereby acknowledged, does hereby grant, bargain, sell, transfer, and convey to said Grantee, its successors, and assigns, a perpetual easement with the right to erect, construct, install and lay and thereafter access and use, operate, inspect, repair, maintain, replace, upgrade, parallel and remove water distribution and/or sewer collection lines and appurtenances, over and across _____ acres of land, more or less, more particularly described in instrument recorded in _____, in the Official Public Records, _____ County, Texas, together with the right of ingress and egress over Grantor's adjacent lands for the purpose for which the above mentioned rights are granted. The easement hereby granted shall not exceed 20' in width, be located across said land as follows:

The easement herein conveyed shall run the length of the property line, parallel and adjacent to _____.

Grantee shall have such other rights and benefits necessary and/or convenient for the full enjoyment and use of the rights herein granted, including without limitation, (1) the reasonable right of ingress and egress over and across lands owned by Grantor which are contiguous to the easement: (2) the reasonable right from time to time to remove any and all paving, undergrowth and other obstructions that may injure Grantee's facilities and appurtenances or interfere with the construction, maintenance, inspection, operation, protection, repair, alteration, testing, replacement, upgrading, relocation (as above limited), substitution or removal thereof: and (3) the rights to abandon-in-place any and all water supply and/or sewer distribution lines, service lines and associated appurtenances, such that Grantee shall have no obligation or liability to Grantor, or their successors or assigns, to remove any such abandoned lines or appurtenances.

In the event the easement hereby granted abuts on a public road and the county or state hereafter widens or relocates the public road so as to require the relocation of this water and/or sewer line as installed, Grantor further grants to Grantee an additional easement over and across the land described above for the purpose of laterally relocating said water and/or sewer line as may be necessary to clear the road improvements, which easement hereby granted shall be limited to a strip of land 20' in width, the center line thereof being the pipeline as relocated.

The consideration recited herein shall constitute payment in full for all damages sustained by Grantors by reason of the installation of the structures referred to herein and the Grantee will maintain such easement in a state of good repair and efficiency so that no unreasonable damages will result from its use to Grantor's premises. This Agreement together with other provisions of this grant shall constitute a covenant running with the land for the benefit of the Grantee, its successors, and assigns.

The Grantors covenant that they are the owners of the above described lands and that said lands are free and clear of all encumbrances and liens except the following:

_____
_____
_____
_____
_____

Form RD-TX 442-8
(Rev. 6-06)

Grantor does hereby bind itself, its successors and assigns, to WARRANT AND FOREVER DEFEND, all and singular, the easement herein granted to Grantee, or Grantee's successors and assigns, against every person whomsoever claiming, or to claim, the same or any part thereof.

The easement conveyed herein was obtained or improved through Federal financial assistance. This easement is subject to the provisions of Title VI of the Civil Rights Act of 1964 and the regulations issued pursuant thereto for so long as the easement continues to be used for the same or similar purpose for which financial assistance was extended or for so long as the Grantee owns it, whichever is longer.

**IN WITNESS WHEREOF** the said Grantors have executed this instrument this _____ day of _____, 20_____.

_____

_____

**ACKNOWLEDGEMENT**
(Individual)

**STATE OF TEXAS** §

**COUNTY OF** _____ §

This instrument was acknowledged before me on _____ by _____

_____.

(SEAL)

_____
Notary Public, State of Texas

Form RD-TX 442-8
(Rev. 6-06)

## ACKNOWLEDGEMENT
(Individual)

**STATE OF TEXAS** §

**COUNTY OF** _____ §

This instrument was acknowledged before me on _____ by _____.

**(SEAL)**

_____
Notary Public, State of Texas

CRYSTAL CLEAR
SPECIAL UTILITY DISTRICT

AGREEMENT made this _____ day of _____, 20_____ between **CRYSTAL CLEAR SPECIAL UTILITY DISTRICT**, a District organized under the laws of the State of Texas (hereinafter called the District) and _____ _____ (hereinafter called the Applicant).

The District shall sell and deliver water and/or wastewater service to the Applicant and the Applicant shall purchase, receive, and/or reserve service from the District in accordance with the Rules and Regulations of the District as amended from time to time by the Board of Directors of the District. Upon compliance with said policies, including payment of a Deposit Fee, the Applicant qualifies for service as a new applicant or as a transferee and thereby may hereinafter be called an Applicant.

The Applicant shall pay the District for service hereunder as determined by the District's Rules and Regulations and upon the terms and conditions set forth therein, a copy of which can be requested. Applicant acknowledges hereof by execution of this agreement. A copy of this agreement shall be executed before service may be provided to the Applicant.

The District shall have the authority to discontinue service and cancel the Deposit of the Applicant not complying with any policy or not paying any utility fees or charges as required by the District's published rates, fees and conditions of service. At any time service is discontinued, terminated or suspended, the District shall not re-establish service unless it has a current, signed copy of this agreement.

Applicant, upon qualification for service under the terms of the District's policies, shall agree to pay the monthly charges for such service as prescribed by the District's Rules and Regulations. Any breach of this agreement shall give cause for the District to liquidate, as damages, the Deposit fees previously paid to defray any losses incurred by the District. If delivery of service to said location is deemed infeasible by the District as a part of this project, the Applicant shall be denied service with the District and the Indication on Interest Fee, less expense, shall be refunded. The Applicant may re-apply for service at a later date under the terms and conditions of the District's policies. For the purposes of this agreement, an Indication of Interest Fee shall be of an amount equal to the District's Deposit Fees.

**All water shall be metered by meters to be furnished and installed by the District. The meter and/or wastewater connection is for the sole use of the Applicant or Customer and is to provide service to only one (1) dwelling or one (1) business. Extension of pipe(s) to transfer utility service from one property to another, to share, resell, or sub meter water to any other persons, dwellings, businesses, or property, etc., is prohibited.** _____

The District shall have the right to locate a water service meter and the pipe necessary to connect the meter on the Applicant's property at a point to be chosen by the District, and shall have access to its property and equipment located upon Applicant's premises at all reasonable and necessary times for any purpose connected with or in the furtherance of its business operations, and upon discontinuance of service the District shall have the right to remove any of its equipment from the Applicant's property. The Applicant shall install, at their own expense, any necessary service lines from the District's facilities and equipment to the point of use, including any customer service isolation valves, backflow prevention devices, clean-outs, and other equipment as may be specified by the District. The District shall also have access to the Applicant's property for the purpose of inspecting for possible cross-connections, potential contamination hazards, illegal lead materials, and any other violations or possible violations of state and federal statutes and regulations relating to the federal Safe Drinking Water Act or Chapter 341 of the Texas Health and Safety Code and/or the District's Rules and Regulations and service policies. _____

The District is responsible for protecting the drinking water supply from contamination or pollution which could result from improper practices. This service agreement serves as notice to each Applicant of the restrictions which are in place to provide this protection. The District shall enforce these restrictions to ensure the public health and welfare. The following undesirable practices are prohibited by state regulations:

a. No direct connection between the public drinking water supply and a potential source of contamination is permitted. Potential sources of contamination shall be isolated from the public water system by an air gap or an appropriate backflow prevention assembly in accordance with state regulations.
b. No cross-connection between the public drinking water supply and a private water system is permitted. These potential threats to the public drinking water supply shall be eliminated at the service connection by the proper installation of an air gap or a reduced pressure zone backflow prevention assembly and a service agreement must exist for annual inspection and testing by a certified backflow prevention device tester.

c. No connection which allows condensing, cooling, or industrial process water to be returned to the public drinking water supply is permitted.
d. No pipe or pipe fitting which contains more than 8.0% lead may be used for the installation or repair of plumbing on or after July 1, 1988, at any connection which provides water for human consumption.
e. No solder or flux which contains more than 0.2% lead may be used for the installation or repair plumbing on or after July 1, 1988, at any connection which provides water for human consumption.

The District shall maintain a copy of this agreement as long as the Applicant and/or premises are connected to the public water system. The Applicant shall allow their property to be inspected for possible cross-connections, potential contamination hazards, and illegal lead materials. These inspections shall be conducted by the District or its designated agent prior to initiating service and periodically thereafter. The inspections shall be conducted during the District's normal business hours.

The District shall notify the Applicant in writing of any cross-connections or other undesirable practices which have been identified during the initial or subsequent inspections. The Applicant shall immediately correct any undesirable practice on their premises. The Applicant shall, at their expense, properly install, test, and maintain any backflow prevention device required by the District. Copies of all testing and maintenance records shall be provided to the District as required. Failure to comply with the terms of this service agreement shall cause the District to terminate service or properly install, test, and maintain an appropriate backflow prevention device at the service connection. Any expenses associated with the enforcement of this agreement shall be billed to the Applicant.

In the event the total water supply is insufficient to meet the needs of all the Customers, or in the event there is a shortage of water, the District may initiate the Emergency Conservation Program as specified in the District's Rules and Regulations. By execution of this agreement, the Applicant hereby shall comply with the terms of said program.

By execution hereof, the Applicant shall hold the District harmless from any and all claims for damages caused by service interruptions due to water line breaks by District or like contractors, tampering by other Customers/users of the District, normal failures of the system, or other events beyond the District's control.

The Applicant shall grant to the District permanent recorded easement(s) dedicated to the District for the purpose of providing reasonable rights of access and use to allow the District to construct, maintain, replace, upgrade, parallel, inspect, test and operate any facilities

necessary to serve the Applicant as well as the District's purposes in providing system wide service for existing or future Customers.

**By execution hereof, the Applicant shall guarantee payment of all other rates, fees, and charges due on any account for which said Applicant is a Customer. Said guarantee shall pledge any and all Deposit Fees against any balance due the District. Liquidation of said Deposit Fees shall give rise to discontinuance of service under the terms and conditions of the District's Rules and Regulations.**

By execution hereof, the Applicant agrees that non-compliance with the terms of this agreement by said Applicant shall constitute denial or discontinuance of service until such time as the violation is corrected to the satisfaction of the District.

Any misrepresentations of the facts by the Applicant on any of the pages of this agreement shall result in discontinuance of service pursuant to the terms and conditions of the District's Rules and Regulations.

| | |
|---|---|
| Applicant | Applicant |
| Date | Date |

Non-Discrimination Statement

"This institution is an equal Opportunity provider and employer.

If you wish to file a Civil Rights program complaint of discrimination, complete the USDA Program Discrimination Complaint Form, found on line at http://www.ascr.usda.gov/complaint_filing_cust.html, or at any USDA office, or call (866) 632-9992 to request the form. You may also write a letter containing all of the information requested in the form. Send your completed complaint form or letter to us by mail at U.S. Department of Agriculture, Director, Office of Adjudication, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410, by fax (202) 690-7442, or email at program.intake@usda.gov."

CRYSTAL CLEAR
SPECIAL UTILITY DISTRICT

# NOTICE TO CUSTOMERS REGARDING CLOSED SYSTEMS

All new meter services may be installed with a dual check valve. The dual check valve prevents water from flowing backwards into the water main. This causes customers to have a closed system. In the event that a customer does not have a pop off valve on his/her water heater(s), the presence of a closed system could cause danger to the customer. Crystal Clear Special Utility District **IS NOT LIABLE** for any damages caused at a customer's property due to the customer's closed system. To find out if you have a closed system, call Crystal Clear SUD at 830-372-1031, or make sure your water heater has the pop off valve in place; either will protect your property.

State law also requires that vacuum breakers be installed on any faucet that a water hose may be attached to. These vacuum breakers are available at most plumbing supply companies.

ACCOUNT #_____ DATE_____

CUSTOMER (PRINT NAME)_____

SERVICE ADDRESS_____

CUSTOMER (SIGNATURE)_____

EXAMPLE: Simply leaving a hose, connected to a faucet, submerged in a sink or any other water basin, can create a serious health threat. When the faucet is left running, or when it leaks, a loss in pressure of the supply main can siphon contaminating materials back into the potable water system.

Non-Discrimination Statement

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# SERVICE CANCELLATION & METER SURRENDER REQUEST

I, _____, landowner, hereby request that my water meter account number _____ and location number _____ for the address _____ be disconnected from service by Crystal Clear Special Utility District and the meter be surrendered. I understand that by signing for this action, there will no longer be water service for that location/address. I also understand that I am fully responsible for all charges incurred on this account to the date of disconnect including consumption and any fees, **which includes a $100 voluntary disconnect fee due at the time of this request**, as well as any damages discovered during this process. Once all the charges are paid in full, my deposit refund will be processed and mailed to the forwarding address I have provided at the bottom of this document. The deposit may **not** be processed for refund until all of the charges owed on the account are paid in full.

I am fully aware and understand that if I or any other person request water service be provided to this location/address, it would be treated as a new account. This would require a new application for service with all of the necessary documents and any cost associated with this process, including but not limited to a deposit, installation fees, etc., in accordance with the Crystal Clear Special Utility District Rules and Regulation. In the event that a Capital Recovery Fee was never paid for this location/address or was refunded, future ability to provide service would be dependent upon system capacity. This capacity may be limited and could also require an engineering study be performed to determine if there is availability; this cost would be the financial responsibility of the person requesting service. If the determination is made as a result of the engineering study, that there is not enough capacity available to provide this location with service, there could be additional charges at the responsibility of the person requesting service for this location.

_____
Requested surrender date

_____ _____
Signature of Account Owner Date Signed

_____ _____
Signature of Account Owner Date Signed

Forwarding Address:

_____

**BELOW THIS LINE FOR OFFICE USE ONLY:**

_____ _____ _____ _____
CSR Signature Rec'd Date Rec'd CSR Signature Processed Date Processed

Non-Discrimination Statement

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CRYSTAL CLEAR
SPECIAL UTILITY DISTRICT

ACCOUNT#_____ DATE_____

TO_____

ADDRESS_____

_____

CHECK NUMBER/DRAFT_____

AMOUNT OF CHECK (including fees due)_____

Your check/draft has been returned to us by your bank for the following reason(s)

_____

You have ten days from the date of this notice or by_____ in which to redeem the returned check/draft and pay as additional $30.00 Returned Check/Draft Fee. Redemption of the returned check/draft and payment of additional fees may be made by cash, money order, credit card or certified check. If you have not redeemed the returned check/draft and paid the additional service fees within ten days, your utility service will be disconnected. If you have two or more returned checks within a twelve month period, you will be required to make future utility bill payments in cash or by money order for a period of twelve months.

CRYSTAL CLEAR SUD MANAGEMENT

Non-Discrimination Statement

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CRYSTAL CLEAR
SPECIAL UTILITY DISTRICT

# SERVICE AVAILABILITY REQUEST FORM

Date _____ CSR _____

This Service Availability Form is a "conditional" approval for service based on current conditions of the system. Service cannot be confirmed until application for service is accepted and fees have been paid. This approval is voided after 180 days of receipt or if the system conditions change due to other applications or service commitments.

Signature below acknowledges acceptance of the above terms.

_____

Name _____

Location of service requested _____

Phone Number _____

**********

## Engineer Use Only

New meter service approved _____ Yes _____ No

If no, explanation _____

Extra construction needed _____ Yes _____ No

Date _____ Authorized Signature _____

Non-Discrimination Statement:

This institution is an equal Opportunity provider and employer.

If you wish to file a Civil Rights program complaint of discrimination, complete the USDA Program Discrimination Complaint Form, found on line at http://www.ascr.usda.gov/complaint_filing_cust.html, or at any USDA office, or call (866) 632-9992 to request the form. You may also write a letter containing all of the information requested in the form. Send your completed complaint form or letter to us by mail at U.S. Department of Agriculture, Director, Office of Adjudication, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410, by fax (202) 690-7442, or email at program.intake@usda.gov."

POLICIES OF CRYSTAL CLEAR SPECIAL UTILITY DISTRICT
REGARDING CUSTOMER LINE EXTENSIONS

Date_____

Crystal Clear Special Utility District will serve new Customers on a first come basis as long as water supply and line size are adequate to serve new Customers without decreasing water pressure and service to present Customers.

Anyone desiring to extend any of Crystal Clear Special Utility District's lines must submit the request and have it approved by Crystal Clear Special Utility District's Engineer and Board of Directors.

Anyone desiring to extend the water line to secure water service must pay all costs of installing the extended line. All line extensions must be according to Crystal Clear Special Utility District's specifications.

All Rules and Regulations apply to all Customers.

The Contractor installing the line **must be approved** by Crystal Clear Special Utility District.

A plan of the line extension and a plat of any subdivision must be supplied to Crystal Clear Special Utility District. This plan and plat must be updated if changes are made.

After the line extension is completed and accepted by Crystal Clear Special Utility District, the line becomes the property of Crystal Clear Special Utility District. The person paying for the installation is responsible for repairing all leaks and breakage on the line for **one year**, after completion.

The only time Crystal Clear Special Utility District promises water service is when a Deposit is approved, purchased and the monthly charges are paid.

For a period of **five years**, anyone wishing to become a Customer of Crystal Clear Special Utility District and have water service on the line extension shall have to pay a reasonable share of the line extension (construction costs only) to the person(s) paying for the line extension. This reasonable share is to be determined by Crystal Clear Special Utility District. For a period of **five years** any new customers must pay $_____ as a reasonable share to _____ in addition to the regular fees required.

Customer_____ CCSUD_____

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CRYSTAL CLEAR
SPECIAL UTILITY DISTRICT

# METER TEST AUTHORIZATION FORM

NAME:_____ DATE OF REQUEST:_____

SERVICE ADDRESS:_____

EMAIL:_____ PHONE NUMBER:_____

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METER SERIAL NUMBER:_____ FINAL READING:_____

REASON FOR REQUEST:_____

Customer requesting a meter test shall accept test results shown by the District. Customer acknowledges and agrees that an initial field test may be performed using a calibrated or marked volumetric container. A subsequent bench test of the meter will be performed thereafter if the field test indicates the meter tests high. The subsequent test shall be conducted in accordance with the American Water Works Association standards and methods on a certified test bench. Customer agrees to pay the District's experienced cost of testing by a third party agency for the test if the results indicate an AWWA acceptable performance, plus any outstanding water utility service. In the event the Customer is required to pay for the test and for outstanding water utility service as set forth herein, said charges shall be applied to the next billing sent to the Customer after the date of the test.

_____ _____

Customer Signature Date

Non-Discrimination Statement

"This institution is an equal opportunity provider and employer."

If you wish to file a Civil Rights program complaint of discrimination, complete the USDA Program Discrimination Complaint Form, found on the internet at http://www.ascr.usda.gov/complaint_filing_cust.html, or at any USDA office, or call (866) 632-9992 to request the form. You may also write a letter containing all of the information requested in the form. Send your completed complaint form or letter to us by mail at U.S. Department of Agriculture, Director, Office of Adjudication, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410, by fax (202) 690-7442, or email at program.intake@usda.gov."

CRYSTAL CLEAR
SPECIAL UTILITY DISTRICT

2370 FM 1979, San Marcos, Texas 78666 830-372-1031

_____ _____

_____ Account #

_____ _____

Date

Re: **Notice of Possible Violation** (Multiple Premises Being Served by a Single Meter)

It has come to the attention of Crystal Clear Special Utility District that your meter may be serving multiple residences and/or dwellings in violation of state health and safety laws and Crystal Clear Special Utility District's Rules and Regulations. Such a potential violation could result in termination of water service to the meter now being served as there is only a commitment to serve one dwelling. Before your water service will be restored, you will be required to pay all deposits and application fees for any additional residences/dwellings.

Attached is a copy of the Texas Commission on Environmental Quality ("TCEQ") regulatory guidance document on individual metering of consuming facilities. We respectfully request that you contact Crystal Clear Special Utility District at 830-372-1031 to avoid losing your water service. If you fail to initiate resolution of this matter within thirty (30) days of this letter, you will be subject to termination without further notice.

Thank you in advance for your prompt attention to this matter.

Sincerely,

Crystal Clear Special Utility District Representative

# APPENDIX B: Non-Standard Developer Forms

CRYSTAL CLEAR
SPECIAL UTILITY DISTRICT

# EQUIPMENT AND LINE DEDICATION AGREEMENT

_____ ("Transferor"), having complied with the Developer, Subdivision, and Non-standard Service Requirements contained in the Rules and Regulations of Crystal Clear Special Utility District (the "District"), the District's Rules and Regulations, and the requirements and conditions set forth in the Non-Standard Service Contract between the District and Transferor dated _____, 20____, Transferor does hereby dedicate, transfer and assign to the District all rights and privileges to and ownership of all equipment, facilities and improvements (collectively the "Improvements") installed as a condition of service, which Improvements are described in the above-described Non-Standard Service Contract and any amendments thereto, and being further described in the document(s) attached hereto as Exhibit "A" or as follows:

On the _____ day of _____, 20_____ the District through its Board of Directors agreed to accept the above-described Improvements. The District shall, from this day forward, hold Transferor harmless from any costs for repairs or maintenance of said Improvements, notwithstanding any warranty or maintenance bonds for said repairs or maintenance as per the Non-Standard Service Contract.

This agreement is entered into on _____, 20____, by:

**CRYSTAL CLEAR SUD TRANSFEROR:**

By:_____
General Manager
2370 FM 1979
San Marcos, TX 78666

STATE OF TEXAS §
COUNTY OF GUADALUPE §

IN WITNESS WHEREOF the said Transferor and General Manager of the Crystal Clear Special Utility District have executed this instrument on this _____ day of _____, 20____.

BEFORE ME, the undersigned, Notary Public, on this day personally appeared _____ and _____ known to me to be the persons whose names are subscribed to the foregoing instrument, and acknowledged to me that he/she/they executed the same for the purpose and consideration therein expressed.

GIVEN UNDER MY HAND AND SEAL on this _____ day of _____, 20____.

_____

Notary Public, State of Texas

Non-Discrimination Statement

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**Memorandum for Record**

Dated: March 19, 2019

To: All CCSUD Customers and Potential/Prospective Customers

From: CCSUD Management

Sub: Agreements/Contracts

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In order to protect Crystal Clear Special Utility District (CCSUD) and CCSUD Customers and/or CCSUD Potential/Prospective Customers, any and all agreements for services and work will be required to be in writing. This includes but not limited to any/all line/system extensions and line/system upgrades/improvements, regardless of the amount of the costs to the CCSUD Customers and/or CCSUD Potential/Prospective Customers. CCSUD does **NOT** and will **NOT** honor any alleged verbal agreements in regards to any/all projects/upgrades. All agreements/contracts must include proper documentation and signatures of all parties involved or they will **NOT** be considered valid.

CCSUD Management

_____ _____

Customer Printed Name Date

_____

Customer Signature

**Received by:**

_____ _____

CCSUD Staff Printed Name Date

_____

CCSUD Staff Signature

# CRYSTAL CLEAR SPECIAL UTILITY DISTRICT
# NON-STANDARD SERVICE AGREEMENT

THIS AGREEMENT is made and entered into by and between _____, hereinafter referred to as "Developer," and Crystal Clear Special Utility District, hereinafter referred to as "CCSUD."

WHEREAS, Developer is engaged in developing that certain approximately _____ acres of land on _____ in _____ County, Texas, more particularly known or to be known as "the Property" and identified by full legal description on Attachment "A" attached hereto and incorporated herein for all purposes; and,

WHEREAS, CCSUD owns and operates a water system which supplies potable water for human consumption and other domestic uses to customers within its state-certificated service area [certificate of convenience and necessity ("CCN") No. 10297]; and,

WHEREAS, Developer has requested CCSUD to provide such water service to the Property through CCSUD's water system.

NOW THEREFORE: KNOW ALL MEN BY THESE PRESENTS: THAT for and in consideration for the mutual promises hereinafter expressed, and other good and valuable consideration, the sufficiency of which is hereby acknowledged by the parties, Developer and CCSUD agree as follows:

1. **Engineering and Design.**

(a) Engineer Report See Attachment "B"

The Water System Extension shall be designed and constructed to provide non-standard water utility service to the Property. The Water System Extension shall be engineered and in accordance with the applicable standard specifications of the CCSUD and all governmental agencies having jurisdiction. CCSUD shall oversee and inspect all design work and construction and may charge Developer a reasonable fee for this work.

The non-standard service requirements of the Property are set forth on Attachment "C" attached hereto and incorporated herein for all purposes. Any Water System Extension

must be sized to provide continuous and adequate water service to the property based on plans for the development of the Property provided to CCSUD by the Developer.

The specific terms and conditions of the extension of CCSUD's retail public water utility service are listed on Attachment "B." In the absence of a necessary term or in the event of conflict with any provision in this general Agreement, the terms in Attachment "B" shall control.

(b) Distribution System.

The water lines, service lines, meters and related portions of the distribution system infrastructure within the boundaries of the Property (Hereinafter the "Distribution System") May be engineered and designed by Developer's consulting engineer, which engineer shall be responsible for overseeing the construction of the Distribution system under the applicable rules of the Texas Commission on Environmental Quality ("TCEQ") and the Texas Board of Professional Engineers ("TBPE"). Should CCSUD's Engineer be required to engineer or design improvements to the Distribution System, the Developer shall pay fees as detailed in Attachments.

(c) Production System.

All water production, storage, treatment, pressure, transmission outside the Property and other non-Distribution System facilities (herein after the "Production System") May be engineered and designed by Developer's consulting engineer, which engineer shall be responsible for overseeing the construction of the Distribution system under the applicable TCEQ and TBPE rules. All engineering and designs for the Distribution and Production Systems must be reviewed and approved by CCSUD's consulting engineer prior to commencement of any utility system construction on the property. After completion of the plans and specifications by the Developer's and CCSUD's consulting engineers and their approval by the CCSUD's consulting engineer, the plans and specifications shall become part of this Agreement by reference and shall more particularly define "the Water System Extension". Should CCSUD's Engineer be required to engineer or design improvements to the Production System, the Developer shall pay fees as detailed in Attachments.

(d) Oversizing.

CCSUD may require the Water System Extension to be oversized in anticipation of the needs of other customers of the CCSUD, subject to the obligation to reimburse the Developer for any such oversizing as provided below. At CCSUD's option, reimbursement may be in the form of a credit against any connection fees Developer may have to pay. CCSUD's obligation to pay for oversizing shall not apply to oversizing related to fire flows or firefighting capacities requested by Developer.

(e) Fire Flows.

If the Developer has requested and CCSUD has agreed to provide additional water service capacities to the Property sufficient to provide fire flows. This non-public drinking water service shall be provided under CCSUD's policies.

(f) Cost Changes.

Due to the variable market for needed materials and supplies, quotations for the cost of construction of utility plant and/or upgrades that will be necessary to meet the service demands of the service application shall be good only for the date of presentation by the Corporation's engineer and/or contractor. For purposes of this Agreement, the "date of presentation" means the date the quotations and Water System Extension plans were presented to and approved by CCSUD's Board of Directors. Following the date of presentation, materials and supplies for construction may include an adjustment to reflect current market prices if such changes are found reasonable and approved in writing by CCSUD's consulting engineer. All costs of change orders or other modifications of the engineered design and/or TCEQ-approved plans shall be borne by Developer unless such changes or modifications are made at CCSUD's request for the sole benefit of other CCSUD customers.

2. **Required Easements or Rights-of-Way.**

Developer shall be responsible for dedicating or acquiring any easements across privately owned land which are necessary for the construction of the Water System Extension and for obtaining any Governmental approvals necessary to construct the Water System Extension in public right-of-way. If Developer cannot obtain any easement identified by CCSUD as necessary, Developer may request CCSUD to exercise its statutory powers of eminent domain to obtain such easement(s). Developer shall bear all costs related to such condemnation proceedings, including all consideration and litigation costs of the condemnation. CCSUD may require Developer to escrow all such projected costs before initiating any condemnation actions for Developer's benefit. By requesting CCSUD to initiate a condemnation of private property, Developer acknowledges and consents to any delays to final provision of retail public water utility service to the Property occasioned by Developer's failure to independently provide CCSUD with necessary easement(s).

All pipeline easements assigned to CCSUD hereunder shall be (and not less than) 20-feet in width within the Property and 20-feet in width outside the Property. The pipeline easement(s) shall be located on private property along a route that best facilitates the most reliable and efficient operation of the Water System Extension. If such optimal route adversely affects Grantee, Developer may request an alternate course of the easement except that when the pipeline(s) or plant is installed, the easement herein granted shall be limited to a strip of land 20-feet in width the centerline or center-point

thereof. CCSUD's consulting engineer shall have the final decision on where any easement must be located.

If continuous and adequate retail public water utility service to the Property requires the construction of new Production System facilities, Developer shall provide CCSUD with all the sites necessary to construct and operate such facilities. The site(s) shall be conveyed in fee or, with CCSUD's consent, by exclusive permanent recorded easement. Developer shall also provide CCSUD with all pipelines, utility, ingress/egress and sanitary control easements identified by CCSUD's consulting engineer and attorney as necessary to the use of said site(s) for water utility purposes. All ingress/egress easements shall be sufficient to construct and maintain an all-weather road from the site(s) to the nearest public road. All sanitary control easements shall comply with all requirements of 30 AC §290.38(48), .41 and .47(c).

Any easements acquired by the Developer shall be assigned to CCSUD upon proper completion of the construction of the Water System Extension. CCSUD's attorney must approve the validity of the legal instruments by which the Developer acquires any such easements and by which Developer assigns such easements to CCSUD. Developer shall be responsible for obtaining, at its expense, any consent or release required by any person or entity having a lien or other security interest in the easement or real property to be encumbered by said easement(s).

3. **Term of Contract.**

Execution of this Agreement shall bind the parties for a period of two calendar years. To extend the contract beyond two years, Developer shall be required to pay connection fees and tap fees for one-half or more of the anticipated residential or commercial building sites within the Property during the initial two-year period. Payment of at least one-half of the anticipated connection fees will extend the contract an additional two years. Construction must commence within six months of the payment of said connection fees.

The connection and tap fees to be paid shall be fees included in CCSUD's Rules and Regulations on the date of payment. Connection and Installations fees shall not be "grandfathered".

4. **Construction of the Water System Modifications, Changes or Extensions.**

(a) <u>Production System</u>

(1) Developer may select his own contractor for the construction of the Production System, subject to CCSUD's right to veto such selection if CCSUD, its consulting engineer or its attorney has had unacceptable prior experience with said contractor and/or his work. If CCSUD rejects

Developer's designated contractor, Developer shall be authorized to select another contractor. No construction will commence until plans and specifications for the Production System have been submitted to and approved by the TCEQ and any other required regulatory agency, as may be required by law. CCSUD shall have no liability of any kind to Developer occasioned by delays or difficulties in obtaining any required governmental approvals, permits, licenses or certificates.

(2) The Production System shall be constructed in accordance with the approved plans and specifications. CCSUD shall have the right to inspect all phases of the construction of the Production System. Developer must give written notice to CCSUD of the date on which construction is scheduled to begin within the Property that may affect any portion of the Production System so that CCSUD may assign an inspector.

(b) Distribution System

(1) Developer may select his own contractor for the construction of the Distribution System, subject to CCSUD's right to veto such selection if CCSUD, its consulting engineer or its attorney has had unacceptable prior experience with said contractor and/or his work. If CCSUD rejects Developer's designated contractor, Developer shall be authorized to select another contractor or to request CCSUD to obtain a suitable contract through a bid procedure. No construction will commence until plans and specifications for the Distribution System have been submitted to and approved by the TCEQ and any other required regulatory agency, as may be required by law. CCSUD shall have no liability of any kind to Developer occasioned by delays or difficulties in obtaining any required governmental approvals, permits, licenses, certificates or contractor acceptable to both CCSUD and Developer. CCSUD shall have no liability whatsoever for the acts and omissions of Developer, his engineer(s), his contractor(s) or his subcontractor(s). CCSUD shall have no liability or responsibility to third persons for the materials and supplies used by Developer. Developer's liability or responsibility to CCSUD for the materials and supplies used shall be limited to the one-year warranty in Paragraph 4. Developer shall be responsible and liable for the safety of the work site and the preservation of materials and equipment related to the Distribution System. Developer shall hold CCSUD harmless for any claims, demands, suits or causes of action related to the Developer-constructed Distribution System. Developer shall indemnify CCSUD for all expenses or damages incurred by CCSUD, including attorney and litigation costs, related to the Developer-constructed Distribution System. All rights and protections of CCSUD in this Paragraph shall be extended to CCSUD's directors,

officers, employees, attorney(s), engineer(s), contractor(s), and subcontractor(s).

(2) The Distribution System shall be constructed in accordance with the approved plans and specifications. CCSUD shall have the right to inspect all phases of the construction of the Distribution System. Developer must give written notice to CCSUD of the date on which construction of the Distribution System is scheduled to begin so that CCSUD may assign an inspector.

5. **Dedication of Water System Extension to CCSUD.**

Upon proper completion of construction of the Water System Extension and final inspection thereof by CCSUD, the Water System Extension, including all components real and personal of the Production and Distribution Systems, shall be dedicated to the CCSUD by an appropriate legal instrument approved by CCSUD's Attorney. Developer shall bear any costs of remediation or rehabilitation necessary to bring the Water System Extension into compliance with all state, federal, and CCSUD standards before acceptance by CCSUD. CCSUD shall have to the sole decision of when the Water System Extension is acceptable. The Water System Extension shall thereafter by owned and maintained by CCSUD; however, Developer shall warrant the construction and suitability of the same for a period of one (1) calendar year and shall bear all costs of repairs and improvements during this warranty period.

6. **Subdivision and Development Restrictions.**

Developer shall create and enforce permanent and irrevocable subdivisions and/or development deed, plat or other restrictions and/or covenants running with the land that shall prohibit the construction of private potable water systems or water wells within the “the property”. No interconnection between a private, non-potable water supply and the CCSUD’s water supply may be constructed or maintained except in strict conformance with applicable state or federal health, safety, environmental or utility regulations.

7. **Cost of the Water System Extension.**

(a) Developer shall pay all costs associated with the Water System modifications, changes or extensions as a contribution in aid of construction, including without limitation to the cost of the following:

(1) engineering and design;

(2) easement or right -of-way acquisition;

(3) construction;

(4) inspection;

(5) attorneys' fees;

(6) governmental or regulatory approvals required to lawfully provide service, including all costs of amending CCSUD's certificate of convenience and necessity;

(7) CCSUD's prescribed Connection Fee (by anticipated meter size) and/or capacity reservation charge shall be charged for each lot and/or service connection for which the Water System Extension is designed to serve less credit for any production, treatment, storage, pressure and transmission facilities, *i.e*., the Production System, added to CCSUD's utility system at Developer's expense to serve the property in question; however, no credit shall be provided for distribution lines, valves, taps, services, flush valves and appurtenances thereto, *i.e*., the Distribution System. However, the total offset credit received shall never exceed the total amount of CCSUD's prescribed Connection Fee (by anticipated meter size) and/or capacity reservation charge, which would otherwise be collected.

(b) Developer shall indemnify CCSUD and hold CCSUD harmless from all of the foregoing costs.

(c) Payment of Contribution in Aid of Construction:

(1) A Non-Standard Service Investigation Fee in an amount set forth in the District's Rules and Regulations, and in consultation with the CCSUD's consulting engineer and counsel, shall be paid by cashier's check payable to the CCSUD at the time of initial application for service.

(2) Connection Fees shall be paid at the time the Developer or its successor requests the initiation of water utility service to a residential or commercial site. Connection Fees, for at least one-half the anticipated lots, must be paid before the end of the first two-year term if the Developer wants to extend the contract another two years.

(d) Provided, however, except for the one-year warranty provide in the Agreement, nothing herein shall be construed as obligating the Developer to maintain the Water System Modifications, Changes or Extensions subsequent to its dedication and acceptance for maintenance by CCSUD and the expiration of the warranty period.

(e) If CCSUD has required the Water System Modification, Changes or Extensions to be oversized in anticipation of the needs of the other customers of CCSUD, CCSUD shall reimburse Developer for the additional costs of construction attributable to the oversizing, as determined by the CCSUD's consulting engineer, in three equal annual installments without interest beginning one year after dedication of the Water System Extension to CCSUD. In the alternative, the Developer may choose to credit his refund against the Connection Fees he would otherwise pay.

8. **Service From the Water System Modifications, Changes or Extensions.**

(a) After proper completion and dedication of the Water System Modifications, Changes or Extensions to CCSUD, CCSUD shall provide continuous and adequate water service to the Property under the requirements of CCSUD's state-issued certificate of convenience and necessity, TCEQ regulations and all duly adopted rules and regulations of CCSUD and payment of the following:

(1) All standard rates, fees and charges as reflected in CCSUD's approved Rules and Regulations;

(2) Any applicable Connection Fee and Installation Fee adopted by CCSUD;

(3) Any applicable reserved service charge as reflected in the District's Rules and Regulations adopted by CCSUD.

(b) Unless the prior approval of CCSUD is obtained, the Developer shall not:

(1) construct or install additional water lines or facilities to service areas outside the Property;

(2) add any additional lands to the Property for which water service is to be provided pursuant to this agreement; or

(3) connect or serve any person or entity who, in turn, sells water service directly or indirectly to another person or entity.

9. **Effect of Force Majeure.**

In the event either party is rendered unable by force majeure to carry out any of its obligations under this Agreement, in whole or in part, then the obligations of that party, to the extent affected by the force majeure shall be suspended during the continuance of the inability, provided however, that due diligence is exercised to resume performance at the earliest practical time. As soon as reasonably possible after the occurrence of the force majeure relied upon to suspend performance, the party whose

contractual obligations are affected thereby shall give notice and full particulars of the force majeure to the other party.

The cause, as far as possible, shall be remedied with all reasonable diligence. The term “force majeure” includes acts of God, strikes, lockouts or other industrial disturbances, acts of the public enemy, orders of the government of the United States or the State of Texas or any civil or military authority, insurrections, riots, epidemics, landslides, lightning, earthquakes, fires, hurricanes, storms, floods, washouts, droughts, arrests, restraints of government and civil disturbances, explosions, breakage, or accidents to equipment, pipelines, or canals, partial or complete failure of water supply, and any other inability of either party, whether similar to those enumerated or otherwise, that are not within the control of the party claiming the inability and that could not have been avoided by the exercise of due diligence and care. It is understood and agreed that the settlement or strikes and lockouts shall be entirely within the discretion of the party having the difficulty and that the requirement that any force majeure be remedied with all reasonable dispatch shall not require the settlement of strikes and lockouts by acceding to the demands of the opposing party if the settlement is unfavorable to it in the judgment of the party having the difficulty.

10. **Notices.**

Any notice to be given hereunder by either party to the other party shall be in writing and may be affected by personal delivery or by sending said notices by registered or certified mail, return receipt requested, to the address set forth below. Notice shall be deemed given when deposited with the United States Postal Service with sufficient postage affixed. Any notice mailed to the CCSUD shall be addressed:

Crystal Clear Special Utility District
Attn: General Manager
2370 FM 1979
San Marcos, TX 78666 (830) 372-1031

Any notice mailed to Developer shall be addressed:

_____

_____

_____

_____

With copy to:

_____

_____

_____

_____

Either party may change the address for notice to it by giving notice of such change in accordance with the provisions of this paragraph.

11. **Severability.**

The provisions of this Agreement are severable, and if any word, phrase, clause, sentence, paragraph, section, or other part of this Agreement or the application thereof to any person or circumstance shall ever be held by any court of competent jurisdiction to be invalid or unconstitutional for any reason, the remainder of this Agreement and the application of such word, phrase, clause, sentence, paragraph, section, or other part of this Agreement to other persons or circumstances shall not be affected thereby and this Agreement shall be construed as if such invalid or unconstitutional portion had never been contained therein.

12. **Entire Agreement.**

This Agreement, including any exhibits attached hereto and made a part hereof, constitutes the entire agreement between the parties relative to the subject matter of this Agreement. All prior agreements, covenants, representations, or warranties, whether oral or in writing, between the parties are merged herein.

13. **Amendment.**

No amendment of this Agreement shall be effective unless and until it is duly approved by each party and reduced to a writing signed by he authorized representatives of the CCSUD and the Developer, respectively, which amendment shall incorporate this Agreement in every particular not otherwise changed by the amendment.

14. **Governing Law.**

This Agreement shall be construed under and in accordance with the laws of the State of Texas and all obligations of the parties are expressly deemed performable within the state-certificated service area of CCSUD.

15. **Venue.**

Venue for any civil suit arising hereunder shall be in Guadalupe County, Texas. Venue for any administrative law action arising hereunder shall be vested in the TCEQ and the appropriate courts of Travis County, Texas.

16. **Successors and Assigns.**

This Agreement shall be binding on and shall inure to the benefit of the heirs, successors and assigns of the parties.

17. **Assignability.**

The rights and obligations of the Developer hereunder may not be assigned without the prior written consent of the CCSUD. CCSUD may assign this Agreement to any other retail public utility authorized by the TCEQ to serve the Property.

18. **Effective Date.**

This Agreement shall be effective from and after the date of due execution by all parties.

19. **Conflict.**

In the event there is determined to be a conflict between the terms of this Agreement and the provisions in the CCSUD's Rules and Regulations governing the same matter, the Rules and Regulations shall prevail.

IN WITNESS WHEREOF each of the parties has caused this Agreement to be executed by its duly authorized representative in multiple copies, each of equal dignity, on the date or dates indicated below.

| CCSUD | DEVELOPER |
| --- | --- |
| By: _____ | By: _____ |
| Date: _____ | Date: _____ |

# CRYSTAL CLEAR SPECIAL UTILITY DISTRICT
# NON-STANDARD SERVICE AGREEMENT

Attachment “A”
Legal Description of the “Property”

# CRYSTAL CLEAR SPECIAL UTILITY DISTRICT
# NON-STANDARD SERVICE AGREEMENT

Attachment “B”
Engineer Report

# CRYSTAL CLEAR SPECIAL UTILITY DISTRICT
# NON-STANDARD SERVICE AGREEMENT

Attachment "C"
Non-standard Service Requirements of the "Property"[1]

1. Type of permanent water utility service being requested (check all applicable):

_____residential

_____commercial

_____mixed

_____industrial

2. Number of requested service connections (by anticipated meter size):

Number _____ Size/type _____

| Meter Size | LUEs | Deposit | Impact Fees (Capital Recovery) | Installation Cost |
|---|---|---|---|---|
| 5/8" | 1 | $300 | $2,500 | $700 |
| 3/4" | 1.5 | $450 | $3,750 | $700 |
| 1" | 2.5 | $750 | $6,250 | $1,075 |
| 1.5" | 5 | $1,500 | $12,500 | $1,450 + add. parts |
| 2" | 8 | $2,400 | $20,000 | $1,650 + add. parts |
| 3" | 16 | $4,800 | $40,000 | TBD |
| 4" | 25 | $7,500 | $62,500 | TBD |
| 6" | 50 | $15,000 | $125,000 | TBD |

3. Other desired domestic public water utility service needs:

_____

_____

4. Water volume and pressure requirements:

[1] Unless otherwise specified elsewhere in this Agreement, the retail public water utility service requirements set forth in this Attachment "C" shall govern all aspects the parties' obligations one to the other. Unless it is clearly and unequivocally states in this Attachment "C" that Developer is requesting additional reserved water capacities for fire flows or other purposes, CCSUD shall only be obligated to provide the service capacities for domestic potable water service, under the 30 TAC Chapter 290, Subchapter D, for the number of consuming facilities, by meter size or GPM water demand, indicated in this Attachment "C".

Gallons: Annual _____ Monthly _____ Highest Day _____

Pressure required: Low _____ Average _____ High _____

Special pressure requirements: _____

_____

5. Additional reserved water capacities for fire flows or other purposes are being requested?

Yes _____ No _____

If yes, the following capacities are needed: _____

_____

_____

6. Is public utility easement required? yes _____ no _____

Are required easements shown on Attachment "A"? yes _____ no _____
If not, attach plat or diagraph showing all required easements.

7. Is phased development of a larger tract planned? yes _____ no _____

Is phased water utility service requested?[2] yes _____ no _____

If phased service, number of phases? _____

Time intervals between phases: _____

8. Date domestic potable water service requested to begin: _____

9. Is non-potable construction or landscaping water service being requested?

yes _____ no _____ If yes, date requested to begin: _____

Describe type and quantity of non-potable construction or landscaping water service being requested. _____

_____

_____

[2] If the property is to be developed in phases and the Developer desires the water system to be constructed in corresponding phases and such phased construction is deemed desirable and acceptable to CCSUD at its sole discretion, Developer shall be required to execute a separate Non-Standard Service Agreement for each development and construction phase. Information on all phases is being requested to assist CCSUD plan for its long-term capacity requirements. No reservations of water service capacities will be made for future phases.

10. Other terms unique to this non-standard service request:

_____

_____

_____

_____

Initialed acceptance of information shown on Attachment “B”:

Developer _____ CCSUD _____

CRYSTAL CLEAR
SPECIAL UTILITY DISTRICT

## NOTICE OF REQUIREMENT TO COMPLY WITH THE SUBDIVISION AND SERVICE EXTENSION POLICY OF CRYSTAL CLEAR SPECIAL UTILITY DISTRICT

Pursuant to Chapter 13.2502 of the Texas Water Code, Crystal Clear Special Utility District hereby gives notice that any person who subdivides land by dividing any lot, tract, or parcel of land, within the service area of Crystal Clear Special Utility District, Certificate of Convenience and Necessity No. 10297, serving Guadalupe, Hays, Comal and Caldwell Counties and other areas, into two or more lots or sites for the purpose of sale or development, whether immediate or future, including re-subdivision of land for which a plat has been filed and recorded or requests more than two water service connections on a single contiguous tract of land must comply with Developer, Subdivision, and Non-Standard Service Requirements (the "Subdivision Policy") contained in Crystal Clear Special Utility District's Rules and Regulations.

**Crystal Clear Special Utility District is not required to extend retail water or waste water utility service to a service applicant in a subdivision where the applicant of the subdivision has failed to comply with the Subdivision Policy.**

Among other requirements, the Subdivision Policy requires the applicant to:

- complete a Non-Standard Service Application
- submit an approved final plat showing the requested service area
- pay a Service Investigation Fee
- enter into a Non-Standard Service Contract and/or other agreements

Applicable elements of the Subdivision Policy, depending on the specific circumstances of the subdivision service, may include:

- evaluation by Crystal Clear Special Utility District of the impact a proposed subdivision service extension will make on Crystal Clear Special Utility District's water supply and/or sewer system and payment of the costs for this evaluation;
- payment of fees for reserving water supply and/or wastewater collection capacity;
- forfeiture of reserved water supply capacity for failure to pay applicable fees;
- payment of costs of any improvements to Crystal Clear Special Utility District's system that are necessary to provide the water and/or service;
- construction according to design approved by Crystal Clear Special Utility District and dedication by the developer of water facilities within the subdivision following inspection.

Crystal Clear Special Utility District's Rules and Regulations and a map showing Crystal Clear Special Utility District's service area may be reviewed at Crystal Clear Special Utility District's offices at 2370 FM 1979, San Marcos, TX 78666. The Rules and Regulations and service area map also are filed of record at the Texas Commission on Environmental Quality in Austin, Texas, and may be reviewed by contacting the TCEQ, Utility Rates and Services [Certification and Rate Design] Section, Water Utilities Division, P.O. Box 13087, Austin, Texas 78711.

# APPENDIX C: Water Standard Details and Wastewater Standard Details

# Approved Equipment List (AEL)

Below is a list of Crystal Clear SUD (CCSUD) approved brands for use in the Distribution and Collection system.

**Brands**

Air Relief Valves: Empire, Valmatic, Apco, Mueller Company.

Corporation Stops: Ford

Curb Stops: Ford

Fire Hydrants: American, Mueller Company, EJ.

Gate Valves: Mueller Company, American, EJ.

Pipe Type: High Density Polyethylene, C900 Series.

Restraining Joints: EBAA Iron Inc. – Megalug

Saddles: Smith Blair, Ford, Mueller

Tapping Sleeves: Smith Blair, Ford, Mueller

Tapping Valves: American, Mueller

Meters: Kamstrup

Meter Boxes: DFW Plastics, NDS Meter Boxes.

VFD: Yaskawa

Vertical Turban Pump: HydroFlo

Motors: TECO or US Motor

Any equipment to be installed in the CCSUD Distribution or Collection systems must come from the list above. Any equipment installed that is not listed above must be approved by the CCSUD inspector or a CCSUD Manager or the installation is subject to a failed inspection until the correct brand can be installed. If you have any questions about these procedures please contact the CCSUD Inspect

**SECTION 01000**
**MOBILIZATION**

PART 1 - GENERAL

1.1 SCOPE

A. The Contractor shall mobilize all materials, labor, equipment, and incidentals in preparation for beginning, with subsequent cleanup, of Work performed under the Contract.

B. Work includes, but is not necessarily limited to: mobilization of personnel, equipment, supplies, and incidentals to the project site; establishment of the Contractor's onsite facilities, safety precautions, scaffolding and/or lifting methods; any other facilities necessary for work on the project; construction submittals; fees for bonds and insurance; obtaining all required permits; coordination with the Owner for the scheduling of all construction activities; and, any other items required for beginning work, but not included explicitly in other bid items.

PART 2 – PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT: The lump sum price for Mobilization shall not exceed ten percent (10%) of the subtotal of all other bid items, excluding this item.

4.2 PAYMENT: Partial payments directed towards the "Lump Sum" bid for Mobilization will be structured as follows: (The adjusted contract amount for construction items, as listed below, is defined as the total contract amount, less the lump sum bid for Mobilization).

1. When 1% of the adjusted contract amount for construction items is earned, 50% of the "Lump Sum" bid for Mobilization will be paid.

2. When 5% of the adjusted contract amount for construction items is earned, 75% of the "Lump Sum" bid for Mobilization will be paid. The initial payment under this item will be deducted from the amount calculated here.

3. When 10% of the adjusted contract amount for construction items is earned, 90% of the "Lump Sum" bid for Mobilization will be paid. Previous payments under this item will be deducted from the amount calculated here.

4. Upon completion of all work under this contract, payment for the remainder of the "Lump Sum" bid for Mobilization will be made. (NOTE: Costs of Insurance and Bonds is inclusive to the cost of Mobilization Item).

5. If requested, payment can be made for approved materials stored on the project site that are deemed necessary and required for the "PROJECT WORK" in accordance with all contract document requirements.

**END OF SECTION**

**SECTION 01100**

**SITE PREPARATION**

PART 1 - GENERAL

1.1 SCOPE

A. The Work included in this Section shall consist of preparing the designated easements and/or right-of-way for construction operations by removing and disposing of all obstructions when removal of such obstructions is not otherwise provided for in the Drawings or Contract Documents.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.1 CLEARING

A. The surface of the ground, for the area to be cleared and grubbed, shall be completely cleared of all timber, brush, stumps, roots, grass, weeds, rubbish, topsoil and vegetation removal, and all other objectionable obstructions resting on, or protruding through, the surface of the ground.

B. Trees and shrubs designated for preservation shall be carefully trimmed as directed and shall be protected from scarring, barking, or other injuries during construction. Exposed ends of pruned limbs shall be treated with an approved pruning material. Tree protection shall be installed as necessary per the Drawings.

C. Clearing operations shall be conducted so that the Contractor shall not damage the existing structures and installations, or those structures under construction. Clearing shall be conducted in a manner that provides for the safety of employees and others.

D. Clearing away structures shall consist of removing remains of houses or other structures not completely removed previously (by the Contractor or others), foundations, floor slabs, concrete, brick, lumber, plaster, cisterns, septic tanks, basements, abandoned utility pipes or conduits, equipment or other foundations, fences, retaining walls, outhouses, shacks and all other debris, as well as buried concrete slabs, curbs, gutters, driveways and sidewalks.

3.2 GRUBBING

A. Grubbing shall consist of the complete removal of all stumps, roots larger than 1-1/2 inches in diameter, matted roots, brush, timber, logs and any other organic or metallic debris not suitable for foundation purposes, resting on, under

or protruding through the surface of the ground to a depth of 18 inches below the subgrade.

B. All depressions excavated below the original ground surface for, or by the removal of, such objects, shall be refilled with suitable materials and compacted to a density conforming to the surrounding ground surface.

PART 4 – JOB CONDITIONS

4.1 STRIPPING

A. In areas so designated, top soil shall be stockpiled. Stockpiled topsoil shall be protected until it is placed as specified.

B. Any topsoil remaining after all Work is in place shall be removed and disposed of by the Contractor in accordance with local, state and federal regulations.

4.2 DISPOSAL OF CLEARED AND GRUBBED MATERIAL

A. Dispose of all material and debris from the clearing and grubbing operation by hauling such material and debris away to an approved facility.

B. Disposal by burning or burial will not be permitted.

C. The cost of disposal (including hauling) of cleared, grubbed material, debris, surplus material shall be considered a subsidiary obligation of the Contractor.

4.3 FENCES

A. Unless shown otherwise in the Contract Documents, all fences along the proposed route and Right-Of-Way which are damaged or removed temporarily by the Contractor shall be replaced by the Contractor to an equal or better condition.

4.4 HOLES

A. Holes remaining after removal of structures, objectionable materials, etc., shall be backfilled and the entire area shall be bladed to prevent ponding of water and to provide adequate drainage of storm water.

4.5 HAZARDOUS MATERIAL

A. If the Contractor encounters hazardous substances, industrial waste, or other environmental pollutants, underground storage tanks, or conditions conductive to environmental damage, the Contractor shall immediately stop Work in the area affected and report the condition to the Owner in writing.

B. The Contractor shall not be responsible for, or be required to conduct, any investigation, site monitoring, containment, cleanup, removal, restoration or other remedial work of any kind or nature under any applicable state or federal

law, regulation, ordinance, or any judicial order.

PART 5 – MEASUREMENT AND PAYMENT

5.1 MEASUREMENT: The quantity measure for payment shall be a lump sum value for the site preparation required for new construction.

5.2 PAYMENT: Payment shall be compensation for all labor, materials, and equipment necessary for site preparation work as per the lump sum price, and payment shall be full compensation for the Work herein specified. This item shall also include, but not be limited to, disposal and hauling of cleared, grubbed material, debris, surplus excavated material including all existing pipe and appurtenances to be abandoned (where specified in the Drawings), tree protection, coordinating with other utilities for locating buried cables and other utilities during construction, repairing and replacing fences, cleaning, and all other Work incidental and specified herein.

**END OF SECTION**

**SECTION 01140**
**DEWATERING**

PART 1 - GENERAL

1.1 SCOPE

A. The Work included in this Section consists of furnishing all equipment, fuel, materials, and labor necessary for dewatering, along with the necessary control and disposal of groundwater, on a continual basis during construction.

1.2 DESCRIPTION OF REQUIREMENTS

A. Dewatering shall include the lowering of the groundwater table to relieve any hydrostatic head that could cause a decrease in the stability of the excavated subgrade. Remove and dispose of water and provide siltation settling basins for all discharges from dewatering systems.

B. Dewatering also shall include the intercepting of seepage which could otherwise emerge from the slope or sides of excavations which could cause a decrease in the stability of the excavated subgrade or the slopes or sides of the excavations.

C. The Contractor shall assume full responsibility and expense for the adequacy of the dewatering system with no additional contract time or cost allowance for performance.

1.3 REFERENCE STANDARDS

A. The drilling, operation, and abandonment of all dewatering wells used in the dewatering system shall comply with regulations of the Texas Commission on Environmental Quality (TCEQ), and the Texas Water Well Drillers Association.

1.4 SUBMITTALS

A. Submit construction plans of dewatering well point system, settling basins and discharge facilities for review by the Owner/Engineer prior to dewatering system installation.

PART 2 – PRODUCTS

2.1 EQUIPMENT AND MATERIALS

A. Selection of equipment and materials is at the option of Contractor as necessary to achieve desired results for dewatering.

B. Eductors, well points, or deep wells, where used, shall be furnished, installed and operated by an experienced Subcontractor who is engaged regularly in ground water control system design, installation and operation.

C. All equipment must be in good repair and operating order.

D. Sufficient standby equipment and materials shall be kept available to ensure continuous operation, where required.

## PART 3 - EXECUTION

### 3.1 DEWATERING

A. The dewatering system shall be capable of providing an excavated subgrade that is relieved of any hydrostatic pressure that could cause a decrease in the stability of the excavated subgrade, and which will provide the necessary groundwater control for the proper performance required to complete the Work described within the Project Specifications.

B. As part of his request for review of a dewatering system, the Contractor shall demonstrate the adequacy of the proposed system and well point filter sand by means of a test installation at the jobsite. Discharge water shall be clear, with no visible soil particles contained within a one-quart sample.

C. Dewatering shall at all times be conducted in such a manner as to preserve the natural undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation.

D. The Contractor shall provide for the disposal of the water removed from the excavation in such a manner as to not cause injury to the public health, private or public property, or to any portion of the work completed or in progress, to the surface of the streets, or cause any impediment to the reasonable use of the site by other contractors.

E. The dewatering system shall not cause damage to newly constructed or existing buildings, utilities, and other work due to the loss of support from incompletely drained soils or from removal of soil particles resulting from the dewatering system operation.

F. If the dewatering system utilized by the Contractor causes or threatens to cause damage to new or existing facilities, the dewatering system shall be modified to prohibit such damage at no additional cost to the Owner.

G. Dispose of subsurface water collected in the manner which conforms to all applicable local and state ordinances, statutes and laws.

H. Maintain continual and complete effectiveness of the dewatering system operation to provide a firm, stable, and excavated subgrade at all times as required for proper performance of Work.

I. Provide dewatering necessary to maintain the groundwater table below the level of backfill as it is being placed.

J. Provide dewatering necessary to maintain the groundwater table below the level of backfill as requested by the Owner. The Contractor's proposed method of dewatering shall include a minimum of two operating groundwater

observation wells or piezometers at each proposed structure and one observation well at each manhole to be used to determine the water level during construction of the structures. Locations of the observation wells shall be at structures and along pipelines as approved by the Owner prior to their installation. The observation wells shall be extended to 6 inches above finished grade, topped with screw-on caps, protected by a 4-inch thick, 24-inch x 24-inch square concrete base, and left in place at the completion of the project.

K. The Contractor shall maintain log readings of the dewatering system documented at least daily. The Contractor shall submit these readings to the Inspector for review, if requested.

PART 4 – JOB CONDITONS

4.1 EROSION CONTROL

A. Provide adequate protection from erosion that may be caused by any of the dewatering operations utilized during the course of the construction. Any damage, disruption or interference to newly constructed work or existing properties, buildings, structures, utilities and/or other work resulting directly or indirectly from dewatering operations conducted under this Contract shall be remedied by the Contractor, at no additional cost to the Owner.

4.2 TREATMENT OF DEWATERING OPERATIONS DISCHARGES

A. Provide such additional treatment devices as may be required to meet the provisions of the Contract. This may include the construction of sumps and/or settling basins, stone rip-rap, silt fences or other requirements. The treatment devices shall be removed afterwards and/or filled in with acceptable backfill material and restored to original conditions once they are no longer needed, at no additional cost to the Owner.

4.3 NOISE CONTROL

A. When dewatering operations continue between the hours of 6 PM and 8 AM, the Contractor shall control the noise to meet local standards.

PART 5 – MEASUREMENT AND PAYMENT

5.1 MEASUREMENT: Dewatering operations are considered to be subsidiary to Section 01230 – Excavation and Backfill, and no separate measurement will be made by the Contractor for this Work.

5.2 PAYMENT: Dewatering operations are considered to be subsidiary to Section 01230- Excavation and Backfill, and no separate payment will be made to the Contractor for this Work.

**END OF SECTION**

**SECTION 01220**

**EXPLORATORY EXCAVATION**

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This section covers exploratory excavation, backfilling exploratory excavation, and restoration of the ground surface as necessary to locate existing underground structures. This includes excavation within the limits of construction or as required.

1.2 DESCRIPTION

A. Exploratory excavation shall be performed for the purpose of determining the location of underground structures and utilities using tight control machinery supplemented by hand labor.

B. Damage to existing structures and utilities shall be avoided during exploratory excavation. Any such structures or utility damaged by the CONTRACTOR shall be replaced or repaired at no cost to the Owner.

1.3 CONTROL OF WORK

A. The locations at which exploratory excavations are to be made shall be determined by the CONTRACTOR for facilitating safe and thorough execution of the work. In addition, exploratory excavations may be indicated in the Contract Documents or designated by the Owner.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.1 SCHEDULING

A. Consult with the Owner as to location of the exploratory excavations so that this work may be scheduled sufficiently in advance of installation of other items of the Work.

B. Obtain all available information on the location of existing underground structures and utilities prior to starting this type of excavation.

C. Notify the Utility Owner of the structures and/or utilities to be affected, in sufficient time to allow their Representatives to observe the exploratory excavations.

3.2 EXCAVATION

A. Conduct all excavations with extreme care so as not to damage any existing structure or utility. If damage occurs notify the Owner and the respective Utility Owner immediately. Make repairs promptly if authorized by the Utility Owner or coordinate with the Utility Owner to facilitate prompt repair and compensation for damages.

B. When the location of underground structures or utilities has been determined, notify the Owner.

3.3 BACKFILL AND RESTORATION

A. Exploratory excavations shall be backfilled and the surface restored according to the applicable Section of the Contract Documents unless otherwise directed by the Owner.

4.0 MEASUREMENT AND PAYMENT

A. MEASUREMENT: Exploratory excavation operations are considered to be subsidiary to 01230 – Excavation and Backfill, and no separate measurement will be made by the Contractor for this work.

B. PAYMENT: Exploratory excavation operations are considered to be subsidiary to Section 01230 – Excavation and Backfill, and no separate payment will be made to the Contractor for this work.

**END OF SECTION**

## SECTION 01230
## EXCAVATION AND BACKFILL

PART 1 - GENERAL

1.1 SCOPE

A. The Work included in this Section shall consist of furnishing all labor, materials, equipment, and incidentals necessary to perform all excavation (unclassified), backfill, fill, grading and slope protection required for completing the structural and/or utility piping work and/or other work shown within the Drawings and specified herein.

B. The item shall include, but not necessarily be limited to: manholes, vaults, duct conduit, pipe, and roadways and paving; all backfilling, fill and required borrow; grading; dewatering, sheeting, shoring, bracing, water handling, and all other work incidental and specified herein.

C. Trench Excavation shall be in accordance with the Typical Trench Backfill standard details included within the Construction Drawings.

D. Where references are made to other standards and codes, unless specific date references are indicated, the latest edition of said standard or code shall govern.

1.2 QUALITY ASSURANCE

A. Required Tests:

1. The Owner will engage the services of a qualified testing laboratory to make tests and determine acceptability of the fill or materials as listed below.

2. Required tests:

a. Select Fill Samples: Gradation, ASTM D422.

b. Compacted Select Fill: Compaction, ASTM D1556, ASTM D1557, and ASTM D2922.

B. Permits and Regulations:

1. Obtain all necessary permits for work in roads, rights-of-ways, railroads, etc.

2. Obtain permits as required by local, state and federal agencies for discharging water from excavations.

3. Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

1.3 RELATED SECTIONS

A. Section 01140, Dewatering.

1.4 REFERENCE STANDARDS

A. Comply with the applicable provisions and recommendations of the following except as otherwise shown or specified; latest revision thereof shall apply.

1. ASTM A36 - Specification for Structural Steel.

2. ASTM A328 - Specification for Steel Sheet Piling.

3. ASTM D422 - Method for Particle-Size Analysis of Soils.

4. ASTM D1556 - Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.

5. ASTM D1557 - Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft 16/cu ft) (2,700 KN-m/cu m).

6. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

7. AISC Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings.

8. Occupational Safety and Health Administration (OSHA) Standards, Title 29, Code of Federal Regulations, Part 1926, Section .650 (Subpart P-Excavations).

1.5 SUBMITTALS

A. Drawings shall be prepared by a licensed Texas Professional Engineer recognized as an expert in the specialty excavation and backfill activities involved. Drawings shall be submitted to the Engineer for review and record purposes only. Calculations shall not be submitted for review, unless requested by the Engineer. Drawing submittals will not be checked and will not imply approval by Engineer of the work involved. The Contractor shall be solely responsible for designing, installing, operating and maintaining whatever system is necessary to satisfactorily accomplish all necessary sheeting, shoring, bracing, protection, cofferdams, underpinning and dewatering.

B. Test Reports - Borrow, Backfill, and Grading:

1. Owner's testing laboratory will submit copies of the following reports directly to Engineer, with a copy to the Contractor:

   a. Tests on borrow material.

   b. Tests on footing subgrade.

   c. Field density tests.

   d. Optimum moisture - maximum density curve for each soil type used for backfill.

   e. Tests of actual unconfined compressive strength or bearing tests of each strata.

C. The Contractor shall submit samples of all select fill, gravel and base materials as required.

   1. Deliver samples to Owner.

D. Compaction equipment and proposed methods.

E. Erosion and sedimentation control plan.

1.6 TRENCH EXCAVATION SAFETY

A. Trench Excavation Safety shall conform to requirements contained within Section 01240 of these Project Specifications.

1.7 SITE PREPARATION

A. Site preparation shall be completed in accordance with Section 01100 of these Project Specifications.

1.8 DEWATERING

A. Dewatering shall be conducted in accordance with Section 01140 of these Project Specifications.

1.9 JOB CONDITIONS AND SAFETY

A. The Contractor shall examine the site and review the available test borings or undertake his own soil borings prior to submitting his bid, taking into consideration all conditions that may affect the work.

B. The Owner will not assume responsibility for variations of sub-soil quality or conditions at locations other than places shown at the time the subsurface investigation was made. Boring log data and soil samples may be available for examination by the Contractor upon request.

C. Existing Structures: The Drawings may show certain surface and underground structures adjacent to the Work. This information has been obtained from existing records. It is not guaranteed to be correct or complete and is shown for the convenience of the Contractor. Contractor shall explore ahead of the required excavation to determine the exact location of all structures. They shall be supported and protected from damage by Contractor. If they are broken or damaged during construction, they shall be restored immediately by Contractor at the Contractor's expense.

D. Existing Utilities: Locate existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.

1. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult the Owner of such piping or utility immediately for directions on how to proceed with construction activities.

2. Cooperate with the Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of the Owner.

3. Demolish and completely remove from site all existing underground utilities indicated within the Contract Documents to be removed.

E. Protection of Persons and Property: Barricade open excavations occurring as part of this Work and post with warning lights. Operate warning lights as recommended by authorities having jurisdiction.

1. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

F. Use of Explosives:

1. The use of explosives at the job site will not be permitted.

G. Dust Control:

1. Conduct all operations and maintain areas of activity, including sweeping and sprinkling of roadways adjacent to the work area, to minimize creation and dispersion of dust. Calcium chloride may be used to control serious or prolonged dust problems, subject to approval of Engineer.

1.10 CODES, ORDINANCES, AND STATUTES

A. The Contractor shall be familiarized and comply with all applicable codes, ordinances, statutes, and bear sole responsibility for any penalties imposed for

noncompliance.

1.11 SHORING, SHEETING, BRACING, AND SLOPING

A. The Contractor shall provide shoring, sheeting, bracing, or sloping as required to protect excavations. All shoring, sheeting, bracing, and sloping will be installed and maintained in accordance with OSHA standards and other applicable laws.

B. For trench sheeting for pipes, no sheeting is to be withdrawn if driven below mid-diameter of any pipe, and no wood sheeting shall be cut off at a level lower than one (1) foot above the top of any pipe unless otherwise instructed by the Owner. If during the progress of the Work the Owner decides that additional wood sheeting should be left in place, he may instruct the Contractor in writing. If steel sheeting is used for trench sheeting, removal shall be as specified above, unless written approval is given for an alternate method of removal.

C. All sheeting and bracing not left in place shall be carefully removed in such a manner as not to endanger the construction or other structures, utilities, existing piping, or property. Unless otherwise approved or indicated in the Drawings, all sheeting and bracing shall be removed after completion of the substructure, care being taken not to disturb or otherwise injure the finished masonry. All voids left or caused by withdrawal of sheeting shall be immediately refilled with sand by ramming with tools especially adapted to that purpose, by watering or otherwise as may be required.

D. Owner has the right to instruct the Contractor with regard to sheeting and bracing to be left in place shall not be construed as creating any obligation on his part to issue such instructions, and his failure to exercise his right to do so shall not relieve the Contractor from liability for damages to persons or property occurring from or on the work occasioned by negligence or otherwise, growing out of a failure on the part of the Contractor to leave in place sufficient sheeting and bracing to prevent any caving or moving of the ground.

E. The Contractor shall construct cofferdams and sheeting outside the neat lines of the foundation unless indicated otherwise to the extent he deems it desirable for his method of operation. Sheeting shall be plumb and securely braced and tied in position. Sheeting, bracing, and cofferdams shall be adequate to withstand all pressures to which the structure will be subjected. Pumping, bracing, and other work within the cofferdam shall be done in a manner to avoid disturbing any construction of the masonry enclosed. Any movement or bulging which may occur shall be corrected by the Contractor at his own expense so as to provide the necessary clearances and dimensions.

1.12 EROSION AND POLLUTION CONTROLS

A. The Contractor shall provide silt barriers, hay bales or other approved devices to prevent erosion or siltation of waterways and drainage courses, in accordance with the Drawing details.

PART 2 – PRODUCTS

2.1 SOIL MATERIALS

A. General:

1. Materials for use as base, fill and backfill shall be as described below.

a. Satisfactory soil materials are defined as those complying with American Association of State Highway and Transportation Officials (AASHTO) M-145, soil classification Groups A-1, A-2-4, A-2-5 and A-3.

b. Unsatisfactory soil materials are those defined in AASHTO M-145 soil classification Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7 along with peat and other highly organic soils.

B. Structural Fill:

1. Structural fill material shall be well graded soil material consisting of coarse aggregate to medium to fine grain sized sand, free of organic, deleterious and/or compressible material. Rock in excess of 3-1/2 inches in diameter shall not be used in the fill material. Structural fill shall not contain hardpan, stones, rocks, cobbles or other similar materials.

C. Select Common Fill:

1. Select common fill material shall be satisfactory soil material containing no more than 15 percent by weight finer than No. 200 mesh sieve. It shall be free from organic matter, muck, marl, and rock exceeding 3-1/2 inches in diameter. Select common fill shall not contain broken concrete, masonry, rubble or other similar materials.

2. Material falling within the above referenced specification, encountered during the excavation, may be stored in segregated stockpiles for reuse. All material which, in the opinion of the Owner, is not suitable for reuse shall be spoiled as specified herein for disposal of unsuitable materials.

D. Bedding Rock:

1. The bedding and initial backfill materials for ductile iron pipe (DI), Polyvinyl Chloride Pipe (PVC), HDPE Pipe, and Wrapped Steel Pipe in all nominal diameters shall be composed of well graded crushed stone or gravel conforming to the following measurements:

| Sieve Size | Avg. Retained (%) | Tolerance (%) |
|---|---|---|
| 1/2" | 0 | 0 |
| 3/8" | 0 | 0-5 |
| #4 | 30 | 20-45 |
| #8 | 90 | 90-100 |
| #16 | 95 | 95-100 |
| #30 | 98 | 98-100 |

E. Secondary and General Backfill:

1. Provide approved soil materials for backfill and fill, free of clay, rock or gravel larger than 6 inches in any dimension, debris, waste, frozen materials, vegetable and other organic matter and other deleterious materials. Previously excavated materials meeting these requirements may be used for backfill.

F. Topsoil

1. Topsoil shall be reasonably free from subsoil, stumps, roots, brush, stones (2 inches or more in diameter), clay lumps, or similar objects.

2. The topsoil and or soil mixture, unless otherwise specified or approved, shall have a PH range of approximately 5.5 to 8.0.

3. The organic compound of topsoil shall be not less than 1%.

2.2 WATER

A. Water used in compaction shall be clean and free from oil and grease. It shall not contain any organic matter or any other deleterious substances.

2.3 COMPACTION EQUIPMENT

A. Compaction equipment shall be of suitable type and adequate to obtain the densities specified, and shall provide satisfactory breakdown of materials to form a dense fill. Compaction equipment shall be operated in accordance with the Manufacturer's instructions and recommendations.

B. Equipment shall be maintained in such condition that it will deliver the manufacturer's rated compaction effort. If inadequate densities are obtained, larger and/or different types of additional equipment shall be provided by the Contractor. Hand-operated equipment shall be capable of achieving the specified densities.

2.4 MOISTURE CONTROL EQUIPMENT

A. Equipment for applying water shall be of a type and quality adequate for the work, shall not leak, and shall be equipped with a distributor bar or other approved

device to assure uniform application. Equipment for mixing and drying out material shall consist of blades, discs, or other approved equipment.

PART 3 – EXECUTION

3.1 GENERAL

A. Material shall be furnished, as required, from off site sources and hauled to the site.

B. The Contractor shall take all the necessary precautions to maintain the work area in a safe and workable condition.

C. The Contractor shall protect his work at all times by flagging, marking, lighting and barricading. It shall also be the Contractor's responsibility to preserve and protect all above and underground structures, pipe lines, conduits, cables, drains or utilities which are existing at the time he encounters them. Failure of the Contract Documents to show the existence of these obstructions shall not relieve the Contractor from this responsibility. The cost of repair of any damage which occurs to these obstructions during or as a result of construction shall be borne by the Contractor without additional cost to the Owner.

3.2 INSPECTION

A. Provide the Resident Inspector with sufficient notice and with the means to examine the areas and conditions under which excavating, filling, and grading are to be performed. The Resident Inspector will notify the Owner and the Engineer if conditions are found that may be detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in an acceptable manner.

3.3 EXCAVATION

A. Excavation of all trenches required for the installation of pipes and electrical ducts shall be made to the depths indicated in the Contract Documents. Excavate in such manner and to such widths as will give suitable room for laying the pipe or installing the ducts within the trenches, for bracing and supporting, and for pumping and drainage facilities. The trench width at the top of the pipe shall not exceed the allowable value as determined by the depth of cut and indicated in the Contract Documents.

B. Rock shall be removed to a minimum 4-6 inches clearance around the bottom and sides of all the pipe or ducts being laid as shown in the Contract Documents.

C. The bottom of the excavations shall be firm, dry and acceptable to the Owner. Excavate unsatisfactory soil material from the bottom of the trench to a depth determined by the Owner/Engineer and replace with rock or shell bedding.

D. Where pipe or ducts are to be laid in bedding or encased in concrete, the trench may be excavated by machinery to, or just below, the designated subgrade

provided that the material remaining in the bottom of the trench is no more than slightly disturbed.

E. Where the pipes or ducts are to be laid directly on the trench bottom, the lower part of the trenches shall not be excavated to the trench bottom by machinery. The last of the material being excavated shall be done manually in such a manner that will give a flat bottom true to grade so that pipe or duct can be evenly and uniformly supported along its entire length on un- disturbed material or bedding rock. Bell holes shall be made as required manually so that there is no bearing surface on the bells and pipes are supported along the barrel only.

F. The Contractor shall abide by the following schedule of criteria concerning interferences with other utilities. In no case shall there be less than 0.33 feet (4 inches) between any two pipe lines or between pipe lines and structures.

G. Concrete encasement shall be provided in accordance with the Concrete Encasement standard detail drawing shown within the Construction Drawings.

3.4 BACKFILLING

A. Backfilling over pipes shall begin as soon as practicable after the pipe has been laid, jointed, and inspected and the trench filled with suitable bedding material.

B. Backfilling over ducts shall begin not less than three days after placing concrete encasement.

C. All backfilling shall be prosecuted expeditiously and as detailed in the Contract Documents.

D. Select granular bedding material shall meet the required measurements.

E. The remainder of the trench shall be filled with compacted backfill, free from stones having a diameter greater than 2 inches and thoroughly compacted with a tamper as fast as placed.

F. The filling shall be carried up evenly on both sides with at least one person tamping for each person shoveling material into the trench.

G. The remainder of the trench above the compacted backfill, as just described above, shall be filled and thoroughly compacted with topsoil with mechanical equipment. The topsoil shall be mound over the original ground surface to permit passage of vehicles to allow for future settling.

H. In locations where pipes pass through building walls, the Contractor shall take the following precautions to consolidate the refill up to an elevation of at least 1 foot above the bottom of the pipes:

1. Place structural fill in such areas for a distance of not less than 3 feet either side of the center line of the pipe in level layers not exceeding 6 inches in depth.

2. Wet each layer to the extent requested and thoroughly compact each layer with a power tamper.

3.5 GRADING

A. Grading shall be performed at such places as are indicated in the Contract Documents, to the lines, grades, and elevations shown or as approved by the Owner/Engineer and shall be made in such a manner that the requirements for formation of embankments can be followed. All unacceptable material encountered, of whatever nature within the limits indicated, shall be removed and disposed of as requested. During the process of excavation, the grade shall be maintained in such condition that it will be well drained at all times. Temporary drains and drainage ditches shall be installed to intercept or divert surface water which may affect the prosecution or condition of the work.

B. If at the time of excavation, it is not possible to place any material in its proper section of the permanent structure, it shall be stockpiled in approved areas for later use. No extra payments will be considered for the stockpiling or double handling of excavated material.

C. The right is reserved by the Owner to make minute adjustments or revisions in lines or grades if found necessary as the work progresses, due to discrepancies in the Contract Documents or in order to obtain a satisfactory construction outcome.

D. Stones or rock fragments larger than 1-1/2 inches in their greatest dimensions will not be permitted within the top 12 inches of the subgrade line of all dikes, fills or embankments.

E. All fill slopes shall be uniformly dressed to the grade, cross-section and alignment shown in the Contract Documents, or as approved in writing by the Owner.

F. In cuts, all loose or protruding rocks on the back slopes shall be jarred loose or otherwise removed to line or finished grade of slope. All cut and fill slopes shall be uniformly dressed to the grade, cross-section and alignment shown in the Contract Documents or as approved in writing by the Owner.

G. No grading is to be done in areas where there are existing pipe lines that may be uncovered or damaged until such lines which must be maintained are relocated, or where lines are to be abandoned, all required valves are closed and drains plugged at manholes.

H. The Contractor shall replace all pavement that is cut or otherwise damaged during the progress of the work as specified elsewhere herein.

3.6 FIELD QUALITY CONTROL

A. Quality Control Testing During Construction: Owner's testing service may inspect and approve subgrades and fill layers before construction work is performed thereon. Tests of subgrades and fill layers may be taken as follows:

1. Footing Subgrade: For each strata of soil on which footings will be placed, at least one test will be made to verify required design bearing capacities. Subsequent verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested strata, when acceptable to Engineer.

2. Tank and Building Slab Subgrade: At least one field density test of subgrade will be made for every 2,000 square feet of tank subgrade or building slab, but in no case less than 3 tests will be made per tank or building structure. In each compacted fill layer, one field density test will be made for every 2,000 square feet of overlaying building slab or tank subgrade, but in no case less than 3 tests will be made.

B. If testing service reports or field inspections show subgrade or fills are below specified density, the Contractor shall provide additional compaction at no additional expense to the Owner.

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT: Unless shown on the construction plans or called out within the technical specifications as a pay item, the structural and/or utility excavation and backfill quantities shown or described are for informational purposes only. No separate measurement of excavation and backfill quantities will be made by the Contractor for this Work.

4.2 PAYMENT: Unless specified as a pay item, structural and/or utility excavation and backfill performed and materials furnished in accordance with this Specification Section will not be paid for directly, but is considered to be subsidiary to the pertinent items associated with construction activities. No separate payment will be made to the Contractor for this Work.

**END OF SECTION**

## SECTION 01240
## TRENCH EXCAVATION SAFETY

PART 1 - GENERAL

1.1 SCOPE

A. The Work included in this Section consists of furnishing all materials, equipment, and labor necessary to perform construction of all trench excavation protection systems to be utilized within the project as shown in the Drawings and specified within.

1.2 REFERENCE STANDARDS

A. Latest provision of Part 1926, Subpart P- Excavations, Trenching, and Shoring of the Occupational Safety and Health Administration (OSHA) Standards and Interpretations, or the most applicable approved equal provision.

1.3 SUBMITTALS

A. Excavation Plan: Prior to start of excavation operations, submit a written plan to Engineer for review to demonstrate Contractor's compliance with OSHA Standard 29 CFR Part 1926.650 and Section 01240 of these Project Specifications. At a minimum, excavation plan shall include:

1. Name of competent person to be placed in charge of excavation and trenching operations.

2. Excavation method(s) or trench protective system(s) to be used.

3. Copies of "manufacturer's data" or other tabulated data if protective systems(s) are designed on the basis of such data.

PART 2 - PRODUCTS

Not Used.

PART 3 – CONTRUCTION

3.1 Trench excavation safety protection shall be accomplished as required by the latest provision of OSHA Standards, or the most applicable approved equal provision.

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT: The quantity measured for payment shall be per linear foot of Trench Excavation Safety along the centerline of any OSHA defined trench regardless of the depth of the trench.

4.2 PAYMENT: Payment shall include compensation for all labor, materials, and equipment necessary for furnishing of Trench Excavation Safety, regardless of the depth of the trench, per linear foot. This item shall also include, but not be limited to, payment for: sloping; sheeting; trench boxes or trench shields; cofferdams, sheet piling; cribbing; bracing; shoring; excavation and backfill; dewatering; any temporary diversion and proper recapture and transportation of water to provide adequate drainage; any jacking and removal of the trench supports after completion; and all other incidentals necessary to complete the Work specified herein.

**END OF SECTION**

## SECTION 01350

## HYDROTESTING AND DISINFECTION

PART 1 – GENERAL

1.1 SCOPE

A. The Contractor shall furnish all labor, materials, equipment, appurtenances, and services required to clean, flush, disinfect, and hydrostatically test all interior surfaces of water main pipelines in accordance with these Project Specifications.

B. All structures containing water, including treatment units not subject to disinfection, shall be cleaned in accordance with Paragraph 3.3 of this Specification Section.

C. Water for initial hydrostatic testing and disinfecting will be furnished by the Owner.

D. Contractor shall provide all temporary piping, hoses, valves, appurtenances, pumps and services as required.

E. Where references are made to other standards or codes, unless specific date references are indicated, the latest edition of said standard or code shall govern.

1.2 REFERENCE STANDARDS

A. Comply with the following applicable provisions and recommendations; the revision in effect at time of the bid opening shall apply.

1. AWWA C600 - Installation of Ductile Iron Mains and Their Appurtenances

2. AWWA C605 - Underground Installation of Polyvinyl Chloride (PVC) and Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe and Fittings

3. AWWA C604 - Installation of Buried Steel Water Pipe- 4 In. and Larger

4. AWWA C651 - Disinfecting Water Mains

5. AWWA C652 - Disinfection of Water Storage Facilities

6. AWWA C653 - Disinfection of Water Treatment Plants

1.3 SUBMITTALS

A. Submit for approval the following:

1. Hydrostatic testing and disinfection procedures, methods, coordination, and schedules.

2. Related impacts on coordination with Owner's operations and Work Sequence.

## PART 2 – PRODUCTS

### 2.1 DISINFECTANT

A. Before disinfection for use with potable water, the water main pipeline shall be filled to eliminate air pockets and flushed to remove particulates. The flushing velocity in the main shall not be less than 2.50 feet/second, unless the Owner determines that conditions do not permit the required flow rate.

B. The Contractor shall disinfect all installed water mains in accordance with the requirements of AWWA C651.

C. Liquid chlorine, sodium hypochlorite or calcium hypochlorite shall be used in accordance with AWWA C652 and AWWA C653.

D. Liquid chlorine shall be used only where gas-flow chlorinators and injectors are installed for treatment applications. Portable or makeshift gas chlorination equipment is not acceptable.

E. Disinfectant chemicals and materials shall be furnished by the Contractor.

F. All disinfection of water mains and piping shall be done under general supervision of the Inspector.

## PART 3 - EXECUTION

### 3.1 GENERAL

A. Disinfection work shall be completed and the facility satisfactorily tested for bacteria in accordance with "Standard Methods for Examination of Water and Wastewater" before it may be placed into service.

B. Samples for bacteriological tests will be taken by the Owner. These samples shall indicate microbiologically-satisfactory water before the facilities will be accepted.

C. If initial tests indicate contamination is present, the Contractor shall repeat the cleaning and disinfection procedure at his sole expense until the test results indicate microbiologically-satisfactory water.

### 3.2 FLUSHING

A. Immediately upon completion of water main installation or repair Work, the Contractor shall flush all mains affected by the scope of the Work.

B. This flushing shall consist of completely filling sections of main between valves and then displacing such initial volumes of water by introducing clear water from existing facilities into and through the main to the point of discharge from the main being flushed.

C. The flow-through shall continue until it is determined all dust, debris, or foreign matter that may have entered during pipe laying operations has been flushed out.

D. All new water mains shall then be left under system pressure for testing.

E. To avoid damage to pavement and inconvenience to the public, fire hoses shall be used to direct flushing water from the main into suitable drainage channels or sewers.

F. The Contractor shall coordinate with the Inspector prior to beginning flushing activities.

3.3 CLEANING

A. All scaffolding, planks, tools, rags, dirt, debris, and any other material not part of the structural or operating facilities shall be removed prior to chlorination.

B. The surfaces of the walls, floors, and operating facilities shall then be thoroughly cleaned by sweeping, a high pressure water hose, scrubbing, or another equally effective method.

C. All water, dirt, or foreign material accumulated in this operation shall be removed from the water storage facility.

3.4 CHLORINATION PROCEDURE

A. Facilities requiring disinfection shall be chlorinated by one of the following methods described in AWWA C652:

1. Method 1: Chlorination of treatment facilities such that at the end of the appropriate retention period the water will have a free chlorine residual of not less than 10 mg/l.

2. Method 2: Applying a solution of 200 mg/l available chlorine to the surfaces of all treatment facilities that will come in contact with water.

3. Method 3: Chlorination of treatment facilities with water having a free chlorine residual of 2 mg/l after 24 hours.

B. Contractor shall:

1. Provide all temporary taps, plugs, valves (including any necessary temporary valves to isolate new piping or structures from existing system), drains, pumps, piping, and connections required to clean, flush, disinfect, and remove the disinfectant.

2. Provide all temporary pumps, piping, and facilities, as required, to drain all flushing water to the work area runoff control area in accordance with the Contractor's Storm Water Pollution Prevention Plan (SWPPP).

3. Perform disinfection of each facility immediately before the facility is placed in operation, and insure that the facility is not contaminated after being acceptably disinfected.

3.5 BACTERIOLOGICAL SAMPLING AND TESTING

A. After the chlorination procedure is completed and before each facility is placed in service, water from the completed facility shall be sampled and tested by Owner for coliform organisms and odor.

B. Bacteriological tests will be completed in accordance with AWWA C652.

1. If a test is negative (satisfactory bacteriological sample), the facility may be placed in service.

2. If a test is positive, Owner will perform an additional set of tests to confirm the results of the initial tests.

3. If a repeat test for coliform organisms indicate positive results, the Contractor shall repeat the cleaning and disinfection procedure for the facility (at the Contractor's cost) until satisfactory results are obtained.

3.6 HYDROSTATIC TESTING

A. After the water pipeline has been laid and after inspection by the Owner, all newly laid main shall be subjected to a hydrostatic pressure test in accordance with AWWA C600. The Contractor shall perform a hydrostatic pre-test to provide reasonable assurance of acceptance prior to performance of the witnessed test. Upon accomplishing a successful pre-test, the Contractor shall contact the Owner at least 48 hours prior to the test. The Owner or the Inspector shall be present during all hydrostatic pipeline tests.

B. Testing shall not be performed before three (3) days after all portions of water mains installation work has been completed.

C. Proper measures shall be taken to ensure that no cross connections are made during testing activities. The Inspector as well as the Engineer shall be informed at least 36 hours in advance of hydrostatic testing.

D. Slowly fill the pipe with water and allow it to stand for 24 hours. Expel all air

from the main. Apply and maintain the specified test pressure by continuous pumping if necessary, for the entire test period. The test pressure shall be calculated for the point of lowest elevation, or as specified by the Owner. The pump suction shall be in a barrel or similar device or metered so that the amount of water required to maintain the test pressure may be measured accurately.

E. Tapping tees shall be tested at 150 psi for 15 minutes before the tap is made to separate from the testing of the main lines and service connections. The hydrostatic test pressure shall be a minimum of 150 psi or 1½ times the operating pressure of the water pipe (measured at the highest elevation of the newly-installed water pipe), whichever is greater, unless otherwise directed by the ENGINEER.

F. Each pressure test duration shall be a minimum of two (2) hours, and allowable leakage shall be determined according to the following formula, unless otherwise directed by the Owner:

1. Leakage shall be defined as the quantity of makeup water required to hold the specified test pressure for the duration of the test period. No pipe installation will be accepted if the leakage is greater than the number of gallons per hour as determined by the following formula:

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

L = quantity of makeup water, in gallons per hour. S = length of pipe section being tested, in feet. D = nominal pipe diameter, in inches. P = average hydrostatic test pressure, in psi (gauge).

G. Test service connection pipe by either testing in conjunction with the main at the test pressure required for the main, or by testing at the normal hydrostatic main pressure after the main has been completely installed and tested. Inspect visually for leaks and repair any leaks before backfilling. Duration of the test shall be at 15 minutes.

H. Upon completion and disinfection, the water mains shall be tested to determine water tightness according to AWWA C605 or most recent revision.

## PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT: Unless shown on the construction plans or called out within the technical specifications as a pay item, the hydrostatic testing and disinfection quantities shown or described are for informational purposes only. No separate measurement of hydrostatic testing and disinfection quantities will be made by the Contractor for this Work.

4.2 PAYMENT: Unless specified as a pay item, hydrostatic testing and disinfection performed and materials furnished in accordance with this Specification Section

will not be paid for directly, but will be considered to be subsidiary to the pertinent items associated with construction activities. No separate payment will be made to the Contractor for this Work.

**END OF SECTION**

**SECTION 01410**

**TESTING LABORATORY SERVICES**

PART 1 – GENERAL

1.1 SCOPE

A. The Work included in this Section consists of furnishing all labor, materials, equipment and incidentals required for testing laboratory services as specified herein.

1.2 DESCRIPTION OF REQUIREMENTS

A. The Owner will employ and pay for the services of an Independent Testing Laboratory to perform specified services and testing.

B. Employment of the laboratory shall in no way relieve the Contractor's obligations to perform the Work of the Contract.

1.3 QUALIFICATION OF LABORATORY

A. Authorized to operate in the State of Texas.

1.4 RELATED SECTIONS

A. Section 01230 – Excavation and Backfill.
B. Section 03600 – Grout.
C. Section 06001 – Flexible Base.
D. Section 09900 – Painting.

1.5 REFERANCE STANDARDS

A. Laboratory of National Institute of Standards and Technology (NIST).

1.6 SUBMITTALS

A. Submit a copy of report of inspection of facilities made by Materials Reference Laboratory of National Institute of Standards and Technology (NIST) during the most recent tour of inspection, with memorandum of remedies of any deficiencies reported by the inspection.

PART 2 – TESTING EQUIPMENT

2.1 GENERAL

A. Calibrated at reasonable intervals by devices of accuracy traceable to either:

1. NIST

2. Accepted values of natural physical constants.

PART 3 - EXECUTION

3.1 LABORATORY DUTIES

A. Cooperate with Engineer and Contractor to provide qualified personnel after due notice.

B. Perform specified inspections, sampling and testing of materials and methods of construction.

C. Comply with specified standards.

D. Promptly notify Engineer/Owner and Contractor of observed irregularities or deficiencies of work products.

E. Promptly submit written report of each test and inspection; one copy each to Engineer, Owner and Contractor. Each report shall include:

1. Date issued.

2. Project title and number.

3. Testing laboratory name, address and telephone number.

4. Name and signature of laboratory inspector.

5. Date and time of sampling or inspection.

6. Record of temperature and weather conditions.

7. Date of test.

8. Identification of product and specification section.

9. Location of sample or test in the Project.

10. Type of inspection or test.

11. Results of tests and compliance with Contract Documents.

12. Interpretation of test results, when requested by Engineer.

13. Employment of personnel making test samples.

14. Perform additional tests as required by Engineer or the Owner.

3.2 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY

A. Laboratory is not authorizedto:

1. Release, revoke, alter or expand requirements of the Contract Documents.

2. Approve or accept any portion of the Work.

3. Perform any duties of the Contractor.

3.3 CONTRACTOR'S RESPONSIBILITIES

A. Cooperate with laboratory personnel, provide access to Work, and to Manufacturer's operations.

B. Secure and deliver to the laboratory adequate quantities of representational samples of materials proposed to be used and which require testing.

C. Furnish copies of Products test reports as required.

D. Furnish incidental labor and facilities.

E. Provide access to Work to be tested.

F. Obtain and handle samples at the Project site or at the source of the product to be tested.

G. Facilitate inspections and tests.

H. Provide a suitable storage box at the site for storage and curing of test samples.

I. Notify laboratory sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.

J. When tests or inspections cannot be performed after such notice, reimburse Owner for laboratory personnel and travel expenses incurred due to Contractor's negligence.

K. Make arrangements with laboratory and pay for additional samples and tests required for Contractor's convenience, including concrete design mixes.

L. Pay for the services of the Independent Testing Laboratory to perform additional inspections, sampling, and testing required when initial tests indicate that work does not comply with the Contract Documents.

PART 4 – MEASUREMENT AND PAYMENT

4.1 Measurement and payment shall be the sole responsibility of the Owner. No separate measurement shall be done by, or payment made to, the Contractor for this Work.

**END OF SECTION**

**SECTION 01700**

**SITE RESTORATION**

PART 1 – GENERAL

1.1 SCOPE

A. The Work included in this Section consists of furnishing all labor, materials, and equipment for preparing and spreading topsoil, fertilizer, seeding, and mulch as shown in the Drawings and specified herein.

B. The Work included in this Section shall also include site restoration of soils to original grade along pipeline installations.

C. Where references are made to other standards or codes, unless specified date references are indicated, the latest edition of said standard or code shall govern.

1.2 RELATED SECTIONS

A. Section 01100, Site Preparation.

1.3 REFERENCE STANDARDS

A. Comply with the applicable provisions and recommendations, except where otherwise shown or specified.

1. Association of Official Analytical Chemists, Official Methods of Analysis.

2. ASTM D2487 – Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)

3. FSO-F-241D, Fertilizer, Mixed, Commercial.

1.4 SUBMITTALS

A. The Contractor shall submit certification from supplier that each type of seed conforms to this Section's requirements and the requirements of the Texas Seed Law.

B. The Contractor shall submit certification stating that the fertilizer complies with this Section's requirements and the requirements of the Texas Fertilizer Law.

1.5 PRODUCT DELIVERY STORAGE, AND HANDLING

A. Materials shall be delivered in proper containers and protect materials from

deterioration during delivery.

B. Store and cover material to prevent deterioration. Remove packaged materials which have become damaged or show deterioration from the site.

PART 2 – MATERIALS

2.1 TOPSOIL

A. Topsoil shall be reasonably free from subsoil, stumps, roots, brush, stones (2 inches or more in diameter), clay lumps or similar objects.

B. The topsoil and or soil mixture, unless otherwise specified or approved, shall have a pH range of approximately 5.5 to 8.0.

C. The organic content of topsoil shall be not less than 1%.

2.2 GRASS SEED

A. Grass seed shall conform to the U.S. Department of Agriculture rules and regulations of the Federal Seed Act and the Texas Seed Law.

B. Seed shall be certified 90 percent pure and furnish 80 percent germination and meet the following requirements:

1. Rye: Fresh, clean, Italian rye grass seed (lollium multi-florum), mixed in labeled proportions. As tested, minimum percentages of impurities and germination must be labeled. Deliver in original unopened containers.

2. Bermuda: Extra-fancy, treated, lawn type common Bermuda (Cynodon dactylon). Deliver in original, unopened container showing weight, analysis, name of vendor, and germination test results.

3. Wet, moldy, or otherwise damaged seed will not be accepted.

4. Seed requirements, application rates and planting dates are:

| Type | Application Rate (pounds/acre) | Planting Date |
|---|---|---|
| Hulled Common Bermuda Grass 98/88<br>Unhulled Common Bermuda Grass 98/88 | 40/40 | Jan 1 to Mar 31 |

| | | |
|---|---|---|
| Hulled Common Bermuda Grass 98/88 | 40 | Apr 1 to Sep 30 |
| Hulled Common Bermuda 98/88<br><br>Unhulled Common Bermuda Grass 98/88<br><br>Annual Rye Grass (Gulf) | 40/40/30 | Oct 1 to Dec 31 |

2.4 FERTILIZER

A. Fertilizer shall be dry and free flowing, inorganic, water soluble commercial fertilizer, which is uniform is composition. Caked, damaged, or otherwise unsuitable fertilizer will not be accepted.

B. Fertilizer shall be standard commercial fertilizers containing 12%, nitrogen, 8% phosphoric acid, and 8% potassium.

C. The fertilizers shall meet the specified requirements of the applicable State and Federal laws. They shall be furnished in standard containers with name, weight, and guaranteed analysis of contents clearly marked thereon.

2.5 MULCH

A. Mulch shall be virgin wood cellulose fibers from whole wood chips having a minimum of 20 percent fibers 0.42 inches (10.7mm) in length and 0.01 inches (0.27 mm) in diameter.

B. Mulch shall be dyed green for coverage verification purposes. Straw mulch or hydromulch may be used in lieu of wood mulch if accepted by the Engineer.

C. The Contractor shall demonstrate comparable performance of straw mulch or hydromulch to wood mulch for acceptance.

PART 3 - EXECUTION

3.1 PREPARATION OF AREA

A. Before applying fertilizer, areas to be seeded shall be rolled or otherwise cleared of stones larger than 2 inches in any diameter, sticks and other debris which might interfere with sowing of seed, growth of grass or subsequent maintenance of grass covered areas.

3.2 PLACING TOPSOIL

A. Topsoil shall be spread evenly on the prepared area to a uniform depth of 4-inches, after compaction.

B. Spreading shall not be done when the ground or topsoil is excessively wet or otherwise in a condition detrimental to the Work.

C. Spreading shall be carried on so that sodding operations can proceed with a minimum of soil preparation or tilling. After spreading, any large stiff clods and hard lumps shall be broken with a pulverizer or by other effective means and all stones or rocks (2-inches or more in diameter), roots litter, or any foreign material shall be raked up and disposed of by the Contractor.

D. The topsoil surface shall conform to the required lines, grades and cross sections. Any topsoil or other dirt falling upon pavements as a result of hauling or handling of topsoil shall be promptly removed.

3.3 DISPOSAL OF WASTE MATERIALS

A. The Contractor shall legally dispose of all waste materials, (i.e. roots, stumps, brush, stones, clay lumps, etc.) generated during the processing of the on-site topsoil.

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT: The quantity measured for payment shall be per square yard of topsoil at 4-inch minimum depth completed with seed, fertilizer, mulch, and watering as agreed upon by the Owner and the Contractor.

4.2 PAYMENT: Payment shall be made for all labor, materials, and equipment necessary for preparing and spreading topsoil, fertilizer, seeding, and mulch in square yard at 4-inch minimum depth as specified in the Drawings and specified herein. This shall include, but not necessarily be limited to: spreading topsoil, seeding, mulching, fertilizing, watering, and any other work incidental and included within this Section.

**END OF SECTION**

## SECTION 01720

## REMOVE AND REPLACE EXISTING GRAVEL/CHIP SEAL DRIVEWAY

### PART 1 – GENERAL

#### 1.1 SCOPE

A. The Work included in this Section consists of furnishing all labor, materials, and equipment for the reconstruction of existing gravel and chip seal driveways.

B. Where references are made to other standards or codes, unless specified date references are indicated, the latest edition of said standard or code shall govern.

#### 1.2 SUBMITTALS

A. The Contractor shall submit certification stating that type of Asphaltic Cement and Aggregates conform to this Section's requirements.

### PART 2 – MATERIALS

#### 2.1 ASPHALTIC CEMENT

A. TxDOT Item 300, "Asphalts, Oils, and Emulsions

#### 2.2 AGGRETATES

A. TxDOT Item 302, "Aggregates for Surface Treatments."

### PART 3 - EXECUTION

#### 3.1 REMOVAL OF EXISTING DRIVEWAY

A. If an existing driveway is to be removed and replaced, remove the existing driveway pavement to the depths and limits shown on the plans or identified by the Engineer using the methods described herein. Asphaltic concrete driveway pavements shall be cut with a concrete saw or other equipment approved by the Engineer. Existing gravel driveways shall be removed with appropriate excavation equipment as shown on the plans or approved by the Engineer. If necessary, remove adjacent soil and vegetation to prevent contamination of the driveway area, and place it in a windrow or stockpile. Do not damage adjacent pavement structure during removal and reconstruction operations.

#### 3.2 PREPARING SUBGRADE

A. Compaction. Use approved equipment to compact the subgrade layer. The plans

or the Engineer may require specific equipment. Compact until there is no evidence of further consolidation. Maintain a level layer to ensure uniform compaction. If the required stability or finish is lost for any reason, recompact and refinish the subgrade at no additional expense to the Owner. Backfill shall be placed in a maximum of 8" thickness compacted to match existing density.

3.3 SURFACING

A. Gravel Driveway. A gravel driveway is defined as a driveway consisting entirely of flexible base material without an asphaltic concrete, Portland cement concrete, or surface treatment layer. The surface of the compacted base shall be smooth and in conformity with typical sections and to the established lines and grades.

B. Chip Seal Driveway. A chip seal driveway is a driveway with a surface treatment layer.

1. Weather
   a) Standard Temperature Limitations. Apply surface treatment when air temperature is above 50°F and rising. Do not apply surface treatment when air temperature is 60°F and falling. In all cases, do not apply surface treatment when surface temperature is below 60°F.
   b) Polymer-Modified Asphalt Cement Temperature Limitations. When using materials described in TxDOT Item 300, Section 2.B, "Polymer Modified Asphalt Cement," apply surface treatment when air temperature is above 70°F and rising. Do not apply surface treatment when air temperature is 80°F and falling. In all cases, do not apply surface treatment when surface temperature is below 70°F.
   c) Asphalt Material Designed for Winter Use. When winter asphalt application is allowed, the Engineer will approve the air and surface temperature for asphalt material application. Apply surface treatment at air and surface temperatures as directed.
2. Surface Preparation. Remove dirt, dust, or other harmful material before sealing.
3. Asphalt Placement. Select an application temperature, as approved, in accordance with TxDOT Item 300, "Asphalts, Oils, and Emulsions." Uniformly apply the asphalt material at the rate of 0.2 Gallons per Square Yard, within 15°F of the approved temperature, and not above the maximum allowable temperature.
4. Aggregate Placement. As soon as possible, apply aggregate uniformly at the rate directed without causing the rock to roll over.
5. Rolling. Start rolling operation on each shot as soon as aggregate is applied. Use sufficient rollers to cover the entire mat width in 1 pass, i.e., 1 direction. Unless otherwise shown on the plans, make a minimum of 5 passes.
6. Brooming. After rolling, sweep as soon as aggregate has sufficiently bonded

to remove excess.

3.4 DISPOSAL OF WASTE MATERIALS

A. The Contractor shall legally dispose of all waste materials, generated during the processing of the on-site topsoil.

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT: The quantity measured for payment shall be per square yard of removal and replacement of existing gravel or chip seal driveway as agreed upon by the Owner and the Contractor.

4.2 PAYMENT: Payment shall be made for all labor, materials, and equipment necessary for "Remove/Replace Existing Gravel/Chip Seal Driveway" in the unit price bid of square yard at 2-inch minimum depth as specified in the Drawings and specified herein. This shall include, but not necessarily be limited to: removal of existing driveway, preparing the subgrade, for furnishing and placing all materials, manipulations, labor, tools, equipment, and any other work incidental and included within this Section.

**END OF SECTION**

**SECTION 02400**
**VALVES AND APPURTENANCES**

PART 1 - GENERAL

1.1 SCOPE

A. The Work included in this Section consists of furnishing all labor, materials, equipment and incidentals required to install complete and ready for operation and testing all valves and appurtenances as shown within the Construction Drawings and as specified herein.

B. The Work includes, but not necessarily limited to, all types of valves required for buried, exposed, submerged, and other types of piping, except where otherwise specifically included in other Sections.

C. Where references are made to other standards and codes, unless specific date references are indicated, the latest edition of said standard or code shall govern.

1.2 DESCRIPTIONS OF REQUIREMENTS

A. The Contractor shall furnish and install the gate valves in accordance with the Typical Iron Valve Box Standard Detail as per the Drawings.

B. The Contractor shall furnish and install flush valves in accordance with the Flush Valve Detail 6-Inch or Larger Standard Detail as per the Drawings

C. The Contractor shall install valve markers in accordance with the Marker Standard Detail drawing as shown within the Construction Drawings.

1.3 QUALITY ASSURANCE

A. Qualifications

1. Manufacturer shall have a minimum of five (5) years of experience in the production of substantially similar equipment, and shall show evidence of satisfactory service in at least five (5) installations.

2. All units of the same type shall be the product of one Manufacturer.

3. The equipment shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these Specifications as applicable.

1.4 RELATED SECTIONS

A. Section 01230, Excavation and Backfill.

B. Section 01350, Hydrotesting and Disinfection.

C. Section 02660, Ductile-Iron Pipe.

1.5 REFERENCE STANDARDS

A. Comply with the following applicable provisions and recommendations, except as otherwise shown or specified where reference is made to one of the below referenced standards, the revision in effect at the time of bid opening shall apply.

1. ASTM A48 - Specification for Gray Iron Castings
2. ASTM A126 - Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings
3. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, and Threaded Rod 60,000 psi Tensile Strength
4. ASTM A436 - Specification for Austenitic Gray Iron Castings
5. ASTM A536 - Specification for Ductile Iron Castings
6. AWWA C500 – Metal-Seated Gate Valves for Water Supply Service
7. AWWA C504 – Rubber-Seated Butterfly Valves
8. AWWA C507 – Ball Valves, 6-inch through 48-inch
9. AWWA C508 – Swing-Check Valves for Waterwork Service, 2-inch through 24-inch NPS
10. AWWA C509 - Resilient-Seated Gate Valves for Water Supply Service
11. AWWA C540 – Power Actuating Devices for Valves and Sluice Gates
12. AWWA C541 – Hydraulic and Pneumatic Cylinder and Vane-Type Actuators for Valves and Slide Gates
13. AWWA C542 – Electric Motor Actuators for Valves and Slide Gates
14. AWWA C550 - Protective Interior Coatings for Valves and Hydrants
15. MSS-SP-67 – Butterfly Valves
16. MSS-SP-70 - Gray Iron Gate Valves, Flanged and Threaded Ends
17. MSS-SP-82 - Valve Pressure Testing Methods
18. MSS-SP-98 - Protective Coatings for Interior of Valves and Hydrants

19. Valves shall be NSF-61 certified.

20. AGMA Standards

21. NEMA, National Electrical Manufacturer's Association.

1.6 SUBMITTALS

A. Shop Drawings

1. Manufacturer's literature, illustrations, paint certifications, specifications, detailed drawings, data and descriptive literature on all valves and appurtenances.

2. Proposed deviations from the Contract Documents.

3. Engineering data including dimensions, materials, sizes and weights.

4. Fabrication, assembly, installation and wiring diagrams.

5. Additional submittal data, where noted, with individual pieces of equipment.

B. Test Reports

1. Provide certified hydrostatic test data, per Manufacturer's standard procedure or MSS-SP-61 for valve.

2. Hydrostatic tests shall be performed, when required by the valve specifications included herein.

C. Certificates

1. For each valve specified to be manufactured, tested and/or installed in accordance with AWWA and other standards, submit an affidavit of compliance with the appropriate standards, including certified results of required tests and certification of proper installation.

D. Operating and Maintenance Data

1. Operating and maintenance instructions shall be furnished to the Owner.The instructions shall be prepared specifically for the project installation and shall include all required cuts, drawings, equipment lists, descriptions, and other information required to instruct operating and maintenance personnel that may be unfamiliar with such equipment.

2. Provide copies of all shop drawings, test reports, maintenance data and schedules, description of operation; and, spare parts information.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping

1. Care shall be taken in loading, transporting and unloading to prevent damage to the valves, appurtenances, or coatings. Equipment shall not be dropped. All valves and appurtenances shall be examined before installation and no piece shall be installed which is found to be defective. Any damage to the coatings shall be repaired by the Contractor as acceptable to the Owner.

2. Prior to shipping, the ends of all valves shall be acceptably covered to prevent entry of foreign material. Covers shall remain in place until just before installation and connecting piping is completed.

B. Storage and Protection

1. Special care shall be taken to prevent plastic and similar brittle items from being directly exposed to the sun, or exposed to extremes in temperature, to prevent deformation. See the individual valve specifications and manufacturer's information for further requirements.

C. Delivery

1. Deliver material to the site to ensure uninterrupted progress of the Work.

a. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete, in ample time to not delay Work.

1.8 MAINTENANCE

A. Special tools and the manufacturer's standard spare parts if required for normal operation and maintenance, shall be supplied with the equipment in accordance with the Contract Documents and where notes, as specified herein.

B. Provide all special tools required for normal maintenance. Tools shall be packaged in a steel case, clearly and indelibly marked on the exterior to indicate equipment for which tools are intended.

C. Provide to the Owner a list of all spare and replacement parts with individual prices and locations where they are available.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Valves shall have manufacturer's name and working pressure cast in raised letters on valve body.

B. Manual valve operators shall turn clockwise to close, unless otherwise specified.

Valves shall indicate the direction of operation.

C. Unless otherwise specified, all flanged valves shall have ends conforming to ANSI B16.1, Class 150 (Class 200 for valves 12 inches or smaller).

D. Buried valves shall have flanged ends with mechanical joint adapters and be installed with a flanged adapter, or have grooved mechanical couplings. All bolts shall be Type 316 stainless steel.

E. Buried valves shall be provided with adjustable two-piece valve boxes and provided with extension stems, operating nuts and covers unless otherwise shown or specified. Extension stems shall terminate 12-inches below furnished grade.

F. All bolts, nuts, and studs on or required to connect buried or submerged valves shall be Type 316 stainless steel.

G. All bolts and studs embedded in concrete and studs required for wall pipe shall be of Type 316 stainless steel.

H. All other bolts , nuts, and studs shall, unless otherwise approved, conform to ASTM A 307, Grade B; or ASTM A 354.

I. Bolts shall have hexagon heads and nuts.

J. Gaskets material and installation shall conform to manufacturer's recommendations.

K. Identification: Identify each valve 4 inches and larger with a stainless steel nameplate stamped with the approved designation. Nameplate shall be permanently fastened to valve body at the factory. Stenciled designations are acceptable for buried valves.

L. The Contractor shall be responsible to coordinate compatible materials of construction for all wettable parts of all valves for each process application.

M. The use of a manufacturer's name and/or model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.

N. Valves shall be of the size shown on the Drawings or as noted; and equipment of the same type shall be identical and from one Manufacturer.

O. Each valve box shall be fitted with a plastic valve ID tag (Blue Emedco 3 ½" x 2 ¾"). Tags shall be securely fastened to valves.

P. Valves and appurtenances shall be marked per AWWA Standards with the Owner name (CCSUD), valve size, flow directional arrows, year of manufacture, working pressure for which they are designed and standard referenced, cast in raised letters or indelibly marked upon some appropriate part of the body.

Q. Joints, size and material - unless otherwise noted or required by the Owner:

1. Except where noted, all joints referred to herein shall be of the same type, nominal diameter, material, and with a minimum rating equal to the pipe or fittings they are connected to.

2. Valves and appurtenances shall be of the same nominal diameter as the pipe or fittings they are connected to.

3. All valves exposed to view (above-grade), or in vaults (below-grade).

   a. 3-inches and smaller - threaded ends

   b. 4-inches and larger - flanged ends

R. Provide all special adaptors as required to ensure compatibility between valves, appurtenances and adjacent pipe.

S. Valves located outdoors but not within a building; within maximum 2-ft above liquid; in vaults; or where otherwise noted shall be especially designed for submerged service where water may completely submerge the valve. All other units shall be as a minimum weather tight.

T. Rising stem valves shall be sealed with adjustable and replaceable packing; valve design must permit packing replacement under operating system pressures with only moderate leakage.

U. Non-rising stem valves shall use a double O-ring stem seal, except that packing shall be used where geared operators are required.

V. Except as otherwise specified, valves shall be rated for the following working water pressures:

| Valve Size | Pressure (psig) |
|---|---|
| 3-inches to 12-inches | 200 |
| 14-inches to 20-inches | 150 |
| 24-inches and greater | 150 |

2.2 GATE VALVES

A. 2 ½-inches in Diameter and Smaller:

1. Valves shall be bronze with screwed ends, solid wedge, rising stem,screwed bonnet type with screwed ends suitable for 150 psi service.

2. Product and Manufacturer: Provide one of the following:

a. Fig. 49-U, as manufactured by Jenkins Brothers.

b. Fig. 431-UB , as manufactured by Crane Company.

c. Or Approved Equivalent.

B. 3-inches in Diameter and Larger:

1. Valves shall be iron body, bronze mounted, non-rising stem and in conformance with AWWA C500.

2. Unless otherwise shown or specified, exposed valves shall have flanged ends conforming to ANSI B16.1, Class 150. Buried valves shall be provided with mechanical joint adapters.

3. Exposed manually operated gate valves shall be equipped with hand wheels. Gate valves located more than five feet above the operating floor shall be provided with chain wheels, sprockets, and aluminum chain. The chain shall extend to three feet above the operating floor.

4. Buried gate valves shall be furnished with valve boxes, nut operated extension stems and tee wrenches as required.

5. Shop painting:

a. Interior metal surfaces of cast iron valves shall be cleaned with a near white blast (SSPC-SP10) and shall be shop painted with two coats of a NSF 61 approved epoxy coating applied in accordance with the manufacturer's recommendations.

b. Exterior surfaces of the valves shall be shop painted as specified hereinafter under Paragraph 2.10 of this Section.

6. Product and Manufacturer: Provide gate valves of one of the following, as listed in the Approved Equipment List (AEL):

a. Mueller Water Products, Inc.

b. American Cast Iron Pipe Company.

c. EJ Group, Inc.

d. Or Approved Equivalent.

7. Exposed gate valves 16-inches and greater in size shall have valve by-pass.

8. All bonnet and packing gland bolts shall be zinc or cadmium electroplated steel; packing gland bolts shall have bronze nuts.

9. Exposed gate valves 16-inches and greater indicated for horizontal stem

Installation shall be furnished with rollers, tracks and scrapers and enclosed bevel gear grease case.

10. Unless otherwise indicated, gate valves 12-inches and smaller shall be capable of installation in the vertical or horizontal position, sealing in both directions at the rated pressure.

11. Resilient wedge valves shall be coated, interior and exterior, with fusion bonded epoxy per AWWA C550.

12. Valve Requirements

    a. Resilient Wedge

        i. Tongue and grooved guides for wedges.

    b. Resilient Seated

        i. Internal and external epoxy coating of valve body, including bonnet, per AWWA C550.

        ii. No recesses in valve body.

2.3 CHECK VALVES - LIQUID SERVICE

A. General:

1. Check valves shall absolutely prevent the return of water back through the valbe when the upstream pressure decreases below the downstream pressure. The valve shall be tight seating.

B. Slanting Disc Type – Pump Discharge (Vertically Oriented)

1. The check valve shall be designed to operate in full open position with a velocity range of 3 to 10 feet per second.

2. Disc position indicator shall be provided.

3. 125 lb. class.

4. Shop Painting:

    a. Interior metal surfaces of the valve, except finished or bearing surfaces, shall be cleaned with a near white blast (SSPC-SP10) and shall be shop painted with two coats of an NSF 61 approved epoxy coating applied in accordance with the manufacturer's recommendations.

    b. Exterior surfaces of the valve shall be shop painted as specified hereinafter under Paragraph 2.10 of this Section.

5. Product and Manufacturer: Provide tilting disc, slow opening and controlled closing check valves of one of the following:

   a. APCO Series 800 T (APCO Willamette Valve & Primer Corp.).

   b. Or Approved Equivalent.

2.4 BUTTERFLY VALVES – WATER SERVICE

A. Valves shall be short body, except where otherwise shown or required to obtain required clearances for valve operator or disc. Valves shall conform to AWWA C504.

B. Valves shall be of the 125 psi pressure class.

C. Flanged ends, where required, shall conform to ANSI B16.1, Class 125.

D. Valve seats shall be mounted in cast-iron valve body, made of rubber suitable for water service.

E. Shafts, retaining rings and internal hardware shall be of stainless steel.

F. Shafts seals of non-buried valves shall have a stuffing box and pull down packing gland. Packing shall be replaceable without removing the valve operator. Buried valves shall be furnished with self-adjusting "V" type packing.

G. Provide a stainless steel seating edge on all discs.

H. Product and Manufacturer. Provide butterfly valves (Circular) of one of the following:

   1. Mueller Water Products, Inc.

   2. DeZurick/APCO/Hilton.

   3. Or Approved Equivalent.

I. Valve Operator – Manual:

   1. Valves shall be equipped with an enclosed worm gear drive and nut, hand wheel or chain wheel operator.

   2. Enclosed worm gear operators shall have a gear ratio designed not to exceed 80 pounds pull to meet the required operator torque.

   3. Gears shall be permanently lubricated and totally enclosed.

   4. Operators shall be designed to hold the valve disc in any intermediate position without creeping or fluttering.

   5. Adjustable stops shall be provided to prevent over-travel in either

position, to withstand a pull of 200 pounds.

6. Stops shall be enclosed within the operator housing and be capable of absorbing the full operator torque with minimum safety factor of five (5).

7. Operators shall be equipped with a direct coupled indicator.

8. Valves regardless of size, if installed with the operating wheel more than five feet above the operating floor, shall be provided with a chain wheel, sprocket, and aluminum chain. The chain shall extend to three feet above the operating floor.

9. Valve operator shall be designed to fully close or fully open the valve in a minimum of 30 turns. Valves shall open counter-clockwise, and shall have a position indicator.

10. Shop Painting:

    a. Interior metal surfaces of the valve, except finished or bearing surfaces, shall be cleaned with a near white blast (SSPC-SP10) and shall be shop painted with two coats of an NSF 61 approved epoxy coating applied in accordance with the manufacturer's recommendations.

    b. Exterior surfaces of the valve shall be shop painted as specified hereinafter under Paragraph 2.10 of this Section.

11. Product and Manufacturer: Provide manual operators of one of the following:

    a. Flowserve Corporation.

    b. Or Approved Equivalent.

2.5 RUNNER SEAT BALL VALVES

A. Valves shall have a cast iron body suitable for 150 psi pressure. Body shall have stainless steel conical seating surfaces to provide abrasion-free, corrosion free surfaces for mating with the resilient seat on the rotor.

B. Ends shall be flanged, conforming to ANSI B16.1, Class 125.

C. Shaft seal shall be of bronze , provided with "O" ring seals.

D. Shaft bearings shall be of bronze, permanently lubricated, sealed with "O" ring seals.

E. Seats shall be of rubber suitable for water service, secured to the rotor by means of ductile Ni-Resist adjusting segments.

F. Rotor shall be of cast iron, secured to stub shafts with stainless steel taper pins.

G. Stub shafts shall be of stainless steel.

H. Provide adjustable thrust bearings for alignment of the rotor in the body.

I. Manufacturer: Provide rubber seat valves of one of the following:

a. Mueller Water Products, Inc.

b. Or Approved Equivalent.

2.6 PINCH CHECK VALVES

A. Pinch Check Valves shall be all rubber, and of the flow operated check type with a slip-on end connection.

B. Valve shall be one-piece rubber construction with fabric reinforcement.

C. Valve shall have aprotective EDPM exterior wrapping for UV protection.

D. Provide stainless steel attachment straps and hardware as needed to securely attach valve to pipe.

E. Manufacturer: Provide rubber pinch check valve of one of the following:

1. Tideflex Technologies.

2. Or Approved Equivalent.

2.7 PINCH VALVES

A. Pipe Automatic Pinch Valves shall be cast iron construction.

B. connections shall be ANSI Calss 125/150 flanged.

C. Sleeves shall be made of EDPM.

D. Provide stainless steel bolts and hardware as needed to securely attach the valve to the pipe.

E. Provide manufacturers standard protective exterior coating for outdoor service.

F. Manufacturer: Provide manual pinch valve of one of the following:

1. Red Valve Company, Inc.

2. Or Approved Equivalent.

2.8 SPECIALS

A. Corporation Stops:

1. Where shown or necessary to complete the Work, corporation stops shall be furnished with bronze stemp, washer, nut, body, and key.

2. Product Manufacturer: Provide Corporation Stops of one of the following:

   a. Ford Meter Corporation Stops:Box Company, Inc.

   b. Or Approved Equivalent.

B. Hose Bibbs:

1. House bibbs shall consist of a boiler drain type valve and vacuum breaker.

2. Valve shall be ¾-inch size or 1-inch size as shown on Drawings, bronze bodied, with aluminum hand wheel and renewable composition disc, suitable for 125 psi working pressure.

3. Valve shall have one male copper joint end and one male hose thread end.

4. Product and Manufacturer: Provide House Bibbs of one of the following:

   a. NIBCO.

   b. Jenkins.

   c. Or Approved Equivalent.

## 2.9 VALVE APPURTENANCES

A. Operators:

1. General: The operators shall be sized based on the maximum expected torque as per valve manufacturer's recommendations and in no case shall the force required to open or close the valve (i.e. rim pull) exceed 40 pounds. The responsibility for proper operation shall reside with the valve supplier.

2. Manual Operators: Manual operators shall be in compliance with AWWA C504, and shall be of the worm gear type and feature a housing that encloses all gearing and can either be buried or is of weatherproof construction for exposed locations. The operator housing shall be constructed of cast iron and shall be permanently grease packed. All housing O-rings, gaskets, and other features shall be designed to ensure permanent water tightness and maintenance free operation. The axis of the worm gear shaft shall remain fixed during operation and stop-limiting devices shall be procided to limit operator travel. Valves scheduled for above ground service shall be equipped with a hand wheel. Buried valves shall be quipped with a 2-inch square AWWA operating nut.

Suitable manufacturers include Limitorque, E-I-M, DeZurick, or approved equivalent.

3. Chain Operators:

   a. All valves more than 5 feet-0 inches above operating floor level shall be equipped with chain operator and sprocket wheel bolted directly to the valve operating wheel

   b. Aluminum chain shall be provided. Equip all operators with a ½-inch hook bolt located to keep chain out of walking areas.

B. Extension Stems, Stem Guides, Wrenches and Keys:

1. Extension stem shall be at least as large as valve stem it operates.

2. Provide intermediate stem guide for extensions more than 7 feet long.

3. Stem brackets and guides shall be made of cast iron and have fully adjustable bronzed bushed guide block. Fasten brackets to walls with approved expansion bolts.

4. Operating buts about 2 inches square shall be included with each extension stem and located in floor box or grating recess, as required.

5. Provide operating key or wrench of suitable lenth and size for each valve that is not readily accessible for direct opertation.

C. Valve Boxes: Provide each buried valve with a valve box as follows:

1. Made of heavy pattern cast-iron, 2-piece adjustable telescoping type.

2. Lower section shall enclose operating nut and stuffing box and rest on bonnet.

3. Inside diameter shall be at least 4 ½ inches.

4. Provide extension stem and operating nut.

5. Cover shall be heavy duty cast iron with direction to open arrow cast in.

6. Provide valve box of adequate size for operation and maintenance of buried air release valves where shown.

7. Square covers shall be provided for all recycled water main valve boxes. Round covers shall be provided for all potable water main valve boxes and labeled "WATER".

## 2.10 SURFACE PREPARATION AND PAINTING

A. Not withstanding any of these Specifications, all coatings and lubricants in contact with potable water shall be certified as accepted for use with that fluid.

B. If Manufacturer's requirements are not to provide finished coating on any interior surfaces, then the Manufacturer shall so state and no interior finish coating will be required, if acceptable to the Owner.

C. Clean and prime coat all ferrous metal surfaces of each valve in the shop.

D. Coat all machined, polished and non-ferrous surfaces including gears, bearing surfaces and similar unpainted surfaces with a corrosion prevention compound which shall be maintained during storage and until equipment begins operation.

PART 3 - EXECUTION

3.1 INSTALLATION

A. All valves and appurtenances shall be installed per the Manufacturer's instructions in the locations shown, true to alignment and rigidly supported. Any damage to the valves and appurtenances shall be repaired to the satisfaction of the Owner before they are installed.

B. Install all brackets, extension rods, guides, the various types of operators and appurtenances as shown on the Drawings, or otherwise required. Before setting these items, the Contractor shall check all Drawings and figures which have a direct bearing on their location. The Contractor shall be responsible for the proper location of valves and appurtenances during the construction of the Work.

C. All components shall be carefully inspected for defects in construction and materials. All debris and foreign material shall be cleaned out of openings, etc. All valve flange covers shall remain in place until connected piping is in place. All operating mechanisms shall be operated to check their proper functioning and all nuts and bolts checked for tightness. Valves and other equipment which do not operate easily, or are otherwise defective, shall be repaired or replaced at no additional cost to the Owner.

D. All items (including valve interiors) shall be cleaned prior to installation, testing, disinfection and final acceptance.

E. Unless otherwise noted, joints for valves and appurtenances shall be made up utilizing the same procedures as specified under the applicable type connecting pipe joint and all valves and other items shall be installed in the proper position as recommended by the Manufacturer. Contractor shall be responsible for verifying manufacturer's torquing requirements for all valves.

F. Install all valves so that operating wheels or wrenches may be conveniently turned from operating floor but without interfering with access, and as approved by the Engineer.

G. Unless otherwise approved, install all valves plumb and level. Install valves free from distortion and strain caused by misaligned piping, equipment or other

causes.

H. Set valve boxed plumb, and centered with the bodies directly over the valves. Carefully tamp earth fill around each valve boc to a distance of 4 feet on all sides of the box, or to the undisturbed trench face, if less than 4 feet.

3.2 INSTALLATION OF MANUAL OPERATIONAL DEVICES

A. Unless otherwise noted, all operational devices shall be installed with the units atthe factory, as shown on the Drawings or as acceptable to the Owner, to allow accessibility to operate and maintain the item and to prevent interference with other piping, valves and appurtenances.

B. For manually operated valves 3-inches in diameter and smaller, valve operators and indicators shall be rotated to display toward normal operation locations.

C. Floor boxes, valve boxes, and extension stems shall be installed vertically centered over the operating nut, with couplings as required and the elevation of the box top shall be adjusted to conform with the elevation of the finished floor surface or grade at the completion of the Contract. Boxes and stem guides shall be adequately supported during concrete pouring to maintain vertical alignment.

3.3 INSPECTION, TESTING AND CORRECTION OF DEFICIENCIES

A. Take care not to over pressure valves or appurtenances during pipe testing. If any unit proves to be defective, it shall be replaced or repaired to the satisfaction of the Owner.

B. Functional Test: All items shall be inspected for proper alignment, operation, proper connection and satisfactory performance. All units shall be operated continuously while connected to the attached piping for at least 8 hours, without vibration, jamming, leakage, or overheating and perform the specified function.

C. The various pipe lines in which the valves and appurtenances are to be installed are specified to be field tested. During these tests any defective valve or appurtenance shall be adjusted, removed and replaced, or otherwise made acceptable to the Owner.

D. Various regulating valves, strainers, or other appurtenances shall be tested to demonstrate their conformance with the specified operational capabilities and any deficiencies shall be corrected or the device replaced or otherwise made acceptable to the Owner.

E. Gate valves: Perform shop tests in accordance with AWWA C500, except no leakage shall occur with design pressure held for one minute.

F. Conduct functional field test of each valve in presence of Engineer to demonstrate that each part and all components together function correctly.

3.4 HYDROTESTING AND DISINFECTION

A. Hydrostesting and disinfection shall be in accordance with Section 01350 of these Project Specifications.

B. All valve bodies shall be hydrostatically tested to at least twice the rated working water pressure. In addition, valves shall be seat-tested, bi-directional at the rated working pressure, with seat leakage not to exceed one fluid ounce per inch of valve diameter per hour. Provide certificates of hydrostatic testing results to Engineer.

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT: The quantity that is measured, "per each," for payment shall be the actual number of valves of each class, type, and size (including actuators, valve boxes, and marker posts/signs) that are furnished and installed by the Contractor for acceptance by the Owner.

4.2 PAYMENT: Payment shall include all labor, materials, testing, and equipment necessary for furnishing and installing complete functioning valves and valve boxes of various sizes as per the Drawings and as specified herein. This item shall also include, but not be limited to: all types and sizes of valves; valve stem; valve box and cover; valve box extensions; concrete collar around valve box; base material below the valve per the Drawings; valve marker, project staking; sheeting; gearing; painting; coating; nut operator extension; excavation and backfill; trenching; restraining utility poles; hydrotesting and disinfection; and all other work incidental to the installation of functional gate valve and box with marker sign complete in place and in reliable service.

**END OF SECTION**

**SECTION 02440**

**COMBINATION AIR RELEASE VALVE**

PART 1 - GENERAL

1.1 SCOPE

A. The Work included in this Section consists of furnishing all labor, materials, testing,equipment and incidentals required to install a complete combination air valve assembly.

B. Where references are made to other standards and codes, unless specific date references are indicated, the latest edition of said standard or code shall govern.

1.2 DESCRIPTIONS OF REQUIREMENTS

A. The Contractor shall furnish and install combination air valve assemblies in accordance with Section 2.1 of these Specifications and the Air Release Valve standard detail as shown within the Construction Drawings.

1.3 QUALITY ASSURANCE

A. Qualifications

1. The equipment shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these Specifications as applicable.

2. Provide the services of a qualified and factory-trained service representative of the Manufacturer to provide operational and maintenance instructions.

1.4 RELATED SECTIONS

A. Section 01230 – Excavation and Backfill.

B. Section 01350 – Hydrotesting and Disinfection.

1.5 REFERENCE STANDARDS

A. Comply with the following applicable provisions and recommendations, except as otherwise shown or specified where reference is made to one of the below listed standards, the revision in effect at the time of bid opening shall apply.

1. ASTM A48 Class 35 – Gray Iron Castings

2. ASTM A126 Class B – Gray Iron Castings for Valves, Flanges, and Pipe Fittings

3. ANSI/NSF Standard 60 – Drinking Water Treatment Chemicals

4. ANSI/NSF Standard 61 – Drinking Water System Components

1.6 SUBMITTALS

A. Shop Drawings

1. Manufacturer's literature, illustrations, paint certifications, specifications, detailed drawings, data and descriptive literature on combination air valves.

2. Engineering data including dimensions, materials, size and weight.

3. Additional submittal data, where noted with individual pieces of equipment.

B. Certificates

1. The Manufacturer shall provide certification that products furnished under this specification are manufactured in an ISO 9001 certified facility or documentation from an accredited facility that ISO 9001 certification is in process.

C. Operating and Maintenance Data

1. Operating and maintenance instructions shall be furnished to the Owner. The instructions shall be prepared specifically for this installation and shall include all required cuts, drawings, equipment lists, descriptions and other information required to instruct operating and maintenance personnel unfamiliar with such equipment.

2. Copies of all shop drawings, test reports, maintenance data and schedules, description of operation and, spare parts information shall be provided to the Owner.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping

1. Care shall be taken in loading, transporting and unloading to prevent injury

to the valves, appurtenances, or coatings. Equipment shall not be dropped. Each combination air valve andassembly components shall be examined before installation and no piece shall be installed which is found to be defective. Any damage to the coatings shall be repaired as acceptable to the Owner.

2. Prior to shipping, the ends of all valves shall be acceptably covered to prevent entry of foreign material. Covers shall remain in place until after installation and connecting piping is completed.

B. Storage and Protection

1. Special care shall be taken to prevent plastic and similar brittle items from being directly exposed to the sun, or exposed to extremes in temperature, to prevent deformation. See the individual piping specifications and Manufacturer's information for further requirements.

1.8 MAINTENANCE

A. Special tools and the Manufacturer's standard spare parts, if required for normal operation and maintenance, shall be supplied with the equipment in accordance with the Contract Documents and where noted, as specified herein.

B. Provide all special tools required for normal maintenance. Tools shall be packaged in a steel case, clearly and indelibly marked on the exterior to indicate equipment for which tools are intended.

C. Provide to the Owner a list of all spare and replacement parts with individual prices and location where they are available.

PART 2 - PRODUCTS

2.1 COMBINATION AIR VALVE ASSEMBLY

A. The valve assembly shall be furnished and installed as per the Combination AirValve standard detail shown within the Construction Drawings.

B. The use of a Manufacturer's name and/or model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.

C. Valves shall be of the size shown on the construction Drawings or as noted; equipment of the same type shall conform to the Approved Equipment List and the models specified in these Specifications..

D. Approved Manufacturers, also shown in the Approved Equipment List (AEL), are listed below.

| Manufacturer | 1" NPT x 5/64" | 2" NPTx3/32" | 3" flg.x 3/32" w/ cowl |
|---|---|---|---|
| Empire Controls | 945 (1" NPT) | 945 | 945T |
| Val-Matic | 201C | 202C | 203C |
| Apco | 143C | 145C | 147C |

E. The combination air release shall be designed to vent accumulated air automatically. The outlet orifice shall be sized properly to facilitate valve operation at pressures of up to 150 psi. The air release valve shall be simple-lever, compound-lever, ball and orifice, or rolling seal depending upon volume requirements and the design of the valve.

F. The combination air release valve shall be designed with the inlet and outlet of equal cross-sectional area where applicable. The valve shall be capable of automatically allowing large quantities of air to be exhausted during the filling cycle and also capable of automatically allowing air to re-enter the system to prevent a negative pressure at water column separation or during the draining cycle. The float shall be guided to minimize premature closure by air and to provide proper alignment for normal closure by floating on the water surface.

G. Combination air release valves shall provide for both automatic air release under system pressure and to allow air movement during filling or draining operations or water column separation. The combination air valve may be housed in a single casting. The housing shall be designed to incorporate conventional or kinetic flow principles to properly vent the air without premature closure. Flanged sized (4 inch and larger) may be furnished in a dual housing. When dual casings are used a bronze manual isolation valve shall be installed if indicated by the manufacturer. This will allow the air release valve to be serviced when the system is under pressure. Field service of the valve may also be performed by closing the isolation valve between the air valve and the pipe connection.

2.2 SURFACE PREPARATION AND PAINTING

A. Notwithstanding any of these Specifications, all coatings and lubricants in contact with potable water shall be certified as acceptable for use with that fluid.

B. If the Manufacturer's requirement is not to require finished coating on any interior surfaces, then Manufacturer shall so state and no interior finish coating will be required, if acceptable to the Owner.

C. Clean and prime coat all ferrous metal surfaces of each valve in the shop.

D. Coat all machined, polished and non-ferrous surfaces including gears, bearing surfaces and similar unpainted surfaces with a corrosion prevention compound which shall be maintained during storage and until equipment begins operation.

PART 3 - EXECUTION

3.1 INSTALLATION - GENERAL

A. Combination air release valve and vault assembly shall be installed per the Manufacturer's instructions in the locations shown, true to alignment and rigidly supported. Any damage to the items listed above shall be repaired to the satisfaction of the Owner before they are installed.

B. Before setting these items, the Contractor shall check all Drawings and figures which have a direct bearing on their location. The Contractor shall be responsible for the proper location of valves and appurtenances during the construction of the work.

C. All materials shall be carefully inspected for defects in construction and materials. All debris and foreign material shall be cleaned out of openings, etc.

D. All items (including valve interiors) shall be cleaned prior to installation, testing, disinfection and final acceptance.

3.2 INSTALLATION OF MANUAL OPERATIONAL DEVICES

A. Unless otherwise noted, all operational devices shall be installed with the units at the factory, as shown on the construction drawings or as acceptable to the Owner, to allow accessibility to operate and maintain the item and to prevent interference with other piping, valves and appurtenances.

3.3 INSPECTION, TESTING AND CORRECTION OF DEFICIENCIES

A. Take care not to over pressure valves or appurtenances during pipe testing. If any unit proves to be defective, it shall be replaced or repaired to the satisfaction of the Owner.

3.4 AIR RELEASE VALVE MARKER

A. The Contractor shall furnish and install a combination air release valve marker for each air release valve installed in accordance with the Air Release Valve standard detail.

3.5 HYDROTESTING AND DISINFECTION

A. Hydrotesting and disinfection shall be in accordance with Section 01350 of these Project Specifications.

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT: The quantity measured for payment shall be for each installed complete and functioning combination air valve and assembly of various sizes with valve marker as accepted by the Owner.

4.2 PAYMENT: Payment shall be compensation all labor, materials, testing, and equipment necessary for furnishing and installing a complete and functioning combination air valve assembly of various sizes as per the construction drawings and as specified herein.

This item shall also include, but not necessarily be limited to: all sizes of combination air valves and assemblies; combination air valve marker; approved tapping saddle; corporation stop; copper tubing; brass ball valve with lever; brass nipple threaded; box; vault box lid; galvanized iron pipe and fittings; security enclosure; accessories and appurtenances; painting; excavation and backfill;; trenching; selected embedment material; anti-corrosion embedment when specified; hydrotesting and disinfection and all other work incidental to the installation of combination air valve assembly complete and in reliable service.

**END OF SECTION**

## SECTION 02640
## FIRE HYDRANT ASSEMBLY

PART 1 - GENERAL

1.1 SCOPE

A. The Work included in this Section consists of furnishing all material, equipment, labor, and performing all operations necessary for the supply of fire hydrants, ductile iron pipe, valves, nozzles, markers and accessories as shown within the Construction Drawings and specified herein.

B. Where references are made to other standards and codes, unless specific date references are indicated, the latest edition of said standard or code shall govern.

1.2 DESCRIPTION OF REQUIREMENTS

A. The Contractor shall furnish and install fire hydrants in accordance with the Fire Hydrant Assembly drawing as shown within the Construction Drawings.

1.3 QUALITY ASSURANCE

A. Install fire hydrants to meet current requirements of Owner.

B. Provide manufacturer's certificate for those products that meet or exceed minimum requirements as specified herein.

1.4 RELATED SECTIONS

A. Section 01230, Excavation and Backfill.

1.5 REFERENCED STANDARDS

A. AWWA C502 – Dry-Barrel Fire Hydrants.

B. AWWA C550 – Protective Interior Coatings for Valves and Hydrants.

C. Fire hydrants shall be NSF-61 certified.

1.6 SUBMITTALS

A. Submit Manufacturer's certificates of conformance to the requirements of these Technical Specifications.

B. Shop Drawings: Submit Manufacturer's drawings and data sheets for material to be supplied under this section. Indicate sizes and types of fire hydrants to be installed.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

A. During loading, transportation and unloading, exercise care to prevent damage to materials.

B. Handling: Fire hydrants should be unloaded carefully. The hydrant should be carefully lowered from the truck to the ground, not dropped. Only hoists and slings with adequate load capacity to handle the weight of the hydrant shall be used.

C. Storage: Hydrants should be stored in the fully closed position to prevent entry of foreign material that could cause damage to the seating surfaces. Whenever practical, hydrants should be stored indoors. If outside storage is required, means shall be provided to protect the operating mechanism from contamination or weathering. In outside storage, parts and flanges shall be protected from the weather and foreign materials.

PART 2 – PRODUCTS

2.1 FIRE HYDRANTS

A. Fire hydrants shall conform to the requirements of the latest revision of AWWA C502 "Dry- Barrel Fire Hydrants" or latest revision thereof. Hydrant barrel shall have safety breakage feature above the ground line. All hydrants shall have 6-inch mechanical joint shoe connections, two (2) 2-1/2 inch hose nozzles and one (1) 4-1/2 inch pumper nozzle with caps fitted with cap chains. Connection threads shall conform to National Standard Specifications as adopted by the National Board of Fire Underwriters.

Operating nut shall be a 1-1/2 inch pentagon, measure from flat to point, and shall open left (counter-clockwise). Main valve shall have 5-1/4 inch fill opening and be of the compression type, opening against water pressure so that valve remains closed should the barrel be broken off.

B. Operating stem shall be equipped with anti-friction thrust bearing to reduce operating torque and assure easy opening. Stops shall be provided to limit stem travel. Stem threads shall be enclosed in a permanently sealed lubricant reservoir with O-ring seals.

C. Fire hydrants shall be designated for 150 psi working pressure and shop tested to 300 psi pressure with main valve both opened and closed. Under test, the valve shall not leak, the automatic drain shall function, and there shall be no leakage into the bonnet.

D. Fire hydrant shall be the following:

1. Mueller Super Centurion 250 (Model A 423).

2. American Darling (Model B-84-B).

3. Approved equivalent.

PART 3 - EXECUTION

## 3.1 INSTALLATION

A. The Contractor shall field stake proposed hydrant installation locations for Owner and/or Engineer confirmation and field relocation, if necessary. The Contractor shall provide a minimum of seven (7) calendar days for the Owner and/or Engineer to review/approve the field stake locations and field relocations.

B. Fire hydrant shall be set plumb with not less than two and one-half (2.50) cubic feet of crushed stone.

C. The Contractor shall place a blue-colored reflective marker at a location in the adjacent roadway in accordance with the Marker Details Standard drawing.

D. Before installing any valve, care shall be taken to see that all foreign material is removed from the interior of the body and the valve is opened and closed to see that all parts are in proper working condition. Valves shall be closed prior to installation. Valves shall be set on gravel or ¾-inch stone with a minimum of one (1) square foot bearing area and four (4) inches thick to support the weight of the valve. Valves shall be set plumb with valve boxes placed directly over the operators. The top section of the valve box shall be set to allow equal movement above and below finished grade. After being correctly positioned, fill shall be carefully tamped around the valve box for a distance of four (4) feet on all sides of the box. In unpaved areas, a 24 inches x 24 inches x 9 inches thick reinforced concrete pad shall be poured around the top of the box as shown in the Typical Iron Valve Box Standard detail drawing as shown within per the Construction Drawings. The box shall be adjusted flush with the finished grade. All fire hydrant valves shall be harnessed or restrained as shown.

E. Fire hydrants shall be set so that the bury line is flush with the surface of the proposed ground as recommended by the Manufacturer, and shall be connected to the mains with main line tees, ductile iron pipe, gate valve and box, fittings, marker, all being part of the assembly. Hydrants shall be set on gravel or ¾-inch stone pad with a minimum of one (1) square foot bearing area and four (4) inches thick to support the weight of the hydrant. The fire hydrant valve shall be restrained back to the tee. After connections are made, the hydrants shall be set at such elevations that the connecting pipe and the distributing mains shall have the same depth of cover. All backfill around hydrants shall be thoroughly compacted to the surface of the ground. Hydrants shall be turned such that the hose nozzles are parallel with, or at a right angle to the curb with the pumper nozzle facing the curb or street, unless directed otherwise by the Engineer.

## 3.2 PAINT

A. The interior of the hydrant shoe shall be coated with fusion-bonded epoxy having a normal dry film thickness of 8 mils, conforming to ANSI/AWWA C550 and NSF 61.

B. After the fire hydrant has been installed, the exterior of the fire hydrants shall be painted with suitable primer and finished with oil-based aluminum paint. Paint shall be applied to all exposed metal surfaces above the hydrant base flange.

3.3 TESTING AND INSPECTION

A. All Fire Hydrant tests and inspections shall conform to ANSI/AWWA C502 Section 5.1 "Production Testing", ANSI/AWWA C502 Section 5.2 "Prototype Testing", and ANSI/AWWA C502 Section 5.3 "Inspection and Rejection" or latest edition thereof.

3.4 FIRE HYDRANT REPLACEMENT

A. The Contractor shall make every effort to maintain water service to existing fire hydrants throughout the construction period, unless otherwise approved by the Engineer.

PART 4 – MEASUREMENT AN PAYMENT

4.1 MEASUREMENT: Standard Fire Hydrants with 6-inch valve and box with marker sign will be measured by the unit of each fire hydrant, valve and box installed.

4.2 PAYMENT: Payment shall be full compensation for all labor, materials, testing, and equipment necessary for furnishing and installing complete new standard fire hydrant with 6-inch valve and box as shown within the Construction Drawings and as specified herein. This item shall include, but not necessarily be limited to: excavation and backfill, selected material, anti-corrosion embedment when specified, nipples, ductile iron pipe, and fittings exclusive of the tee from the main line pipe, polyethylene wrap, concrete pad, painting, valve marker, testing and inspection and all other work incidental to furnishing and installing a fire hydrant.

**END OF SECTION**

**SECTION 02650**

**POLYVINYL CHLORIDE (PVC) PIPE**

PART 1 - G E N E R A L

1.1 SCOPE

A. The Work included in this Section consists of furnishing all material, equipment, testing, and labor while performing all operations necessary for the installation of Polyvinyl Chloride (PVC) pipe that is compliant with all AWWA C900 and C905 standards as shown within the Construction Drawings and as specified herein.

B. Where references are made to other standards or codes, unless specific date references are indicated, the latest edition of said standard or code shall govern.

1.2 QUALITY ASSURANCE

A. Manufacturer shall have a minimum of 5 years of experience producing PVC pipe, and shall show evidence of at least 5 installations that are currently in satisfactory operation.

B. PVC pipe shall be the product of one manufacturer.

1.3 RELATED SECTIONS

A. Section 01230, Excavation and Backfill.

B. Section 01240, Trench Excavation Safety.

C. Section 01350, Hydrotesting and Disinfection.

D. Section 02670, Ductile Iron Fittings.

E. Section 02680, Joint Restraints and Thrust Blocking.

1.4 REFERENCE STANDARDS

A. Comply with the current Texas Commission on Environmental Quality (TCEQ) rules and the American Water Works Association (AWWA) standards for materials relating to water distribution systems.

1.5 SUBMITTALS

A. Shop Drawings

1. Submit Manufacturer's certificate of conformance with referenced standards.

2. Submit Manufacturer's drawings and data sheets for material to be supplied under this Section. Indicate sizes and types to be installed.

3. Submit Manufacturer's Specifications for the tracer wire.

4. Submit Manufacturer's Specifications for the detectable marker tape. Indicate size to be installed.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Pipe shall be unloaded and inspected in accordance with the Manufacturer's instructions.

B. Pipe stored on the site shall be contained within the protective unit packages provided by the Manufacturer. If packages need to be opened, the pipe shall be stored on a flat surface and not in direct contact with the ground. Do not stack packages higher than four (4) vertical feet. Keep inside of pipe free from dirt and debris. Care shall be exercised to, avoid compression damage to or deformation of, the pipe.

C. All pipe segments that are stored shall be covered to provide protection from the sunlight.

D. Handle all material carefully at all times. Any pipe having a crack or which has received a severe blow shall be marked as rejected and immediately removed from the jobsite.

PART 2 - P R O D U C T S

2.1 PVC PIPE

A. PVC pressure pipe shall conform to the requirements of AWWA C900 with outside diameter equal to that of cast iron pipe, or to the requirements of AWWA C905 with outside diameter equal to that of cast iron or steel pipe.

B. All PVC pressure pipe shall be a rated DR 25 unless otherwise noted on the plans.

C. PVC pipe shall be colored to designate its end use: blue for water mains, green for sanitary sewer mains, and purple for reuse water mains.

D. PVC pipe shall be furnished in standard laying lengths of 20 feet (plus or minus one inch) unless stated otherwise.

E. PVC pipe marking shall include the following:

1. Manufacturer's name or trademark.

2. Standard to which it conforms.

3. Pipe dimeter size.

4. Material design code.

5. Pressure rating.

6. Standard Dimension Ratio (SDR) number or schedule number.

7. Laboratory seal or mark attesting to suitability for potable water use.

8. Manufacture date (date of installation shall not exceed one year from this date).

2.2 SLICK BORE INSTALLATION METHOD

A. PVC pipe shall be Certa-Lok C900/RJ (DR 18) for all pipe diameter sizes.

2.3 PIPE JOINT RESTRAINTS AND THRUST BLOCKING

A. Pipe joint restraints and thrust blocking shall conform to all requirements with all requirements of Section 02680 of these Project Specifications.

2.4 DUCTILE IRON FITTINGS

A. All buried fittings shall be ductile iron with mechanical joints and shall conform to all requirements within Section 02670 of these Project Specifications.

2.5 PIPE JOINT LUBRICANT

A. The joint lubricant shall have been tested and approved for potable water service. No lubricant shall be used that will harbor bacteria or damage the gaskets.

2.6 PIPE TRACER WIRE AND MARKER TAPE

A. Tracer wire shall be installed for future use in locating pipe. Tracer wire shall be No. 12 AWG copper-clad steel, extra high-strength with minimum 1,150-lb break load and 30 mil HDPE insulation.

B. Tracer wire shall be taped or zip-tied to the main pipeline in a minimum of 60-inch increments.

C. Tracer wire shall be placed on all new PVC pipe whether it is installed by open trench, slick bore or jack and bore method.

D. Marker tape shall be installed as an additional pipe identification device when pipe is installed by open trench method only.

E. During the backfilling process, all water mains, service lines and system appurtenances shall have a continuous warning tape places immediately above them and throughout their length at a depth of eighteen (18) inches above the utility line surface. The tape shall be six (6) inches wide. Tape material shall be formulated from 100 percent virgin polyolefin resins. Resins shall be pigmental for chemical stability and resistance to sulfide staining (color fastness). Tape shall be constructed by the mechanical (non-adhesive) lamination of two piles of three layers blown film in such a manner as to produce a bi-axially oriented structure. The tape shall be able to provide a 700 percent elongation prior to rupture as per ASTM-D882.

F. The warning tape shall be manufactured with a permanent American Public Works Administration (APWA) blue color pigment and at a maximum of every thirty (30)

inches along its length, be imprinted with a continuous warning message as follows: "CAUTION: POTABLE WATER LINE BURIED BELOW." Alternatively, the warning tape shall be manufactured with a permanent APWA green color pigment and at a max of every thirty inches along its length, be imprinted with a continuous warning message as follows: "CAUTION: SEWER OR DRAIN LINE BURIED BELOW."

2.7 WATER MAIN CROSSING MARKER

A. The Contractor shall install the water main crossing marker in accordance with the Marker Standard Detail drawing as shown within the Construction Drawings.

B. The water main crossing marker shall be placed on Right-of-Way or fence line at all road crossings.

C. The water main crossing marker detail shall be used for water main detecting services.

PART 3 - E X E C U T I O N

3.1 PIPE UNLOADING AT THE SITE

A. Inspect each shipment of pipe and make provision for a timely replacement of any damaged material. Unload by hand or use canvas slings to avoid scratching the pipe. Do not slide or drag PVC pipe over an abrasive surface. Pipe with deep scratches shall be replaced with new pipe and removed from the site immediately.

B. Stack pipe packages no higher than four (4) vertical feet and provide support for the pipe barrel to prevent bending of the pipe. Pipe stockpiled for more than thirty (30) days shall be covered to protect it from the sun's rays. Provide for air circulation through the stockpile.

C. Store rubber gasket rings in a cool, dark place out of the direct rays of the sun.

3.2 DISTRIBUTING PIPE ALONG THE TRENCH

A. Distribute pipe by hand. Do not drop or drag pipe. Distribute sufficient pipe for one day's work, and place with bell end in the direction of pipe laying. Prevent dirt and contaminants from entering the pipe.

3.3 ASSEMBLING THE PIPE

A. Closely follow the Manufacturer's recommended procedure for cleaning, setting the gasket ring, lubricating the spigots end of pipe, and assembling.

3.4 PIPE PLACING IN TRENCH

A. Pipe that is assembled prior to placing in the trench shall be carefully fed by hand (or with the use of approved equipment) on the pipe bed. Provide pockets in the pipe bed material to accommodate bell ends and eliminate a concentration of load at these points.

3.5 PREVENTING TRENCH WATER FROM ENTERING PIPE

A. When pipe laying is not in progress, close the open ends of pipe with a watertight plug and allow no water or other objectionable materials to enter the pipe.

3.6 WATER MAIN INSTALLATION

A. The Contractor shall start his work at a tie-in point or as designated by the Engineer/Owner. Pipe shall be laid with bell ends facing in the direction of the pipe laying, unless otherwise authorized or directed by the Owner. All valves and fire hydrants and valves must be installed as soon as the pipe laying reaches their designated location.

B. All pipes shall be installed to the required lines and grades with fittings, valves, and hydrants placed at the required locations. The pipe shall be laid by inserting the spigot end into the bell flush with the intersection line or as recommended by the Manufacturer. At no time shall the bell end be allowed to go past the "insertion line". A gap between the end of the spigot, and the adjoining pipe is necessary to allow for expansion and contraction.

C. New water main crossing any other utility shall have a minimum of 30 inches of cover over the top of the pipe, unless otherwise modified by the Engineer. Excavation around other utilities shall be done at least 12 inches all around. Any damage to other utilities shall be reported to their governing entity. In both of these cases of existing utility damage, the Contractor shall promptly notify the Inspector.

D. Water main crossings of other utility lines shall be made in accordance with all applicable TCEQ rules and regulations.

3.7 HYDROTESTING AND DISINFECTION

A. Hydrotesting and disinfection of PVC pipe shall be completed in accordance with Section 01350 of these Project Specifications.

3.8 TRENCH EXCAVATION SAFETY

A. Trench excavation safety shall be provided by the Contractor in accordance with Section 01240 of these Project Specifications.

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT: The quantity measured for payment shall be per linear foot for each size diameter and type of PVC pipe installed by open cut method as accepted by the Owner.

4.2 PAYMENT: Payment shall be full compensation for all labor, materials, testing, and equipment necessary for furnishing and installing the PVC pipe per linear foot of the various diameter size and types by the open cut method as per the Drawings and as specified within. This item shall also include, but not necessarily be limited to: all types and sizes of PVC pipe; tracer wire; marker tape; water main crossing marker; selected embedment; compaction; hydrotesting and disinfection; excavation and backfill; trenching; and all other work incidental to the installation of the PVC pipe complete in place and in reliable service.

END OF SECTION

**SECTION 02660**

**DUCTILE IRON PIPE**

PART 1 - GENERAL

1.1 SCOPE

A. The Work included in this Section consists of furnishing all material, equipment, labor, testing and performing all operations necessary for the supply of all ductile iron piping within the limits of work, as shown on the Drawings and specified herein.

B. Where references are made to other standards or codes unless specific date references are indicated, the latest edition of said standard or code shall govern.

1.2 QUALITY ASSURANCE

A. Manufacturer's Qualifications

1. Manufacturer shall have a minimum of five years of experience producing ductile iron pipe and fittings, and shall show evidence of at least five installations in satisfactory operation.

2. Ductile iron pipe and fittings shall be the product of one manufacturer.

B. Material Qualifications

1. All pipe, fittings and other materials supplied under this contract shall be subject to inspection while still on the delivery truck. It is the sole responsibility of the vendor and supplier to make prior contact with the Owner and provide a minimum of 48-hours prior notice of delivery.

2. Materials found to be defective, not in strict compliance with the quality standards of samples supplied, or of these specifications shall be immediately returned to the vendor at no expense of the Owner. If defects are discovered at a later time, the vendor shall be required to remove said items and shall bare all costs for so doing together with any replacement costs. Rejection of items may subject the vendor to liquidated and/or actual damages as specified elsewhere herein.

1.3 RELATED SECTIONS

A. Section 01230, Excavation and Backfill

B. Section 01240, Trench Excavation Safety

C. Section 01350, Hydro testing and Disinfection

D. Section 02670, Ductile Iron Fittings

E. Section 02680, Joint Restraints and Thrust Blocking

1.4 REFERENCE STANDARDS

A. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified:

1. AWWA C104, Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.

2. AWWA C105, Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids.

3. AWWA C110, Ductile-Iron and Gray-Iron Fittings, 3 inches through 48 inches, for Water and Other Liquids.

4. AWWA C111, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

5. AWWA C115, Flanged Ductile-Iron Pipe with Threaded Flanges.

6. ANSI B16.1, Cast Iron Pipe Flanges and Flanged Fittings.

7. ANSI B18.2.1, Square and Hex Bolts and Screws Inch Series, Including Hex Cap Screws and Lag Screws.

8. ANSI B18.2.2, Square and Hex Nuts.

9. ASTM A 307, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.

10. ASTM A 354, Specification for Quenched and Tempered Alloy Steel Bolts, Studs and Other Externally Threaded Fasteners.

1.5 SUBMITTALS

A. Submit Manufacturer's certificate of conformance with Standards.

B. Submit Manufacturer's drawings and data sheets for material to be supplied under this section. Indicate sizes and types to be installed.

C. Submit Manufacturer's specifications for marker tape.

1.6 DELIVERY, STORAGE AND HANDLING

A. During shipping, delivery and installation of pipe and accessories, handle in a

manner as to ensure a sound, undamaged condition.

B. Exercise particular care not to injure pipe coatings.

PART 2 – PRODUCTS

2.1 DUCTILE IRON PIPE

A. Ductile iron pipe shall conform to ANSI/AWWA Standard C151/A21.51- "Ductile-Iron Pipe, Centrifugally Cast, for Water", or latest revision thereof.

B. Ductile iron pipe for water applications shall be in full compliance with ANSI/NSF 61, "Drinking Water System Components-Health Effects". Manufacturers shall maintain their NSF certification for the duration of the Contract and any extensions thereof.

C. All pipes thickness and outside diameter of pipe for water usage shall conform to Table 1 (Standard dimensions of push-on-joint and mechanical-joint ductile-iron pipe) and Table 2 (Dimensions for special thickness classes of push-on-joint ductile-iron pipe and mechanical-joint ductile-iron pipe) from ANSI/AWWA Standard C151/A21.51 for the following sizes. (The pressure class specified is the minimum permitted):

| Pipe Diameter Size | Pressure Class (psi) |
|---|---|
| 3-inches through 12-inches | 350 |
| 14-inches through 20-inches | 250 |
| 24-inch | 200 |
| 30-inches through 64-inches | 150 |

D. For restrained joint pipe, the thickness of the pipe barrel remaining after grooves are cut, if required in the design of restrained end joints, shall not be less than the nominal wall thickness of equal sized non-restrained joint pipe as shown above.

E. Each piece of pipe shall be marked as required in Section 4.7 of AWWA C151- Letters and numerals on pipe sizes 12-inch and smaller shall be not less than 3/8-inch.

F. The single gasket push-on pipe shall be shipped in standard 20-foot lengths, but not both. The restrained single-gasket push-on joint pipe shall be shipped in standard 20-foot lengths as specified above or fabricated lengths as noted in each order. At least two lengths of each size of single gasket push-on pipe furnished under each order shall be tested with circumferential gauges to ensure that the pipe may be cut at any point along its length and have an outside diameter which will be within the Manufacturer's standard design dimensions and tolerances for plain pipe. These lengths shall be identified with an easily distinguished, painted

marking, longitudinally along the full length of the pipe.

2.2 DUCTILE IRON FITTINGS

A. Ductile iron fittings shall be in accordance with Section 02670 of these Project Specifications.

2.3 LININGS AND COATINGS

A. Asphaltic Coating

1. All pipe and fittings shall be outside-coated with an asphaltic material applied by means of the airless spray method. The exterior coating shall meet AWWA Specifications for this type of coating, shall be smooth without pinholes, thin, bare or overly thick areas. Smoothness shall be such that when hand rubbed, no "sand paper" feeling will be experienced and such that the spigot area will readily slide through the gasket without pulling, tearing, rolling or otherwise disturbing the sealing capabilities of the gasket. Spigot ends shall be beveled prior to painting and to an extent that will permit ready insertion of the spigot through the gasket area.

B. Interior Cement-Mortar Lining

1. Pipe and fittings for potable water use shall be cement-lined and seal-coated in accordance with ANSI/AWWA Standard C104/A21.4-95, "Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water."

C. Exterior Painting

1. All exterior, above grade ductile iron piping, valves, and fittings, excluding stainless steel hardware, shall be prepared for painting by:

a. Cleaning all surfaces as per NAPF 500-03-01 Solvent Cleaning to remove all oil, grease, factory-applied tars and/or bitumastic coatings and all other soluble contaminants.

b. Preparing ductile iron pipe as per NAPF 500-03-04 Abrasive Blast Cleaning for Ductile Iron Pipe providing a minimum 1.5 mil angular anchor profile.

c. Preparing ductile iron valves and fittings as per NAPF 500-03-05 Abrasive Blast Cleaning for Cast Ductile Iron Fittings.

2. Following surface preparation, the following coating system shall be applied:

a. First Coat: Tnemec Series 27WB Typoxy applied at 6.0 to 8.0 dry mils.

b. Second Coat: Tnemec Series 27WB Typoxy applied at 6.0 to 8.0 dry mils.

c. Third Coat: Tnemec Series 740 UVX applied at 3.0 to 5.0 dry mils.

d. Total minimum dry film thickness shall be 13.0 mils.

e. The Coatings colors shall be selected by the Owner using a color chart supplied by the Contractor with shop drawing submittals.

2.4 PIPE MARKER TAPE

A. Marker tape shall be used as a buried pipe identification service.

B. During the backfilling process, all Ductile Iron water mains, service lines and system appurtenances shall have a continuous warning tape placed immediately above them and throughout their length at a depth of eighteen (18) inches above the utility line surface. The tape shall be six (6) inches wide. Tape material shall be formulated from 100 percent virgin polyolefin resins. Resins shall be pigmential for chemical stability and resistance to sulfide staining (color fastness). Tape shall be constructed by the mechanical (non-adhesive) lamination of two plies of three layers blown film in such a manner as to produce a bi-axially oriented structure. The tape shall be able to provide a 700 percent elongation prior to rupture as per ASTM-D882.

C. The warning tape shall be manufactured with a permanent American Public Works Administration (APWA) blue color pigment at a maximum of every thirty (30) inches along its length, be imprinted with a continuous warning message as follows: "CAUTION: POTABLE WATER LINE BURIED BELOW." At tees, tape ends, etc., the warning tape shall be tied together (spliced) with a knot to create a continuous warning tape throughout the length of the pipeline and associated branch lines, appurtenances, etc.

2.5 WATER MAIN CROSSING MARKER

A. The Contractor shall install the water main crossing marker in accordance with the Marker standard detail drawing as shown within the Construction Drawings.

B. The water main crossing marker shall be placed on R.O.W. or fence line at all road crossings.

C. The water main crossing marker detail shall be used for water main detecting services.

PART 3 - EXECUTION

3.1 General

A. The Contractor shall provide all barricades and/or flashing warning lights necessary to warn of the construction throughout the Project.

B. Pipe and fittings shall at all times be handled with great care to avoid damage. In loading and unloading, they shall be lifted with cranes or hoists or slid or rolled on skidways in such manner as to avoid shock. Under no circumstances shall this material be dropped or allowed to roll or slide against obstructions.

C. All work shall be performed by skilled workmen experienced in similar installations.

D. All pipes shall be adequately supported by clamps, brackets, straps, concrete supports, rollers or other devices as shown and/or specified. Supports or hangers shall be spaced so that maximum deflection between supports or hangers shall not exceed 0.05 inches for pipe filled with liquid, but shall not be further than 6 feet apart, whichever is closer, unless otherwise shown.

E. All pipe supports shall be secured to structures by approved inserts or expansion shields and bolts.

F. All pipe shall be thoroughly cleaned internally before being installed. All pipes, except oxygen service, air and gas, shall be flushed with water and swabbed to assure removal of all foreign matter before installation. Air and gas piping shall be tapped with a hammer to loosen scale or other foreign matter that might be within the pipe, then thoroughly blown with a high-pressure air hose. Air shall be from the Contractor's air compressor.

G. Whenever possible, the pipe will be installed with minimum 48-inches of cover, however, due to the numerous utilities in the area, this burial depth could change substantially.

H. At all horizontal or vertical pipe deviations, the Contractor shall install both restrained pipe and thrust blocks. Joints may only be opened to adjust alignment by half of the AWWA or Manufacturer's recommended opening (which is smaller).

## 3.2 INSTALLATION OF PIPE, FITTINGS AND VALVES

A. All bends, tees, and plugs, unless otherwise specified, shall be backed with concrete thrust blocks to undisturbed ground. Provision shall be made to prevent concrete from adhering to plugs or bolts.

B. Bolts, nuts, and rubber gaskets for use in flanged and mechanical joints shall be stored under cover. Gaskets shall not be exposed to heat, light or any petroleum products, shall be kept clean and shall not be handled with greasy or dirty hands.

C. Before making up flanged joints in cast iron pipe and fittings, the back of each flange under the bolt heads, and the face of each flange shall have all lumps, blisters and excess bituminous coating removed and shall be wire brushed and

wiped clean and dry.

D. Before laying the ductile iron pipe, all lumps, blisters and excess coal-tar coating shall be removed from the bell and spigot ends of each pipe and the outside of the spigot and the inside of the bell wire brushed and wiped clean and dry. The entire gasket groove area shall be free of bumps or any foreign matter which might displace the gasket.

E. The cleaned spigot and gasket shall not be allowed to touch the trench walls or trench bottom at any time. Vegetable soap lubricant shall be applied in accordance with the pipe Manufacturer's recommendations, to aid in making the joint. The workmen shall exercise caution to prevent damage to the gasket or the adherence of grease or particles of sand or dirt. Deflections shall be made only after the joint has been assembled.

F. Cutting of ductile iron pipe for inserting valves, fittings, etc., shall be done by the Contractor with a mechanical pipe saw in a neat and workmanlike manner without damage to the pipe, the lining, or the coating.

G. Unless otherwise directed, ductile iron pipe shall be laid with the bell ends facing in the direction of laying; and for lines on an appreciable slope, the bells shall, at the discretion of the Engineer, face upgrade.

H. Push-on and mechanical joints in ductile iron pipe and fittings shall be made in accordance with the Manufacturer's standards except as otherwise specified herein. Joints between push-on and mechanical joint pipe and/or fittings shall be made in accordance with AWWA Standard Specifications, "Installation of Ductile-Iron Mains and Their Appurtenances," C600-10, except that deflection at joints shall not exceed one-half of the Manufacturer's recommended allowable deflection, or one-half of the allowable deflection specified in AWWA C600-10, whichever is the lesser amount.

I. Flanged joints shall be used only where indicated on the Drawings. Before making up flanged joints in the pipeline, the back of each flange under the bolt heads and the face of each flange shall have all lumps, blisters and excess bituminous coating removed and shall be wire brushed and wiped clean and dry. Flange faces shall be kept clean and dry when making up the joint, and the workmen shall exercise caution to prevent damage to the gasket or the adherence of grease or particles of sand or dirt. Bolts and nuts shall be tightened by opposites in order to keep flange faces square with each other, and to ensure that bolt stresses are evenly distributed.

J. Bolts and nuts in flanged and mechanical joints shall be tightened in accordance with the recommendations of the pipe Manufacturer for a leak-free joint. The workmen shall exercise caution to prevent overstress. Torque wrenches shall be used until, in the opinion of the Engineer, the workmen have become accustomed to the proper amount of pressure to apply on standard wrenches.

3.3 PIPE PROTECTION

A. Paint all uninsulated metal (ductile iron or steel) piping underground with two

coats of asphaltic paint.

B. Wrap soil pipe that touches metal or is exposed to masonry with a layer of 6 mils polyethylene.

C. Spirally wrap all pipe lines embedded in concrete with two layers of 30 lb. felt.

D. Coat all exposed threads on galvanized steel pipe after assembly with two coats of zinc chromate.

E. Cleaning and Testing: All of the piping installed under this project shall be tested as follows and as directed by the Engineer.

1. All potable water piping shall be disinfected per AWWA standards.

2. No leakage shall be permitted for flanged or any other type of above ground piping.

F. Installation of Aboveground and Exposed Piping

1. Aboveground and exposed pipe fittings, valves and accessories shall be installed as shown or indicated on the drawings.

2. Piping shall be cut accurately to measurements established at the job site and shall be worked into place without springing or forcing, properly clearing all equipment access areas and openings. Changes in sizes shall be made with appropriate reducing fittings rather than bushings. Pipe connections shall be made in accordance with the details shown and Manufacturer's recommendations.

3. Open ends of pipe lines shall be properly capped or plugged during installation to keep dirt and other foreign material out of the system. Pipe supports and hangers shall be provided where indicated and as required to insure adequate support of the piping.

4. Welded connections shall be made in conformity with the requirements of AWWA Standard C206 and shall be done only by qualified welders. The Engineer may, at his option, require certificates that welders employed on the work are qualified in conformity with the requirements of this standard and/or sample welds to verify the qualifications of the welders. Before testing, field welded joints shall be coated with the same material as used for coating its pipe in accordance with the requirements of AWWA.

5. Flanged joints shall be made up by installing the gasket between the flanges. The threads of the bolts and the faces of the gaskets shall be coated with a suitable lubricant immediately before installation.

6. Use of perforated band iron (plumber's strap), wire or chain as pipe hangers will not be acceptable. Supports for pipe less than 1-1/2 inches nominal size shall not be more than 9-feet on centers and pipe 2-inches nominal size and larger shall be supported at not more than 10-feet on

centers, unless otherwise indicated. Supports for PVC pipe shall be spaced one-half the distance specified above unless otherwise indicated. Any noticeable sagging shall be corrected by the addition of extra supports at the Contractor's expense.

3.4 EXCAVATION AND BACKFILL

A. Excavation and backfill on all potable water lines and where otherwise noted, shall be in accordance with Section 01230 of these Project Specifications.

3.5 TRENCH SURFACE RESTORATION

A. The surface of the backfilled trench shall be restored to match the previous conditions. This shall include final grading, placement of topsoil and seeding, placement of sod, or other prepared or unprepared surfaces. Existing above grade items shall be replaced in-kind, including but not limited to fencing, concrete/asphalt surfaces, curbing, vegetation (shrubs, plantings, trees, etc.) mailboxes, signage, etc.

3.6 FIELD QUALITY CONTROL

A. All water mains shall be flushed to remove all sand, debris, rock and other foreign matter.

B. Dispose of the flushing water without causing a nuisance or property damage.

C. Pressure and Leakage Testing: All pumps, piping and gauges shall be furnished, installed and operated by the Contractor and all such equipment and devices and their installation shall be approved by the Engineer.

D. Pump shall be of a non-pulsating type suitable for this application and gauge accuracy certification may be required at the Engineer's discretion. All pressure and leakage testing shall be done in the presence of a representative of the Owner as a condition precedent to the approval and acceptance of the system.

3.7 HYDROTESTING AND DISINFECTION

A. Hydro testing and disinfection shall be in accordance with Section 01350 of these Project Specifications.

3.8 TRENCH EXCAVATION SAFETY

A. Trench and excavation safety shall be in accordance with Section 01240 of these Project Specifications.

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT: The quantity measured for payment shall be per linear foot for each size diameter of ductile iron pipe installed and as accepted by the Owner.

4.2 PAYMENT: Payment shall be full compensation for all labor, materials, testing, and equipment necessary for furnishing and installing the ductile iron pipe per linear foot of the various diameter sizes using the open cut method as per the Drawings and as specified within. This item shall also include, but not necessarily be limited to: all types and sizes of ductile iron pipe; marker tape; water main crossing marker; compaction; polyethylene sleeves and wraps; hydro testing and disinfection; excavation and backfill; dewatering; trenching and all other work incidental to the installation of the ductile iron pipe complete and in place and in reliable service.

**END OF SECTION**

## SECTION 02670

## DUCTILE IRON FITTINGS

### PART 1 - GENERAL

1.1 SCOPE

A. The Work included in this Section consists of furnishing all labor, materials, equipment and incidentals for performing operations necessary to furnish and install ductile iron fittings (3-inches through 48-inches) designed and manufactured for the use of ductile iron pipe or PVC pipe (C900 and/or C905) as shown on the Drawings and as specified herein.

B. Where references are made to other standards and codes, unless specific date references are indicated, the latest edition of stated standard or code shall govern.

1.2 DESCRIPTIONS OF REQUIREMENTS

A. Except as otherwise modified or supplemented herein, the latest revision of AWWA Standard C110 for Gray-Iron and Ductile-Iron Fittings, 3 inch through 48 inch for Water and other Liquids and AWWA Standard C153 for Ductile-Iron Compact Fittings, shall govern the design, manufacture, and testing for all fittings under this Section.

1.3 QUALITY ASSURANCE

A. The Owner/Engineer may inspect materials for conformance to the Drawings and specifications herein.

1.4 RELATED SECTIONS

A. Section 02680, Joint Restraint and Thrust Blocking

1.5 REFERENCE STANDARDS

A. AWWA C110 – Ductile-Iron and Gray-Iron Fittings.

B. AWWA C116 – Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings.

C. AWWA C153 – Ductile-Iron Compact Fittings.

D. ASTM F1674 – Standard Test Method for Joint Restraint Products for Use with PVC Pipe.

E. ASTM D4976 – Standard Specification for Polyethylene Plastics Molding and Extrusion Materials.

F. ASTM A536 – Standard Specification for Ductile Iron Castings.

1.6 SUBMITTALS

A. Shop Drawings

1. Submit Manufacturer's certificate of conformance with referenced standards.

2. Submit Manufacturer's drawings and data sheets for materials to be supplied under this Section. Indicate dimensions, materials, size, and weight.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver materials to the site to ensure uninterrupted progress of the Work.

B. Handle all fittings and accessories carefully with approved handling devices. Do not drop or roll material off trucks.

C. Unload fittings and accessories to or as close to the place where they are to be installed as is practical to avoid unnecessary handling. Keep pipe interiors completely free from dirt and foreign matter.

PART 2 - PRODUCTS

2.1 DUCTILE-IRON FITTINGS

A. Full body fittings shall conform with AWWA C110 - "Ductile-Iron and Gray-Iron Fittings" for 3 inch through 48 inch for Water and other Liquids.

B. Compact fittings shall conform with AWWA C153 - "Ductile-Iron Compact Fittings".

C. Fittings shall be manufactured conforming to the requirements of ASTM A536.

D. Fittings designated for raw water or wastewater service shall be fusion bonded epoxy coated inside and outside meeting all the requirements of AWWA C116 – "Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings."

E. Fittings, including the joints and restraint systems, shall have a minimum pressure rating of 350 psi for 3-inch through 24-inch in diameter fittings. Minimum pressure ratings of 250 psi for all fittings of size greater than 24-inches in diameter. Testing shall be done in accordance with the procedures found in ASTM F1674.

F. The exterior of all fittings designated for finished or potable water service shall be provided with a petroleum asphaltic coating in accordance with the latest revision of AWWA C110. The interior of all fittings designated for finished or potable water service shall be cement mortar lined in accordance with the latest revision of AWWA C104.

G. Fittings for 2-inch size shall be of manufacturers' standard design in accordance with applicable design standards of AWWA C110.

PART 3 - EXECUTION

3.1 DUCTILE IRON FITTINGS

A. Joint restraints and thrust blocking for ductile iron fittings shall be provided in accordance with Section 02680 of these Project Specifications.

B. Anti-corrosion protection consisting of polyethylene sleeve and asphaltic material for ferrous surfaces shall be applied to exterior surfaces of all fittings installed.

C. Approved adapters shall be used when necessary to provide a transition between pipes and/or fittings of different diameters.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT: The quantity determined for payment shall be as measured by the total fittings weight in tons for the various sizes of fittings installed and as specified in the Drawings.

4.2 PAYMENT: Payment shall be full compensation for all labor, materials, testing, and equipment necessary for furnishing and installing various sizes of fittings made at the unit price bid for each ton of fittings to the nearest one-hundredth of a ton of fitting weight installed. Subsidiary items at no separate cost shall include, but not necessarily be limited to: weights of glands, bolts, nuts, washers, gaskets (all types). These are considered subsidiary to the installation of fittings and no separate payment will be made for anti-corrosion protection; select anti-corrosion embedment material; joint restraints and thrust blocking; and all other work incidental to the installation various sizes of fittings in place and in reliable service.

END OF SECTION

## SECTION 02675

## PIPE ENCASEMENT

### PART 1 - GENERAL

#### 1.1 SCOPE

A. The Work included in this Section consists of furnishing all material, equipment, labor, and performing all operations necessary to install casing pipe and carrier pipe by the method of jack and bore or open trench, as shown on the Construction Drawings and specified herein.

B. Casing pipe for carrier pipe shall be provided and installed in accordance with the Casing Standard Detail drawing as shown within the Drawings.

C. Where references are made to other standards or codes, unless specific date references are indicated, the latest edition of said standard or code shall govern.

#### 1.2 RELATED SECTIONS

A. Section 01140, Dewatering

B. Section 01220, Exploratory Excavation

C. Section 01230, Excavation and Backfill

D. Section 02650, PVC Pipe

E. Section 02680, Joint Restraints and Thrust Blocking

#### 1.3 REFERENCED STANDARDS

A. AWWA C206 – Field Welding of Steel Water Pipe

B. AWWA C210 – Liquid-Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines

C. AWWA C900 – Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4-In. Through 60-In. (100 mm Through 1,500 mm)

D. ASTM A36 – Standard Specification for Carbon Structural Steel

E. ASTM A135 - Standard Specification for Electric-Resistance-Welded Steel Pipe

F. ASTM A139 – Standard Specification for Electric-Fusion (Arc)-Welded Steel Pipe (NPS 4 and Over)

#### 1.4 SUBMITTALS

A. Shop Drawings

1. Submit Manufacturer's certificate of conformance with referenced standards.

2. Submit Manufacturer's drawings and product data sheets for the materials to be supplied under this Section. Indicate sizes and types to be installed.

3. Submit Manufacturer's specifications for tracer wire and marker tape.

PART 2 – MATERIALS

2.1 CARRIER PIPE

A. Polyvinyl Chloride (PVC) carrier pipe shall be Certa-Lok C900/RJ (DR 18) for all pipe diameter sizes.

B. High-Density Polyethylene (HDPE) carrier pipe as specified on the Construction Drawings for all pipe diameter sizes.

2.2 STEEL CASING

A. Steel casing shall be new or used pipe in good condition, and acceptable to Crystal Clear Special Utility District and to the governing roadway authority.

B. Casing pipe shall extend a minimum of 10 linear feet, past the edge of pavement along TxDOT roadways, and a minimum of 5 linear feet, past the edge of pavement along all other roadways, unless otherwise directed by the Engineer or regulatory authority.

C. Steel casing pipe shall be standard weight or heavier conforming to ASTM A36, ASTM A135, ASTM A139, or other acceptable standard specification.

D. Pipe joints shall be welded together in accordance with AWWA C206.

2.3 PVC CASING

A. PVC casing shall be new or used pipe in good condition, and acceptable to Crystal Clear Special Utility District and governing authority.

B. The diameter of the PVC casing shall be per Casing Standard Detail under steel casing minimum nominal size (in) in correspondence to the pipe nominal size (in) specified or otherwise noted in the Construction Drawings.

2.3 CASING SPACERS

A. Casing spacers are required for all carrier pipe lines 4-inch and larger in diameter.

B. Casing spacers shall be placed within 2 feet of the ends of casing pipe.

Subsequent spacers shall be placed a maximum of 10 feet apart within the casing, with at least 3 spacers per joint of pipe.

C. Casing spacers shall be made from T-304 stainless steel of a minimum 14-gauge thickness.

D. Casing spacers shall have a synthetic rubber or PVC liner to insulate the carrier pipeline from the spacer.

E. Casing spacers shall have 1.5-inch-wide glass reinforced plastic or UHMW polymer runners to insulate the spacer from the casing pipe interior.

2.4 PIPE TRACER WIRE AND MARKER TAPE

A. Tracer wire shall be installed for future use in locating pipe. Tracer wire shall be No.12 AWG copper-clad steel, extra high-strength with minimum 1,150-lb break load and 30 mil HDPE insulation.

B. Tracer wire shall be taped or zip-tied to the main pipeline in a minimum of 60-inch increments.

C. Tracer wire shall be installed by open trench, slick bore, and jack and bore method.

D. Marker tape shall be installed as an additional buried pipe identification device when pipe is installed by open trench method only.

E. During the backfilling process, all water mains, service lines and system appurtenances shall have a continuous warning tape placed immediately above them and throughout their length at a depth of eighteen (18) inches above the utility line surface. The tape shall be six (6) inches wide. Tape material shall be formulated from 100 percent virgin polyolefin resins. Resins shall be pigmental for chemical stability and resistance to sulfide staining (color fastness). Tape shall be constructed by the mechanical (non-adhesive) lamination of two piles of three layers blown film in such a manner as to produce a bi-axially oriented structure. The tape shall be able to provide a 700 percent elongation prior to rupture as per ASTM-D882.

F. The warning tape shall be manufactured with a permanent American Public Works Administration (APWA) blue color pigment and at a maximum of every thirty (30) inches along its length, be imprinted with a continuous warning message as follows: "CAUTION: POTABLE WATER LINE BURIED BELOW." Alternatively, the warning tape shall be manufactured with a permanent APWA green color pigment and at a max of every thirty inches along its length, be imprinted with a continuous warning message as follows: "CAUTION: SEWER OR DRAIN LINE BURIED BELOW."

2.5 WATER MAIN CROSSING MARKER

A. The Contractor shall install the water main crossing marker in accordance with the Marker Standard Detail drawing as shown within the Construction Drawings.

B. The water main crossing marker shall be placed on Right-of-Way or fence line at all roads and gas pipeline crossings.

C. The water main crossing marker detail shall be used for water main detecting services.

2.6 HYDROTESTING AND DISINFECTION

A. Hydrotesting and disinfection of carrier pipe shall be completed in accordance with Section 01350 of these Project Specifications.

PART 3 – CONSTRUCTION

3.1 JACKING

A. Suitable pits or trenches shall be excavated on each side of the roadway for the purpose of jacking operations, and for placing end joints of the pipe.

B. For trench installation of pipes, work shall be securely sheeted and braced. All excavations shall be adequately dewatered.

C. Jacking work should in no way interfere with the operation of streets, highways, railroads, and other facilities. Jacking operations shall not damage or weaken such facilities.

D. The pipe to be jacked shall be set on guides to support the section of the pipe being jacked, and to direct it in the proper line and grade.

E. Generally, the pipe shall be jacked from the downstream end towards the upstream end.

F. Any pipe that cannot be repaired to its original condition or is damaged in jacking operations shall be removed and replaced at the Contractor's expense.

G. Jacking pits shall be backfilled and compacted immediately upon completion of jacking operations.

3.2 EXCAVATION AND BACKFILL

A. Excavation and backfill shall be completed in accordance with Section 01230 of the Project Specifications.

B. Boring operations may include creating of a pilot hole which shall be bored for the entire length of roadway crossing. This shall be used as a guide for the larger hole to be bored. Water or drilling fluid may be used to lubricate cuttings.

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT: The quantity measured for payment shall be per linear foot of casing pipe and carrier pipe installed with jack and bore or open trench method as accepted by Owner. Jack and bore method shall be measured from face to face of jacking pits.

4.2 PAYMENT: Payment shall be full compensation for all labor, materials, tools, and equipment necessary for jacking and boring operations, and furnishing pipe casing and carrier pipe as per the Construction Drawings and as specified within. This item shall include, but not necessarily limited to: jack and bore (if method used); carrier pipe; casing pipe; casing spacers; liners; end seals; pipe tracer wire; marker tape; water main crossing marker; excavation and backfilling; grout; compaction; hydrotesting and disinfection; and all other incidental work incidental for furnishing and installing pipe casing and carrier pipe in reliable service.

**END OF SECTION**

## SECTION 02680

## JOINT RESTRAINTS AND THRUST BLOCKING

### PART 1 - GENERAL

1.1 SCOPE

A. The Work included in this Section consists of furnishing all labor, materials, equipment and incidentals for thrust blocking installation and adjustment, as shown on the Drawings and as specified herein.

B. Water pipe joint restraints system components shall be installed as shown on the Drawings and as specified herein.

C. Where references are made to other standards and codes, unless specific date references are indicated, the latest edition of stated standard or code shall govern.

1.2 DESCRIPTIONS OF REQUIREMENTS

A. The Contractor shall furnish and install thrust blocking and anchorage in accordance with the Thrust Block Anchoring standard detail shown within the Construction Drawings.

B. Underwriter Laboratories (U.L.) and Factory Mutual (F.M.) certifications are required on all restraint systems.

C. Unless otherwise noted, restraint systems to be used on Polyvinyl Chloride (PVC) pipes (AWWA C900 and C905) shall meet or exceed the ASTM Standard F1674, "Standard Test Methods for Joint Restraint Products for Use with PVC Pipe," or the latest revision thereof. Restraint system used on ductile iron pipe shall meet or exceed AWWA Standard C111.

D. Each restraint system shall be packaged individually and include installation instructions.

1.3 QUALITY ASSURANCE

A. The Owner/Engineer may inspect materials of conformance to the Drawings specifications herein.

1.4 RELATED SECTIONS

A. Section 02670, Ductile Iron Fittings

1.5 REFERENCE STANDARDS

A. AWWA C105 – Polyethylene Encasement for Ductile-Iron Pipe Systems.

B. AWWA C110 – Ductile-Iron and Gray-Iron Fittings.

C. AWWA C111 – Rubber-Gasket Joints for Ductile – Iron Pressure Pipe and Fittings.

D. AWWA C116 – Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings.

E. ASTM A536 – Standard Specification for Ductile Iron Castings.

F. ASTM F1674 – Standard Test Method for Joint Restraint Products for Use with PVC Pipe.

1.6 SUBMITTALS

A. Shop Drawings

1. Pipe joint restraint system.

2. Polyethylene wrapping.

3. Poly tape.

1.7 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Joint restraints, gaskets, glands, bolts, nuts, and accessories shall be shipped in suitable protective containers.

B. Handle all joint restraints and accessories carefully with approved handling devices. Do not drop or roll material off trucks.

C. Unload joint restraints and accessories to or as close to the place where they are to be installed as is practical to avoid unnecessary handling. Keep all items completely free from dirt and foreign matter.

PART 2 - PRODUCTS

2.1 PIPE JOINT RESTRAINT SYSTEM AND THRUST BLOCKING

A. Suitable thrust blocking and anchorage or joint restraints shall be provided at all the following water main locations: plugs, caps, tees, crosses, valves, bends, reducers, dead ends, and as specified in the Drawings.

B. All mechanical (joint) restraints shall be bidirectional.

C. Restraining joint types shall be as manufactured by EBAA Iron Sales, Inc., or approved equivalent.

D. Pipe joint restraints shall be made of ductile iron material in accordance with ASTM A536 and shall be compatible with mechanical joint conforming to AWWA C111.

E. Connecting pieces with one end flanged and the other end either plain-end or mechanical joint, shall conform with AWWA C110.

F. Flange adaptors shall be used only on a restricted basis and **shall not** be used as a general substitute for regular flanged joints, except where indicated in the Drawings. Flanges shall be made of ductile iron conforming with ASTM 536. Adapters shall be restrained by a number of individual gripping wedges operated by torque-limiting actuating screws.

G. Restraint rings for PVC pipe bells (AWWA C900 and C905) shall be made of ductile iron components. All ductile iron shall conform to ASTM A536. A split ring shall be used behind the bell and a serrated restraint ring shall be used to grip the pipe. A sufficient number of bolts shall be used to connect the bell ring and the pipe ring. The combination shall have a minimum working pressure rating of 150 psi.

H. Pipe four (4) inches in diameter or larger shall have an integral bell formed with a race designated to accept the gasket in accordance with AWWA C900 and C905. The spigot end shall have a bevel and a stop mark on the outside diameter to indicate insertion depth. Provisions shall be made for expansion and contraction at each joint. All surfaces of the joint upon or against which the gasket may bear shall be smooth, free of cracks, fractures, or imperfections that could adversely affect the performance of the joint.

I. The gasket shall be molded to a circular form and to the proper cross section and shall consist of a vulcanized high grade elastomeric compound conforming to ASTM F4777.

1. Quality Control Test Requirements

    a. The Manufacturer shall take adequate measures in the production of PVC and couplings to assure product compliance with the requirements of AWWA C900 and C905.

    b. All of the tests specified in AWWA C900 and C905 shall be performed at the intervals indicated therein.

J. Underground mechanical joint or push-on joint applications may not be used above grade or as substitute for flanged joints. Any above grade applications will require submission of shop drawings of the piping system where they are utilized, reasoning for use, and approval from both the Owner and Engineer.

K. Push-on Type Joints (Single Gasket and Single Gasket with Gasket Restraint)

1. Push-on joints shall conform to AWWA C111, except that the gaskets for pipe and fittings shall be neoprene where so specified.

2. The required number of gaskets for each push-on joint pipe plus one extra for every 50 joints or fraction thereof, shall be furnished with each order. The gaskets shall be shipped in suitable protective containers.

2.2 POLYETHYLENE WRAPPING

A. Polyethylene wrapping shall conform to the material requirements of the latest revisions of AWWA C105 and ASTM D4976.

B. The following physical properties shall be meet:

1. Wrapping film shall be a nominal thickness of 8 mils.

2. Tensile strength shall meet or exceed 3600 psi in accordance with ASTM D882.

3. Minimum elongation shall not be less than 800% of the test strip minimum test per the latest ASTM D882 test.

4. Minimum dielectric strength shall be 800V/mil thickness minimum in accordance with ASTM D149.

5. Minimum impact resistance shall be 600 grams in accordance with ASTM D1709 Method B.

6. Minimum propagation tear resistance shall be 2550 gf machine and transverse direction in accordance with ASTM D1922.

2.3 POLY TAPE

A. Poly tape shall consist of an elastomeric film backing of either polyethylene or plasticize polyvinyl chloride, coated on one side with a homogenous pressure-sensitive adhesive. Tape shall conform to Federal Specifications L-T-1512a and AWWAA C209.

PART 3 - EXECUTION

3.1 RESTRAINER FOR PVC PIPE (C900 and C905) AND DUCTILE IRON PUSH-ON TYPE CONNECTIONS

A. Mechanical pipe joint restraints shall include strapping logs, tie rods, retainer glands, joint harnesses, split clamping rings, threaded flanges and other mechanical restraints as approved by the Owner.

B. All mechanical restraint systems shall be capable of preventing movement of the pipe and withstanding the thrust in pounds for various line sized as follows:

| Nominal Pipe Diameter (inches) | Thrust (lbs. force) |
|---|---|
| 2 | 750 |
| 3 | 1,500 |
| 4 | 2,700 |
| 6 | 6,000 |
| 8 | 10,400 |
| 10 | 16,800 |
| 12 | 24,000 |

C. Bolts and nuts used to attach the split retainer ring shall comply with ANSI B 18.2/18.2.2, SAW Grade 5. Restraining rods and bolts shall be of low alloy corrosion resistant high strength steel conforming to AWWA C111.

D. Pipe restraints shall be utilized to prevent movement for push-on ductile iron or PVC (compression type) bell and spigot pipe connections or where a flexible coupling has been used to join two sections of plain-end pipe ductile iron or PVC pipe. The restrainer may be adapted to connect a plain end ductile iron or PVC pipe to a ductile iron mechanical joint (MJ) bell fitting. The restrainer must not be directionally sensitive.

E. The pipe shall be restrained by a split retainer band. The band shall be cast iron or ductile iron, meeting or exceeding ASTM A536, Grade 65. The inside face or contact surface of the band shall be of sufficient width to incorporate cast or machined non-directionally sensitive serration to grip the outside circumference of the pipe. The serration shall provide full (360 degrees) contact and maintain pipe roundness and avoid any localized points of stress. The split band casting shall be designed to "bottom-out" before clamping bolt forces (110 ft-lb minimum torque) can over-stress the pipe, but will not provide full non-directionally sensitive restraint at the rated pressures.

3.2 NON-METALLIC RESTRAINED JOINT PIPE AND COUPLINGS FOR PVC PIPE CONNECTIONS

A. Gaskets for restrained coupling connections shall join two sections of factory grooved PVC (C900 and C905) pipe.

B. The coupling shall incorporate twin elastomeric sealing gaskets meeting the requirements of ASTM F-477 in all applications, meeting or exceeding the performance requirements of AWWA C900 and C905, latest revisions.

C. The inside face or contact surface of the coupling connection shall be of sufficient width to incorporate a factory machined non-directionally sensitive groove in both pipe and coupling the grip the outside circumference of the pipe. The couplings shall provide full (360 degrees) contact and maintain pipe roundness and avoid and localized points of stress. The coupling shall be designed with an internal stop to align the precision-machined grooves in the coupling and pipe prior to installation of a non-metallic thermoplastic restraint spleen, and will provide full non-directionally sensitive restraint at the rated pressures.

D. The non-metallic restrained joint pipe and couplings for PVC (C900 and C905) restraint system shall consist of a pipe and couplings system produced by the same Manufacturer meeting the performance qualifications of U.L. and F.M. required on all restraint systems.

3.3 FITTING RESTRAINT FOR DUCTILE IRON PIPE (ONLY)

A. Radial bolt type restrainer systems shall be limited to ductile iron pipe in conjunction with Mechanical Joint (MJ) bell end pipe of fittings. The system shall utilize a standard MJ gasket with a ductile iron replacement gland conforming to Standard MJ bolt circle criteria.

B. The wedge screws shall be compressed to the outside wall of the pipe using a shoulder bolt and twist-off nuts to insure proper actuating of the restraining system.

C. Standard MJ fitting tee-bolts and nuts shall be high strength steel conforming to AWWA C111 and AWWA C153.

D. Standard MJ gasket shall be virgin SBR meeting ASTM D-2000 3 BA 715 or 3 BA 515.

3.4 POLYETHYLENE WRAPPING AND TAPE

A. Polyethylene wrap shall be installed at ductile iron pipe joints as a sleeve 2 feet longer than the pipe joint. The sleeve shall cover the full length of the pipe joint, lap over 1 foot on each end of the adjoining pipe joint, lap over 1 foot on each end of the adjoining pipe joints, and be secured with the minimum of two circumferential turns of poly tape.

B. Completely wrap ductile iron fittings and valves with a minimum of 1-foot overlap on each end and appropriately taped using poly tape. No duct tape shall be used.

C. Polyethylene wrap shall be installed on joints and restraint system components for corrosion protection.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT: Joint restraints and thrust blocking are considered subsidiary to Section 02670 – Ductile Iron Fittings, and no separate measurement will be made by the Contractor for this Work.

4.2 PAYMENT: Joint restraints and thrust blocking are considered subsidiary to Section 02670 – Ductile Iron Fittings, and no separate payment will be made to the Contractor for this Work.

**END OF SECTION**

## SECTION 02690

## TAPPING SLEEVES AND VALVES

PART 1 - GENERAL

1.1 SCOPE

A. The Work included in this section consist of furnishing all material, equipment, testing, labor and performing all operations necessary for the installation tapping sleeves and valves as shown on the Drawings and specified herein.

1.2 QUALITY ASSURANCE

A. Provide manufacturer's affidavit that all valves purchased for tapping of existing waterlines conform to applicable requirements of AWWA C500 and that they have been satisfactorily tested in accordance with AWWA C500.

1.3 RELATED SECTIONS

A. Section 01230, Excavation and Backfill

B. Section 02670, Ductile Iron Fittings

C. Section 02680, Joint Restraints and Thrust Blocking

D. Section 02400, Valves and Appurtenances

1.4 REFERENCE STANDARDS

A. American Water Works Association (AWWA):

1. AWWA C500, Gate Valves 3 through 48 inches for water and wastewater service.

2. AWWA C110, Ductile-Iron and Gray Iron Fittings for water service.

3. AWWA C207, Steel Pipe Flanges for Waterworks Service – Sized 4 inch through 144 inch.

4. AWWA C223, Fabricated Steel and Stainless Steel Tapping Sleeves.

1.5 SUBMITTALS

A. Shop Drawings

1. Submit Manufacturer's certificate of conformance.

2. Submit Manufacturer's drawings and data sheets for material to be supplied under this section. Indicate sizes and types to be installed.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Tapping Sleeves:

1. Tapping Sleeve Bodies: Stainless steel; in two sections to be bolted together with high-strength, corrosion-resistant, low-alloy, steel bolts; mechanical joint ends.

a. 12 inch and smaller: stainless steel; Smith-Blair Style 665, Ford Meter Box Style FTSS, Mueller Style H-304, or approved equivalent.

b. 16 inch and larger: epoxy coated carbon steel; Smith-Blair Style 663, Ford Meter Box Style FTSC, Mueller Style H-306, or approved equivalent.

2. Branch Outlet of Tapping Sleeve: Flanged; machined recess; AWWA C207, Class D, ANSI 150 lb. drilling. Gasket: Affixed around recess of tap opening to preclude rolling or binding during installation.

3. Where fire service from 6-inch main is approved, use cast iron split sleeve.

B. Tapping Valves: Meet all requirements of Section 02400 – Valves and Appurtenances with following exceptions:

1. Inlet Flanges:

a. AWWA C110; Class 125.

b. AWWA C110; Class 150 and higher: Minimum eight-hole flange.

2. Outlet: Standard mechanical or push-on joint; to fit any standard tapping machine.

3. Valve Seat Opening: Accommodate full-size shell cutter for nominal size tap without any contact with valve body; double disc.

4. Open Left (CCW) operation only.

PART 3 – EXECUTION

3.1 GENERAL

A. Install tapping sleeves and valves at locations and of sizes as shown on Drawings.

B. Thoroughly clean tapping sleeve, tapping valve and pipe prior to installation and in accordance with manufacturer's instructions.

C. Hydrostatically test installed tapping sleeve to 150 psig for a minimum of 15 minutes.

Inspect sleeve for leaks, and remedy leaks prior to tapping operation.

D. When tapping concrete pressure pipe, size on size, use shell cutter one standard size smaller than waterline being tapped.

E. Do not use Large End Bell (LEB) increasers with a next size tap unless existing pipe is asbestos-cement.

3.2 INSTALLATION

A. Tighten bolts in proper sequence so that undue stress is not placed on pipe.

B. Align tapping valve properly and attach it to tapping sleeve.

C. Make tap with sharp, shell cutter:

1. For 12-inch and smaller tap, use minimum cutter diameter one-half inch less than nominal tap size.

2. For 16-inch and larger tap, use manufacturer's recommended cutter diameter.

D. Withdraw coupon and flush all cuttings from newly-made tap. Coupon shall be submitted to Owner.

E. Wrap completed tapping sleeve and valve in accordance with Section 02680 – Joint Restraints and Thrust Blocking.

F. Place concrete thrust block behind tapping sleeve (NOT over tapping sleeve and valve).

G. Block under valve using concrete blocks.

H. Request inspection of installation prior to backfilling.

I. Backfill in accordance with Section 01230 – Excavation and Backfill.

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT: Measurement for installation of tapping sleeves and valves as a single unit assembly is on a, "per each," basis.

4.2 PAYMENT: Payment shall be full compensation for all labor, equipment, and materials required for installation of each tapping sleeve and valve assembly of varying size as indicated within the Construction Drawings and described within the Technical Specifications.

**END OF SECTION**

## SECTION 02710

## WATER MAIN TIE-INS

PART 1 – GENERAL

1.1 SCOPE

A. The Work included within this Section consists of furnishing all material, equipment, and labor while performing all operations necessary for water main tie-ins as shown within the Construction Drawings and specified herein.

1.2 RELATED SECTIONS

A. Section 01140, Dewatering

B. Section 01230, Excavation and Backfill

C. Section 15100, Valves and Appurtenances

D. Section 02650, PVC Pipe

E. Section 02660, Ductile Iron Pipe

F. Section 02665, HDPE Pipe

G. Section 02670, Ductile Iron Fittings

H. Section 02690, Tapping Sleeves and Valves

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

3.1 WATER MAIN TIE-INS

A. The Contractor shall make a water main tie-in from the new water main to the existing water main as shown within the Drawings or as directed by the Engineer.

B. The Contractor shall be responsible for all shutdowns and isolation of the existing water mains, and this includes the following:

1. Customer notification of service shutdown.

2. Dewatering the excavation.

3. Cutting the pipe for connections.

4. Any other requirements as recommended by the Inspector or Engineer in order to safely and accurately complete this effort.

C. All water main tie-ins shall be completed during normal work hours from 8 A.M.-5 P.M., unless the Contractor is otherwise directed by the Owner or the Engineer.

D. During construction, the planned shutdown and tie-in work shall be coordinated through and approved by the Inspector or Engineer with a minimum of two weeks prior notice of such activity, and accomplished at a time where it will be the least inconvenient for the customers.

E. No additional compensation will be provided to the Contractor for tie-ins that must be accomplished after normal working hours.

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT: Unless shown on the construction plans or called out within the technical specifications as a pay item, water main tie-in activities described herein are for informational purposes only. No separate measurement of water main tie-in activities will be made by the Contractor for this Work.

4.2 PAYMENT: Unless specified as a pay item, water main tie-in activities performed and materials furnished in accordance with this Specification Section will not be paid for directly, but are considered to be subsidiary to the pertinent items associated with other water main construction activities. No separate payment will be made to the Contractor for this Work.

**END OF SECTION**

**SECTION 02710**

**WATER SERVICES**

PART 1 – GENERAL

1.1 SCOPE

A. The Work included in this Section consists of furnishing all material, equipment, labor, and performing all operations that consist of water service supply lines adjustment and installation as shown within the Construction Drawings and specified herein.

B. Water services shall be installed in accordance with the Service Connection Standard Detail drawing as shown within the Construction Drawings.

C. Where references are made to other standards or codes, unless date references are indicated, the latest edition of said standard or code shall govern.

1.2 SUBMITTALS

A. Not Included.

1.3 RELATED SECTIONS

A. Texas Department of Transportation (TxDOT) Item 00340, Dense-Graded Hot-Mix Asphalt (Small Quantity)

B. Section 01230, Excavation and Backfill

PART 2 – PRODUCTS

2.1 SERVICE SADDLES

A. Service Saddle shall have an epoxy coated body with double stainless-steel straps and nuts with a pressure rating of not less than that of the pipe to which it is to be connected.

B. Saddle shall have a rubber gasket cemented to the body, with compatible threading between the saddle and corporation stop.

C. Saddle shall conform to AWWA C800 standards. The service saddle shall provide full support around the circumference of the outside diameter pipe size, providing a bearing area of sufficient width to ensure that the pipe will not distort when the saddle is tightened.

D. Single strap saddles are not acceptable for use of this application.

E. Approved Manufacturer, also shown within the Approved Equipment List (AEL), are listed below:

1. Smith - Blair.
2. The Ford Meter Box Company, Inc.
3. Mueller Water Products, Inc.
4. Or Approved Equivalent.

2.2 CORPORATION STOPS

A. Corporation stops shall be 1-inch or 2-inch brass, equipped with connections compatible with the polyethylene (or copper) tubing and threaded in accordance with Specifications in AWWA C901.

B. The outlet shall be composed of a compression joint.

C. The corporation stop shall be pressure rated at 150 psi.

D. Approved corporation stop shall be ¾-inch (I.P. x Comp) Ford #F-1100-3G-NL, or approved equivalent.

2.3 METER (CURB) STOPS

A. A curb stop shall be installed at the end of every customer service pipe at the customer's property line.

B. Meter (curb) stop brand shall be Ford as the approved Manufacturer, or approved equivalent.

C. Meter (curb) stops shall be angle style, ball type, with full port, tee handle, meter nut and lock wing without drain.

D. Pipe connections shall be suitable for the type of service pipe used.

E. All parts shall be brass with female iron pipe size connections or compression-pattern and shall be designed for a hydrostatic test pressure not less than 150 psi.

F. Curb stops shall be sized to match the meter size and conform to AWWA C800 and AWWA C901.

2.4 POLYETHYLENE (OR COPPER) TUBING

A. Polyethylene tubing shall be provided in compliance with AWWA C901. Copper tubing shall be provided in compliance with ASTM B88.

B. All polyethylene and copper tubing shall be rated at 200 psi working pressure.

2.5 WATER METERS

A. Water meters shall be provided by the Owner.

2.6 METER BOXES

A. Meter boxes shall be as manufactured by DFW Plastics, Model No. DFW1300.12.1C or DFW 1600X.12.1C, or approved equivalent.

2.7 METER BOX LIDS

A. Meter box lids shall be Model No. DFW1200.1C.LID or DFW1500.1C.LID, or approved equivalent.

B. The word "WATER" shall be cast into the cover or the lid.

PART 3 – EXECUTION

3.1 WATER SERVICE LINE INSTALLATION

A. A service supply line located between the water main and the inlet side of the water meter is designated as a "water service line." A service supply line located between the outlet side of the water meter to the point of connection within the limits of the customer's lot or property is designated as the "customer's yard piping."

B. Existing meter and meter box relocation shall be included in the service line installation.

C. The Contractor shall trench and backfill in accordance with the Typical Trench Backfill Standard Detail drawing as shown within the Construction Drawings.

D. Saw cutting, excavation, backfill, and replacement of pavement shall be completed in accordance with the following Project Specifications, whichever are applicable:

1. TxDOT Item 0340, Dense-Graded Hot-Mix Asphalt (Small Quantity)

2. Section 01230, Excavation and Backfill

3.2 BORING SERVICE LINES

A. Bored casing inside diameter shall be 4-inches for 2-inch service lines in accordance with the Service Connection Standard Detail drawings as shown within the Construction Drawings.

B. Steel casing must be used for lateral encased crossings at all TxDOT roadways.

C. HDPE casing may be used for County or residential roadways if approved by

Owner/Engineer.

3.3 TAPPING PVC WATER MAINS

A. Single meter service shall include PVC adaptor coupling with corporation stop.

3.4 SINGLE SERVICE LINE- SINGLE AND DUAL METERS

A. Single service lines with single and dual meters shall conform to the Service Connection Standard Detail drawings as shown within the Construction Drawings.

3.5 TAPPING ASBESTOS CEMENT WATER MAINS (AC PIPE)

A. Service line tapping of AC pipe shall be completed during the period immediately before or after hydrostatic pressure testing operations so that subsequent flushing will maximize the elimination of contaminants associated with the tapping process.

B. Direct tapping into the pipe wall without use of a service saddle will not be allowed.

C. Service saddles must be used when tapping AC pipe.

D. Drill tools shall be used for services less than 2-inches in size.

E. Shell type drills shall be used for all services 2-inches and greater in size.

3.6 RECONNECTING SHORT AND LONG SERVICE LINES

A. New water main(s) to which services are to be reconnected on the same side of the street as the old main, are defined as "short reconnects." Existing services on the opposite side of the street of the new main shall be defined as "long reconnects."

B. Both old and new water mains at existing service line connections shall be exposed.

C. The old water main shall be exposed for the purpose of gaining access to the existing service corporation stop and the new main for the purpose of installing the new corporation stop.

D. The new main shall be exposed for the purpose of being drilled and tapped with an approved tapping machine, a new corporation stop installed under pressure, and the trench extended laterally to expose a sufficient length of the existing service line to provide slack to bend it into position for tying to the new corporation stop.

E. After suitable notification to the customer, the Contractor shall "kill" the existing service by closing the corporation stop, removing the existing flare nut, inserting inside the existing flared nut an appropriately-sized copper disc and replacing

the existing flared nut on the corporation stop if the main is non-ferrous, or plugging the existing service line at the main if the main is ferrous.

3.7 RELOCATING SHORT AND LONG SERVICES

A. Service relocates are defined as services that are relocated from an alley or street to a side yard or front of street.

B. New water main(s) to which services are to be relocated, and are on the same side yard of the street as the customer's new meter box location, are designated as "short relocates."

C. New water main(s) to which services are to be relocated, and are on the opposite side of the street from the customer's new meter box location, are designated as "long relocates."

3.8 NEW SHORT AND LONG SERVICES

A. If a new water main is required to be extended to provide water service for new customers, the service lines laid to be connected to the new water main shall be designated as "new services."

B. Newly laid water main(s) to which new services are on the same side of the street as the customer's new meter box location, are designated as "new short services."

C. Newly laid water main(s) to which new services are on the opposite side of the street from the customer's new meter box location, are designated as "new long services."

D. New services shall be installed in accordance with the Service Connection Standard Detail drawing as within the Construction Drawings.

3.9 ABANDONMENT OF SERVICE LINES

A. The Contractor shall accomplish all cutting, capping, and plugging necessary to isolate new service lines transferred to new and existing mains from those that are to be abandoned.

B. The corporation stop for an abandoned service line tapped on a ferrous main shall be removed, and the tap at the main shall be plugged with an appropriately sized brass plug.

C. For a non-ferrous main, the corporation stop shall not be removed from the main. Instead, the corporation stop shall be closed and the flared nut shall be removed from the corporation stop. After the appropriately sized copper disc is inserted inside the flared nut, replace the flared nut on the corporation stop.

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT:

A. Reconnect short service will be measured by the unit of the various types and sizes of each service line reconnected.

B. Reconnect long service will be measured by the unit of the various types and sizes of each service line reconnected.

C. Relocate short service will be measured by the unit of the various types and sizes of each service line relocated.

D. Relocate long service will be measured by the unit of the various types and sizes of each service line relocated.

E. New short service will be measured by the unit of the various types and sizes of each new service line installed.

F. New long service will be measured by the unit of the various types and sizes of each new service line installed.

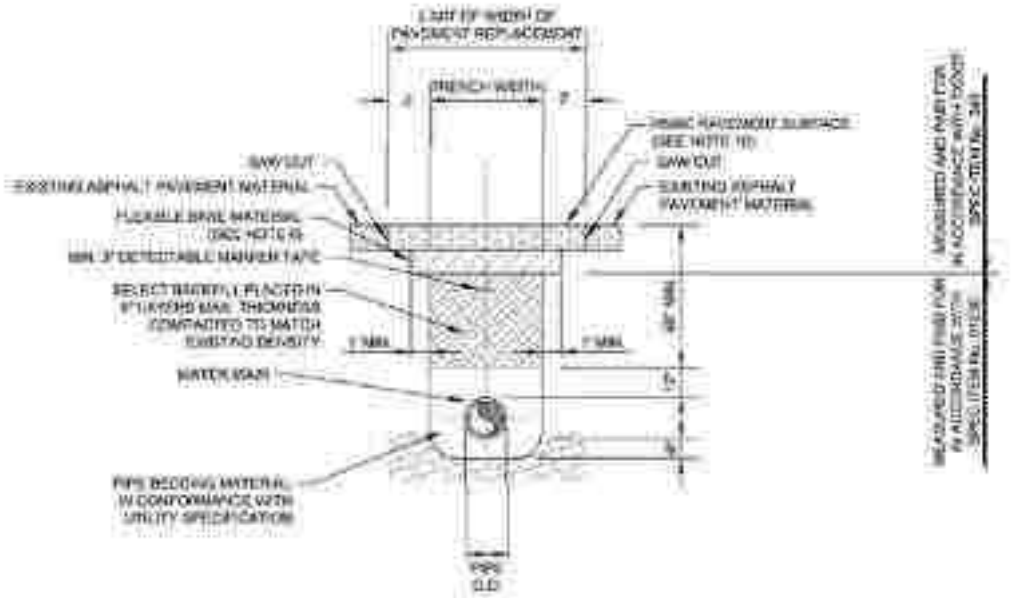
4.2 PAYMENT:

A. Payments shall be full compensation for all labor, materials, testing, and equipment necessary for reconnecting short and long services made at the price bid unit for each service line of the various sizes reconnected as shown within the Construction Drawings and as specified herein. This item shall also include, but not necessarily be limited to: excavation and backfilling; dewatering; cutting pavement and surface structures of whatever type encountered and replacement with whatever type specified, polyethylene or copper, corporation stop, and service saddle for short or long service line reconnections.

B. Payments shall be full compensation for all labor, materials, testing, and equipment necessary for relocating short and long services made at the price bid unit for each service line of the various sizes relocated as shown within the Construction Drawings and as specified herein. This item shall also include, but not necessarily be limited to: excavation and backfilling; dewatering; cutting pavement and surface structures of whatever type encountered and replacement with whatever type specified, and polyethylene or copper tubing, meter box and lid (if meter box and lid need to be replaced) for short or long service line relocations.

C. Payments shall be full compensation for all labor, materials, testing, and equipment necessary for new short and long services made at the price bid unit for each service line of the various sizes installed as shown within the Construction Drawings and as specified herein. This item shall also include, but not necessarily be limited to: excavation and backfilling; dewatering; cutting pavement and surface structures of whatever type encountered and replacement with whatever type specified, and polyethylene or copper tubing, service saddle, corporation stop, meter box and lid, and ball valve for new short or long service line installations.

END OF SECTION




TRENCH AND BACKFILL NOTES:

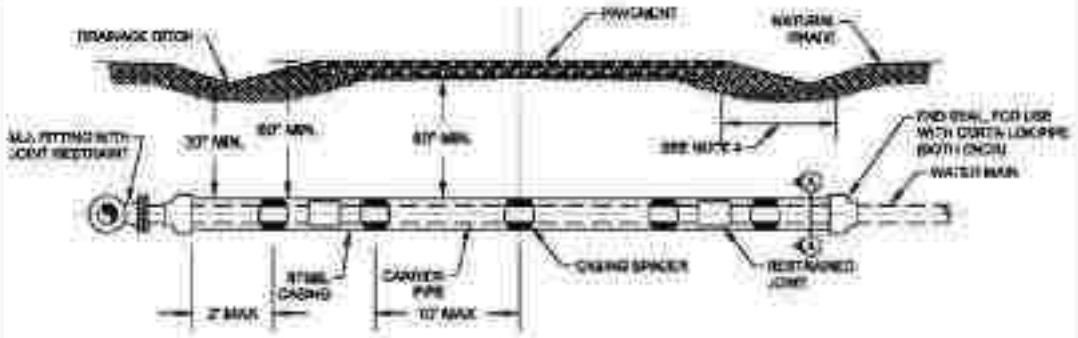
1. ADEQUATE BARRICADES & PARKING SIGNS SHALL BE ERECTED BEFORE ANY WORK IS STARTED IN PUBLIC RIGHT-OF-WAY.
2. THE ROADWAY SHALL BE CUT ONLY AS WIDE AS REQUIRED.
3. NO MORE THAN HALF OF THE WIDTH OF ANY ROAD SHALL BE CUT & OPENED AT ONE TIME.
4. REFER TO SPECIFICATIONS FOR ANY SPECIAL REQUIREMENTS OR CONDITIONS.
5. BACKFILL SHALL BE COMPLETED IMMEDIATELY AFTER PIPE IS LAYING WITHIN PUBLIC RIGHT-OF-WAYS OR CROSSING PUBLIC ROW'S OR PRIVATE DRIVEWAYS.
6. THE EXISTING PAVING SURFACE SHALL BE SAW CUT IN A STRAIGHT LINE A MAXIMUM OF 12" WIDER THAN UNDISTURBED SIDE OF THE TRENCH ASPHALT MATERIAL ABOVE THE CENTER LINE OF THE EXCAVATION.
7. ANY CONCRETE PAVING SHALL BE SAW CUT 6" WIDER THAN UNDISTURBED SIDES OF THE EXCAVATION.
8. LOCAL STREETS SHALL BE 10" AND MAJOR/MINOR STREETS SHALL BE 12" THICK. BASE MATERIAL SHALL BE PLACED 2' WIDER THAN TRENCH WIDTH ON BOTH SIDES. FLOWABLE BASE SHALL BE CDOT ITEM 247 TYPE A, GRADE 1.
9. DAMAGED PAVEMENT OUTSIDE THE TRENCH CUT SHALL BE REMOVED AND REPLACED WITH A BASE THICKNESS OF 10" OR A THICKNESS MATCHING EXISTING, WHICHEVER IS GREATER, AT NO ADDITIONAL COST TO THE OWNER.
10. REPLACEMENT AC SURFACE LAYER SHALL BE OF THE TYPE AND THICKNESS BASED ON FUNCTIONAL CLASSIFICATION:
    A. MIN. 3" HMAC SHALL BE CDOT ITEM 340, TYPE G FOR TRENCH REPAIR IN LOCALS/ESSENTIAL STREETS AND DRIVEWAYS.
    B. MIN. 3" HMAC SHALL BE CDOT ITEM 340, TYPE S FOR TRENCH REPAIR IN COLLECTOR/ARTERIAL STREETS.

TRENCH SAFETY NOTES:

1. TRENCH SAFETY SYSTEM, SHORING OR SIDE SLOPE, TO BE IN ACCORDANCE WITH OSHA STANDARDS.
2. TRENCH SAFETY SYSTEM PLAN TO BE PROVIDED BY CONTRACTOR PRIOR TO CONSTRUCTION.

NOT TO SCALE

| | | | |
|---|---|---|---|
| PROJECT OF: CRYSTAL CLEAR SPECIAL UTILITY DISTRICT | ASPHALT PAVEMENT AND DRIVEWAY (TRENCH REPAIR) | M&S ENGINEERING | APPROVED: OCTOBER 2018 / REVISED: OCTOBER 2019 |
| | | | SHEET 1 OF 1 |

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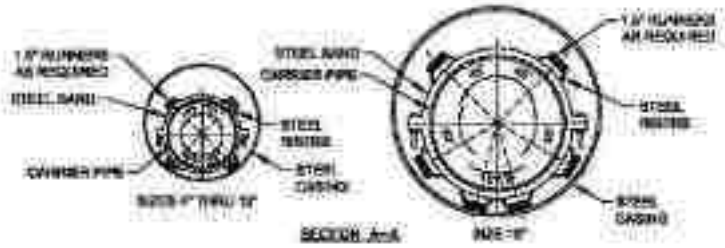


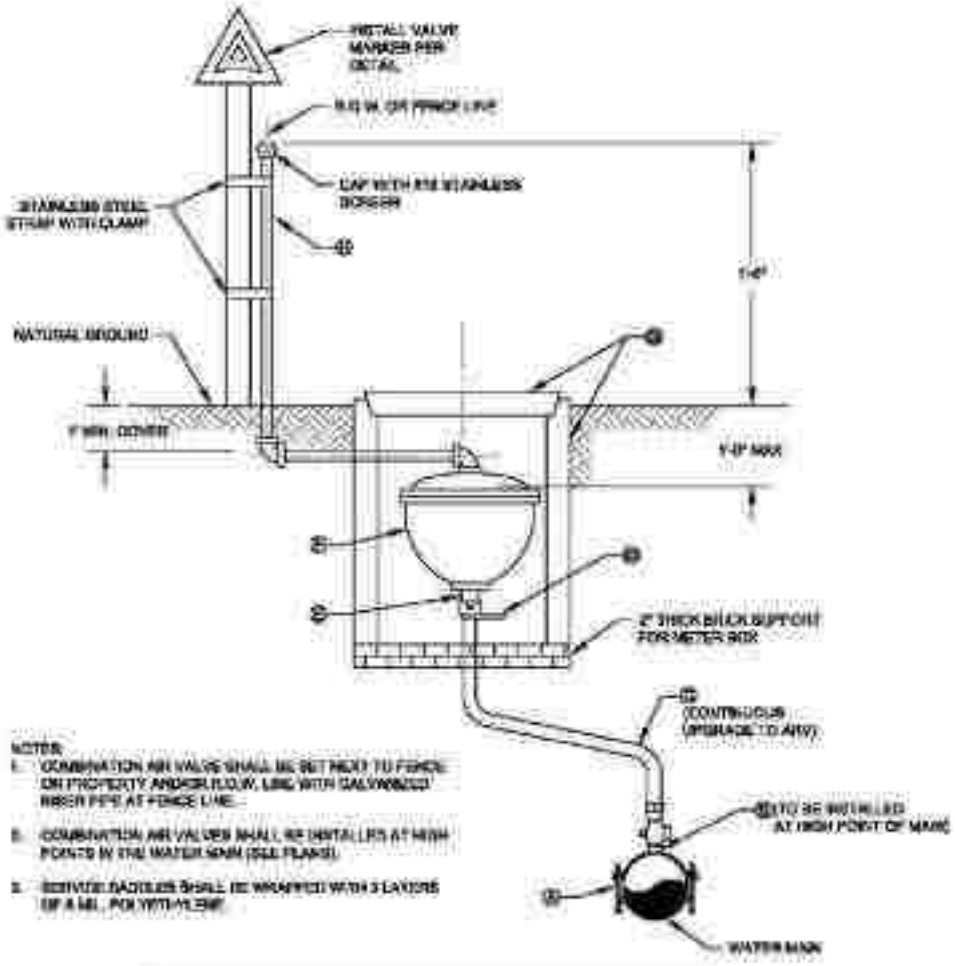

SECTION A-A

| CARRIER PIPE | | | STEEL CASING | | | | | CASING SPACERS | |
|---|---|---|---|---|---|---|---|---|---|
| NOMINAL SIZE (IN) | PIPE OUTSIDE DIAMETER (IN) | RUNNER OUTSIDE DIA. (IN) | MIN. NOMINAL SIZE (IN) | OUTSIDE DIAMETER (IN) | INSIDE DIAMETER (IN) | WALL THICKNESS (IN) | WEIGHT CLASS | BAND WIDTH | No. OF RUNNERS PER I.D. |
| 4 | 4.80 | 8.25 | 10 | 10.750 | 10.25 | 0.25 | STANDARD | 8" | 2 TOP, 2 BOTTOM |
| 6 | 6.90 | 11.25 | 12 | 12.750 | 12.250 | 0.375 | STANDARD | 8" | 2 TOP, 2 BOTTOM |
| 8 | 9.05 | 14.75 | 16 | 16.000 | 15.250 | 0.375 | STANDARD | 8" | 2 TOP, 2 BOTTOM |
| 12 | 13.20 | 18.85 | 20 | 20.000 | 19.250 | 0.375 | STANDARD | 8" | 2 TOP, 2 BOTTOM |
| 16 | 17.40 | 23.01 | 24 | 24.000 | 23.250 | 0.375 | STANDARD | 8" | 2 TOP, 2 BOTTOM |

NOTES:

1. CARRIER PIPE VALUES BASED ON CURTA-LOK CASING (OR 16) FOR ALL PIPE SIZES.
2. STEEL CASING SHALL BE STANDARD WEIGHT OR HEAVIER PIPE CONFORMING TO ASTM A-36, ASTM A-569, ASTM A-139, ASTM A-139 OR OTHER ACCEPTABLE STANDARD SPECIFICATION. PIPE SHALL BE COATED AND LINED IN ACCORDANCE WITH AWWA C-210 OR APPROVED EQUAL. PIPE JOINTS SHALL BE WELDED IN ACCORDANCE WITH AWWA C-206. STEEL CASING SHALL BE NEW OR USED IN GOOD CONDITION ACCEPTABLE TO CRYSTAL CLEAR SPECIAL UTILITY DISTRICT AND TO THE ROADWAY AUTHORITY.
3. CASING SPACERS ARE REQUIRED FOR ALL LINES 4 INCH AND LARGER. ONE CASING SPACER SHALL BE PLACED WITHIN 2 FT. OF ENDS OF CASING. SUBSEQUENT SPACERS SHALL BE PLACED A MAXIMUM OF 10 FT. APART WITHIN THE CASING WITH AT LEAST 3 SPACERS PER JOINT OF PIPE.
4. CASING PIPE SHALL EXTEND A MINIMUM OF 10 FT. PAST EDGE OF PAVEMENT ALONG CROSS ROADWAYS AND A MINIMUM OF 5 FT. PAST EDGE OF PAVEMENT ALONG ALL OTHER ROADWAYS UNLESS OTHERWISE DIRECTED BY ENGINEER OR REQUIRED BY AUTHORITY.
5. CASING SPACERS SHALL BE MADE FROM T-304 STEEL OF A MINIMUM 14 GAUGE THICKNESS.
6. CASING SPACERS SHALL HAVE A SYNTHETIC RUBBER OR PVC LINER TO INSULATE THE PIPELINE FROM THE SPACER.
7. CASING SPACERS SHALL HAVE A 1.5" RIGID GLASS REINFORCED PLASTIC OR NYLON POLYMER RUNNERS TO INSULATE THE SPACERS FROM THE CASING.

| PROPERTY OF: CRYSTAL CLEAR | CASING DETAIL | M&S ENGINEERING | APPROVED: | REVISED: |
|---|---|---|---|---|
| | | | JUNE 2018 | DECEMBER 2018 |
| | | | SHEET 1 OF 1 | |




NOTES:

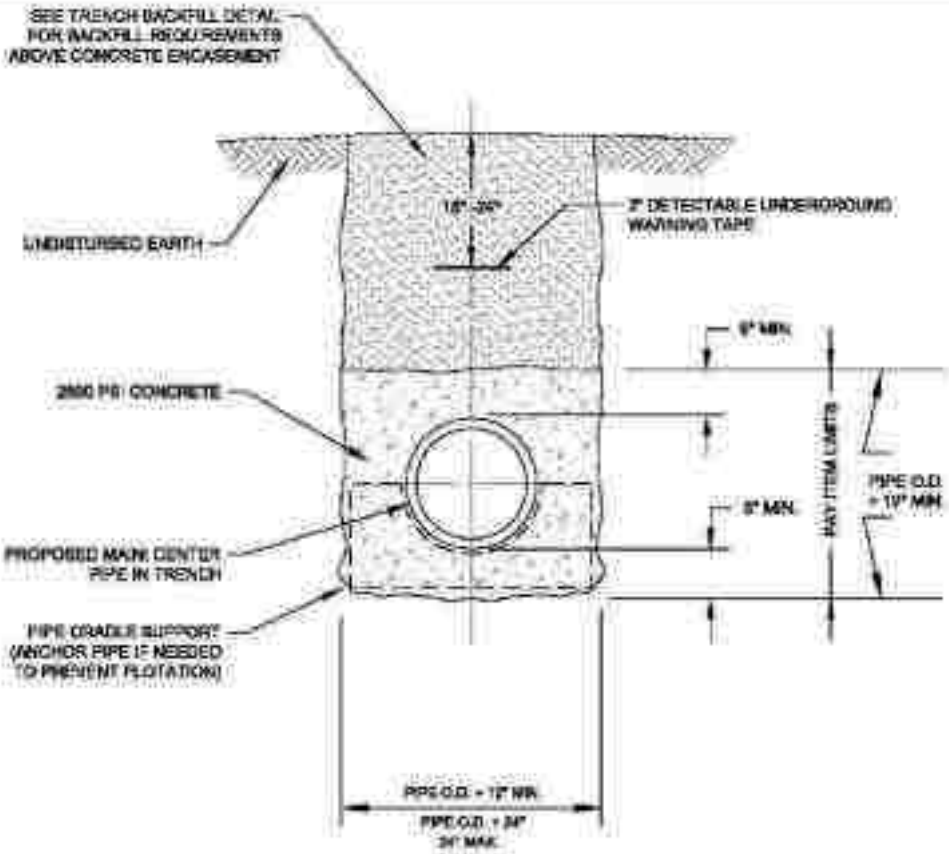
1. COMBINATION AIR VALVE SHALL BE SET NEXT TO FENCE ON PROPERTY AND/OR FLOW LINE WITH GALVANIZED RISER PIPE AT FENCE LINE.
2. COMBINATION AIR VALVES SHALL BE INSTALLED AT HIGH POINTS IN THE WATER MAIN (SEE PLANS).
3. SERVICE SADDLES SHALL BE WRAPPED WITH 3 LAYERS OF 8 MIL. POLYETHYLENE.

| TAP MATERIAL LIST | | MATERIAL LIST SIZES | |
|---|---|---|---|
| LABEL | ITEM | 1-INCH TAP | 2-INCH TAP |
| A | APPROVED TAPPING SADDLE | 1" | 2" |
| B | CORPORATION STOP | 1" | 2" |
| C | COPPER TUBING (SEAMLESS, TYPE K) | 1" | 2" |
| D | BRASS BALL VALVE WITH LOWER | 1" | 2" |
| E | BRASS NIPPLE THREADED | 1" | 2" |
| F | COMBINATION AIR VALVE | PER AEL* | |
| G | METER BOX AND LID | DFW2000FD OR DFW2000FD** | |
| H | GALVANIZED IRON PIPE AND FITTINGS | 1" | 2" |

* AEL = APPROVED EQUIPMENT LIST
** METER BOX TO BE INSTALLED AS NECESSARY TO COVER FULL DEPTH OF COMBINATION AIR RELEASE VALVE

NOT TO SCALE

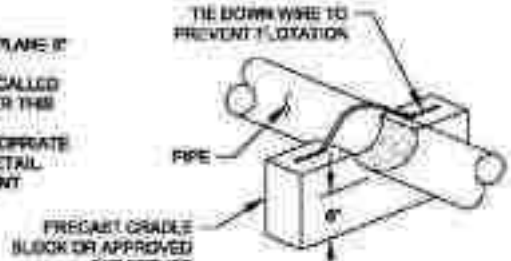
| PROPERTY OF CRYSTAL CLEAR | COMBINATION AIR VALVE DETAIL | M&S ENGINEERING | APPROVED: JUNE 2016 | REVISION: JULY 2018 |
|---|---|---|---|---|
| | | | SHEET 1 OF 1 | |




CONCRETE ENCASEMENT

NOTES:

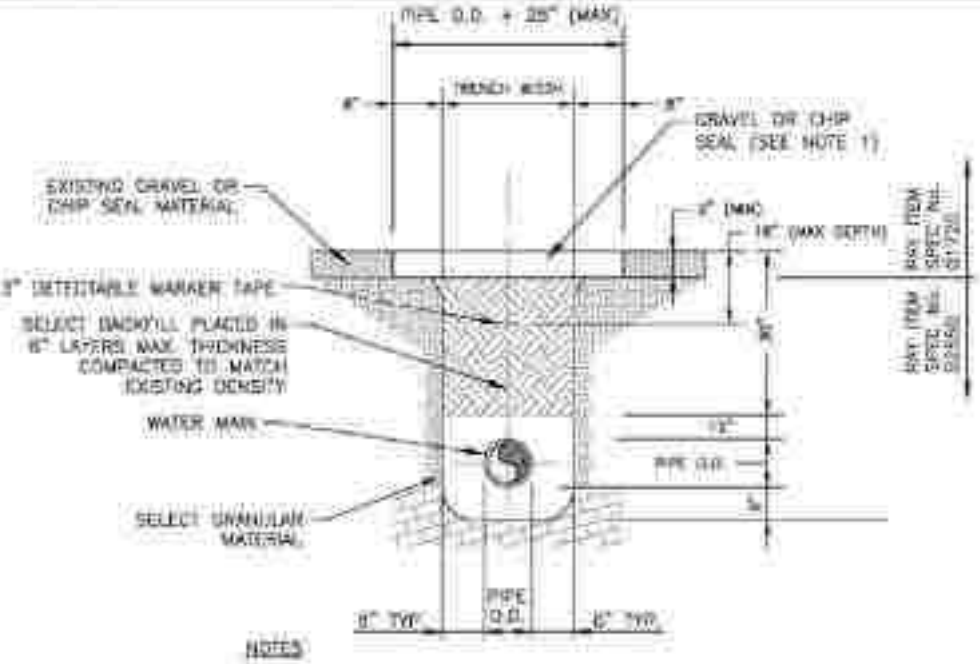
1. ALL CONCRETE ENCASEMENT SHALL BE POURED AT A PLANE 8" ABOVE THE PIPE BETWEEN EXCAVATED TRENCH WALL.
2. CONCRETE ENCASEMENT WILL BE USED ONLY WHERE CALLED OUT IN THE PLANS AND LIMITS OF PAYMENT WILL BE PER THIS DETAIL.
3. BACKFILL AND RESTORATION WORK WILL BE PER APPROPRIATE TRENCH DETAIL WITH EMBEDMENT FOLLOWING THIS DETAIL.
4. SUPPORTS ARE INCIDENTARY TO CONCRETE ENCASEMENT




PIPE CRADLE SUPPORT

NOT TO SCALE

| PROPERTY OF CRYSTAL CLEAR SPECIAL UTILITY DISTRICT | CONCRETE ENCASEMENT DETAIL | M&S ENGINEERING | APPROVED: MAY 2019 | REVISED: AUGUST 2019 |
|---|---|---|---|---|
| | | | SHEET 1 OF 1 | |




NOTES

1. GRAVEL OR CHIP SEAL (MATCH EXISTING PAVEMENT TYPE) SHALL BE A MINIMUM OF 3" THICK.
2. ROAD BASE AND SURFACE MATERIALS IN THE TRENCH CUT SHALL BE REPLACED IN KIND, OF EQUAL THICKNESS.

TRENCHING NOTES

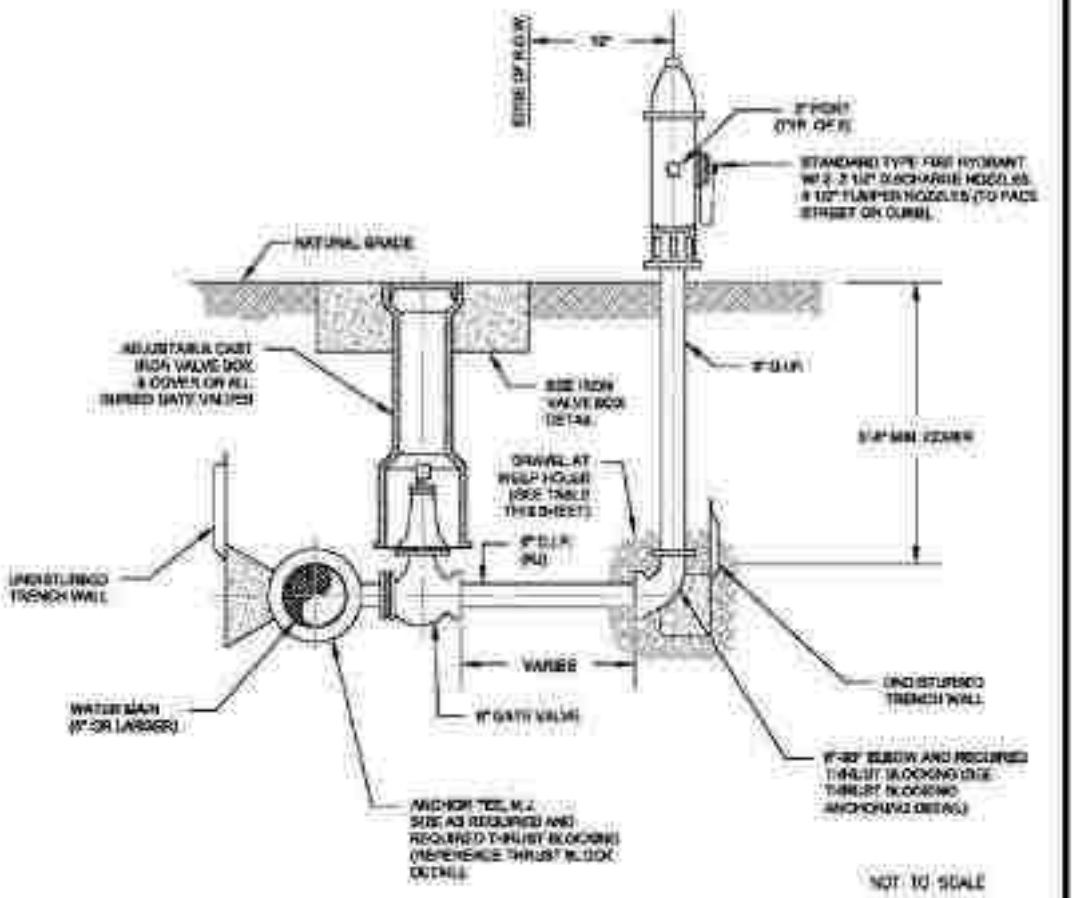
1. ADEQUATE BARRICADES & WARNING SIGNS SHALL BE ERECTED BEFORE ANY WORK IS STARTED IN PUBLIC RIGHT-OF-WAY.
2. THE DRIVEWAY SHALL BE CUT ONLY WHERE REQUIRED BY THE ENGINEER.
3. DRIVEWAY SHALL REMAIN ACCESSIBLE AT ALL TIMES.
4. REFER TO SPECIFICATIONS FOR ANY SPECIAL REQUIREMENTS OR CONDITIONS.
5. BACKFILL SHALL BE COMPLETED IMMEDIATELY AFTER PIPELINE LAYING WITHIN PRIVATE DRIVEWAYS.

TRENCH SAFETY NOTES

1. TRENCH SAFETY SYSTEM, SHORING OR SIDE SLOPE TO BE IN ACCORDANCE WITH OSHA STANDARDS.
2. TRENCH SAFETY SYSTEM PLAN TO BE PROVIDED BY CONTRACTOR PRIOR TO CONSTRUCTION.
3. ALL EXCAVATION GREATER THAN 5' DEEP SHALL MEET TRENCH SAFETY NOTE.

NOT TO SCALE

| PROPERTY OF CRYSTAL CLEAR SPECIAL UTILITY DISTRICT | TYPICAL GRAVEL/CHIP SEAL DRIVEWAY REPAIR DETAIL | M&S ENGINEERING | APPROVED: JULY 2018 / REVISION: |
|---|---|---|---|
| | | | SHEET 1 OF 1 |




NOT TO SCALE

| GRAVEL AT WEEPHOLE | |
|---|---|
| LENGTH OF HYDRANT RISER | CU. FT. OF GRAVEL REQUIRED |
| 3' | 2.5 |
| 4' | 3 |
| 5' | 3.5 |
| 6' | 4 |
| >6' | TBD BY CCSUD |

NOTE:

1. THE EARTH-BEARING SURFACE SHALL BE THE UNDISTURBED TRENCH WALL.
2. ALL PIPE JOINTS SHALL BE RESTRAINED PUSH-ON GASKETED.
3. ALL FITTINGS AND FITTING JOINTS MUST BE WRAPPED IN THREE LAYERS OF 8-MIL POLYETHYLENE IN ACCORDANCE WITH AWWA C105/A21.5 OR LATEST REVISION THEREOF.
4. 12"x12"x6" THICK CONCRETE BLOCKS SHALL BE INSTALLED DIRECTLY UNDER ALL VALVES, FITTINGS, ETC.

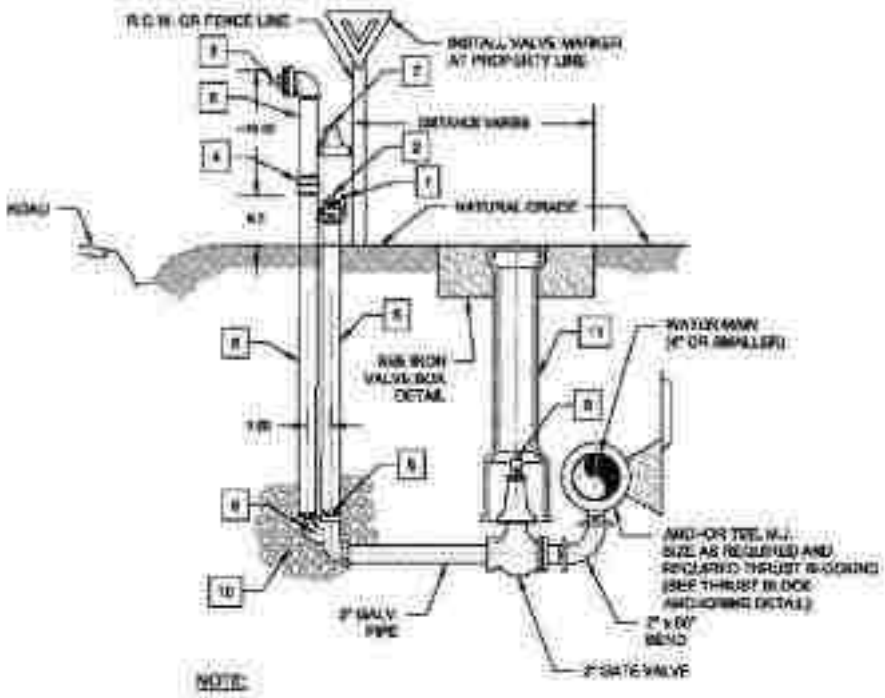
PROPERTY OF CRYSTAL CLEAR SPECIAL UTILITY DISTRICT

FIRE HYDRANT DETAIL

M&S ENGINEERING

| APPROVED | REVISION |
|---|---|
| JUNE 2016 | JULY 2016 |

SHEET 1 OF 1




NOTE:

1. BURIED PIPING SHALL BE WRAPPED IN POLYWRAP.
2. THE EARTHBEARING SURFACE SHALL BE THE UNDISTURBED TRENCH WALL.
3. ALL PIPE JOINTS SHALL BE KEPT FREE FROM CONCRETE.
4. ALL FITTINGS AND FITTING JOINTS MUST BE WRAPPED W/ THREE LAYERS OF 8-MIL POLYETHYLENE IN ACCORDANCE WITH AWWA C105.
5. 12"x12"x4" THICK CONCRETE BLOCKS SHALL BE INSTALLED DIRECTLY UNDER ALL VALVES, FITTINGS, ETC.

| ITEM | DESCRIPTION | NOTES |
|---|---|---|
| 1 | TOP CAP | |
| 2 | SLOTTED CAP WASHER NUT | |
| 3 | 2-1/2" HBT OUTLET | SHOWN WITH CAP |
| 4 | 2" COUPLING | |
| 5 | 2" STEEL PIPE | |
| 6 | INLET VALVE BODY | |
| 7 | LOCKING CANVA | |
| 8 | DRAIN HOLE | |
| 9 | HYDRANT SHUT-OFF VALVE | |
| 10 | CRUSHED ROCK | |
| 11 | VALVE BOX | |

NOT TO SCALE

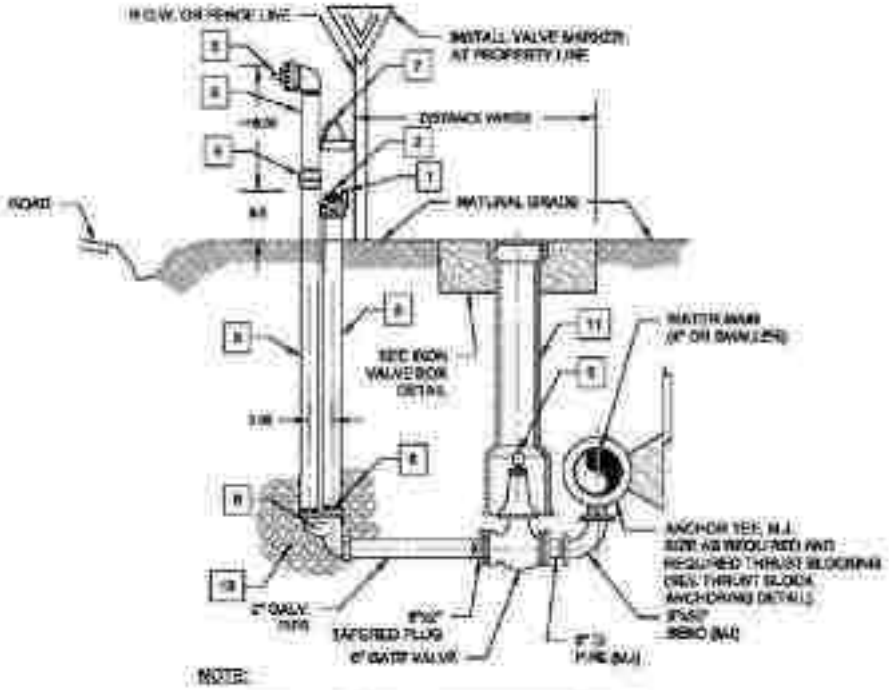
PROPERTY OF CRYSTAL CLEAR SPECIAL UTILITY DISTRICT

PLUSH VALVE DETAIL 4"INCH OR SMALLER

M&S ENGINEERING

| APPROVED | REVISION |
|---|---|
| JUNE 2018 | JUNE 2018 |

SHEET 1 OF 1



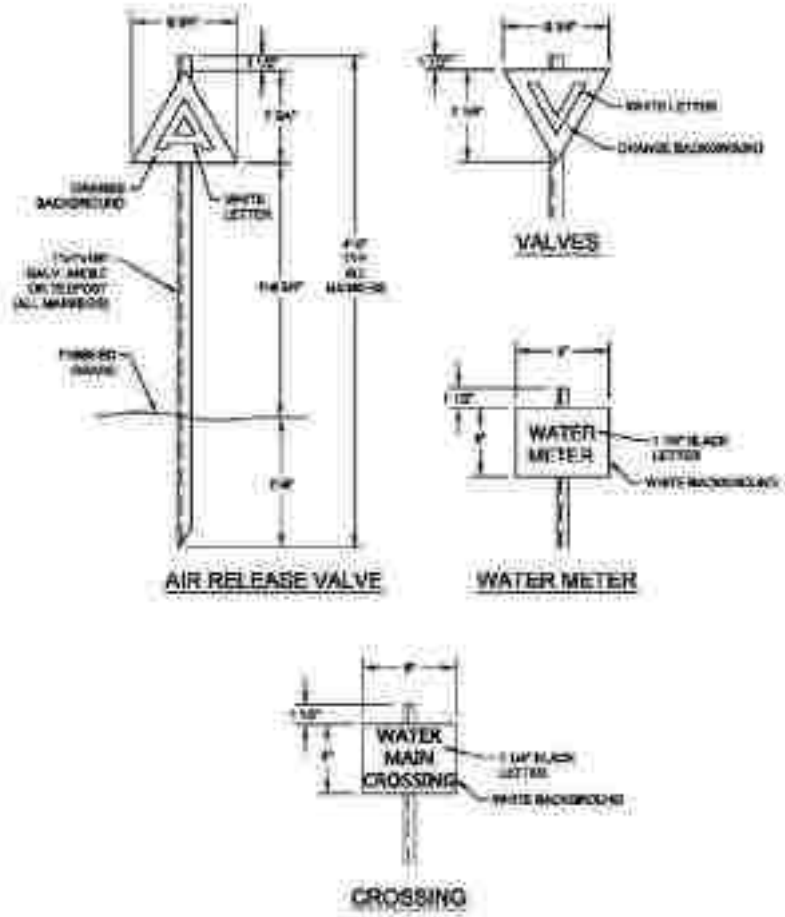

NOTE:

1. BURIED PIPING SHALL BE WRAPPED IN POLYWRAP.
2. THE EARTHBEARING SURFACES SHALL BE THE UNDISTURBED TRENCH WALL.
3. ALL PIPE JOINTS SHALL BE KEPT FREE FROM CONCRETE.
4. ALL FITTINGS AND FITTING JOINTS MUST BE WRAPPED W/ THREE LAYERS OF 8-MIL POLYETHYLENE IN ACCORDANCE WITH AWWA C105.
5. 12"x12"x4" THICK CONCRETE BLOCKS SHALL BE INSTALLED DIRECTLY UNDER ALL VALVES, FITTINGS, ETC.

| ITEM | ITEM/DESCRIPTION | NOTES |
|---|---|---|
| 1 | CAP | |
| 2 | SLOTTED OPERATING NUT | |
| 3 | 4-1/2" NST OUTLET | SHOWN WITH CAP |
| 4 | 2" COUPLING | |
| 5 | 2" STEEL PIPE | |
| 6 | INLET VALVE BODY | |
| 7 | LOCKING COVER | |
| 8 | DRAIN HOLE | |
| 9 | HYDRANT INLET GATE VALVE | |
| 10 | CRUSHED ROCK | |
| 11 | VALVE BOX | |

NOT TO SCALE

| PROPERTY OF: CRYSTAL CLEAR | FLUSH VALVE DETAIL 8 INCH OR LARGER | M&S ENGINEERING | APPROVED: JUNE 2016 | REVISION: APR 2019 |
|---|---|---|---|---|
| | | | SHEET 1 OF 1 | |

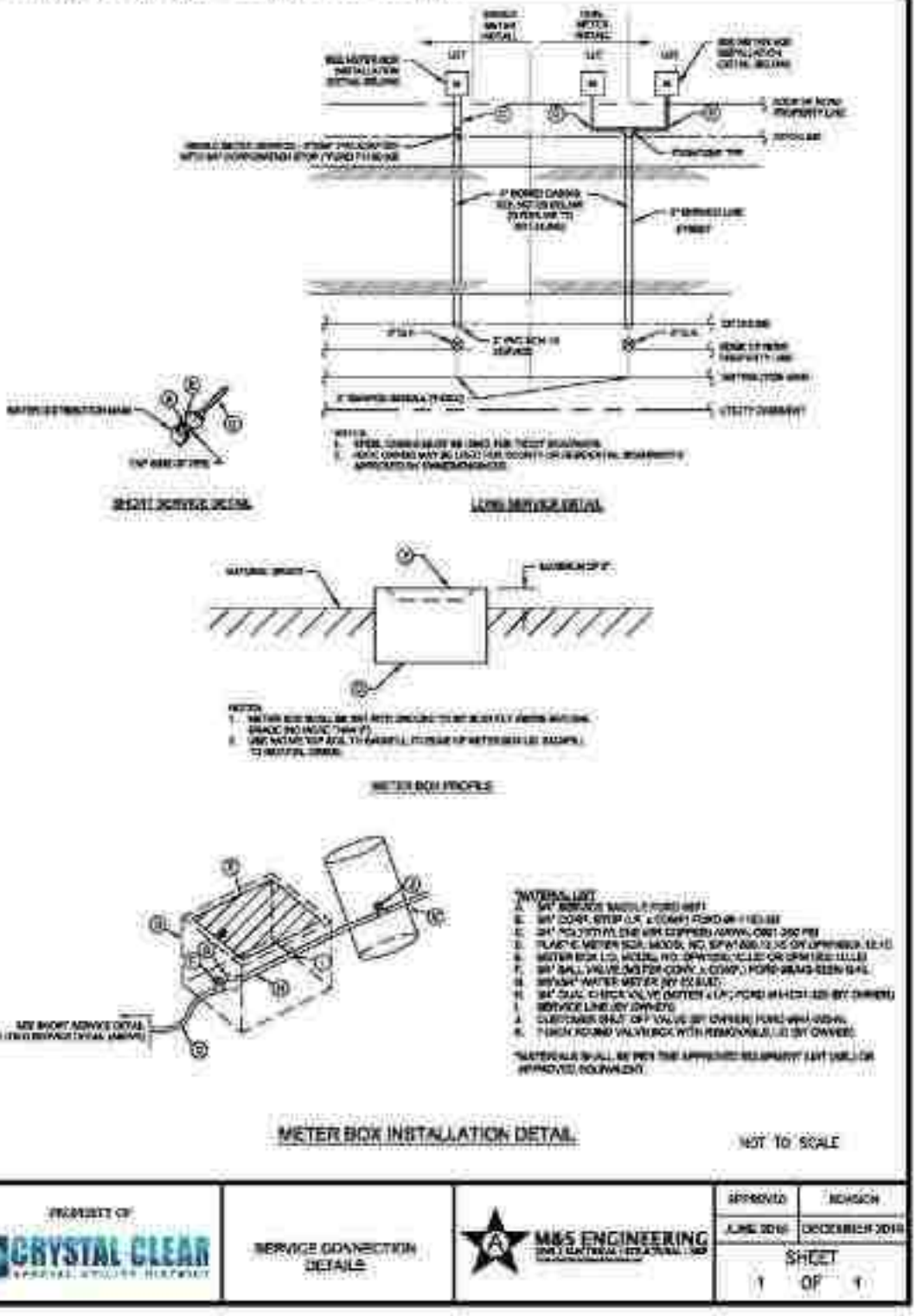



NOTES:

1. MARKERS SHALL BE MADE OF 20MA STEEL WEATHER GRAVEL PATIN SIMILAR TO THOSE MANUFACTURED BY RURAL WATER SPECIALTY CO., TULSA, OK. MODEL 1002 FOR WATER LINE MARKERS & MODEL 1021 FOR AIR RELEASE MARKERS & MODEL 1000 FOR VALVE MARKERS.
2. MARKERS SHALL BE PLACED AT ALL GATE VALVES, FLUSHING VALVES, AIR RELEASE VALVES & WATER METERS.
3. PIPELINE MARKERS SHALL BE PLACED ON FLOW FENCE LINE AT ALL ROAD CROSSINGS.
4. PLASTIC OR FLOW BLADE MARKERS MAY NOT BE SUBSTITUTED FOR STEEL.

NOT TO SCALE

| | | | | |
|---|---|---|---|---|
| PROPERTY OF CRYSTAL CLEAR | MARKER DETAILS | M&S ENGINEERING | APPROVED | REVISION |
| | | | JUNE 2016 | AUGUST 2018 |
| | | | SHEET 1 OF 1 | |



METER BOX INSTALLATION DETAIL

NOT TO SCALE

PROPERTY OF
CRYSTAL CLEAR
SPECIAL UTILITY DISTRICT

SERVICE CONNECTION DETAILS

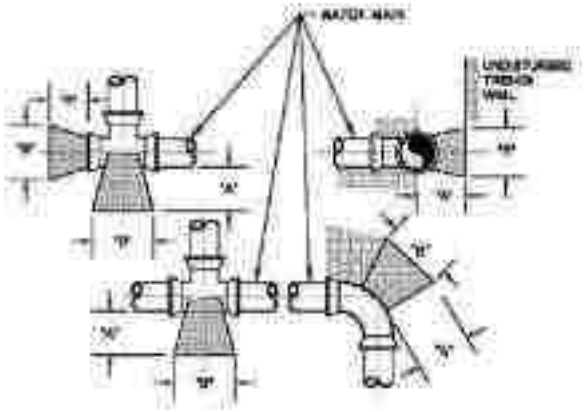
M&S ENGINEERING

| APPROVED | REVISION |
|---|---|
| JUNE 2016 | DECEMBER 2018 |

SHEET
1 OF 1

| PIPE SIZE | DIMENSION "B" (INCHES) | | | | |
|---|---|---|---|---|---|
| | 90° BENDS | 45° BENDS | 22 1/2° BENDS | VALVES |
| 4"/6" | 1'-3" | 1'-0" | 1'-0" | 0" | 1'-0" |
| 8" | 1'-9" | 2'-0" | 1'-0" | 1'-0" | 1'-0" |
| 10" | 2'-10" | 2'-0" | 1'-0" | 1'-0" | 2'-0" |
| 12" | 3'-3" | 2'-3" | 2'-3" | 1'-6" | 2'-6" |
| 16" | 4'-0" | 2'-6" | 2'-6" | 2'-0" | 2'-6" |
| 20" | 4'-9" | 3'-0" | 3'-0" | 2'-0" | 3'-0" |

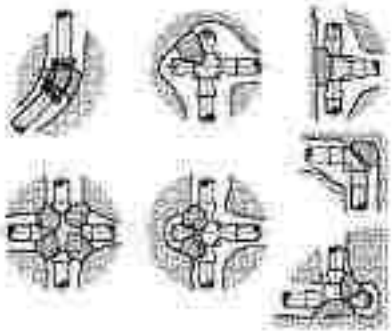
DIMENSION "A" SHALL BE A MINIMUM OF 1'-0" BUT IS TO BE INCREASED WHERE NECESSARY TO PROVIDE BEARING AGAINST UNDISTURBED TRENCH WALL.




THRUST BLOCK DIMENSIONING

NOTES:

1. THE EARTH BEARING SURFACE SHALL BE THE UNDISTURBED TRENCH WALL.
2. ALL PIPE JOINTS SHALL BE KEPT FREE FROM CONCRETE.
3. ALL THRUST BLOCKS SHALL CONTAIN A MINIMUM OF 1 1/2 CUBIC YARDS OF CONCRETE.
4. CONCRETE SHALL BE 3000 P.S.I. AT 28 DAYS MINIMUM.
5. ALL FITTINGS AND FITTING JOINTS MUST BE WRAPPED IN THREE LAYERS OF 8-MIL POLYETHYLENE IN ACCORDANCE WITH AWWA C105.
6. 12"x12"x4" THICK CONCRETE BLOCK SHALL BE PLACED DIRECTLY UNDER ALL VALVES, FITTINGS, ETC.



THRUST BLOCK ANCHORING DETAIL

NOT TO SCALE

| | | | |
|---|---|---|---|
| PROPERTY OF CRYSTAL CLEAR | THRUST BLOCK ANCHORING DETAILS | M&S ENGINEERING | APPROVED: JUNE 2016 / REVISION: APR 2016 |
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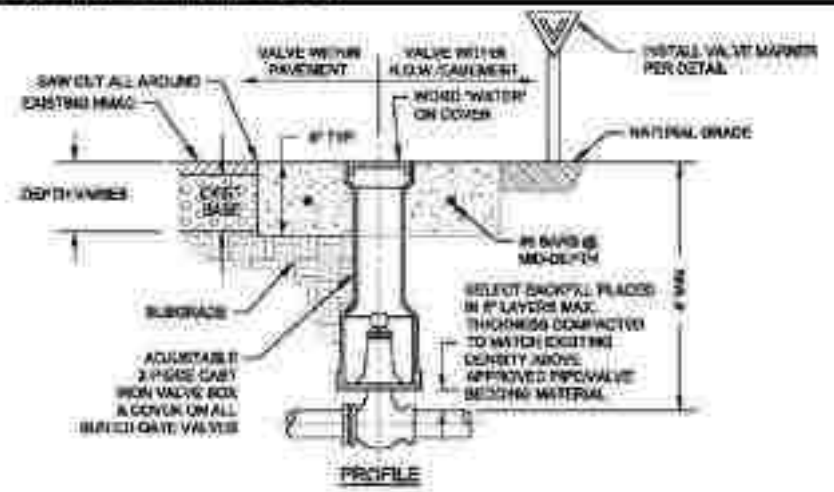
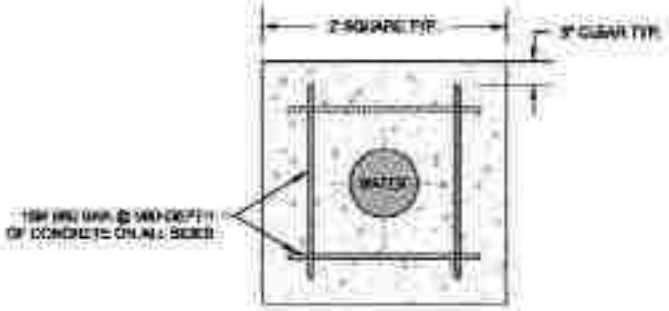



PROFILE




PLAN

NOTES:

1. VALVES BURIED SHALL BE FITTED WITH A PLASTIC VALVE ID TAPE (BLUE RIBBED) 3-1/2" X 2-3/4") INDICATING OWNER (CCSUD) VALVE SIZE, YEAR OF INSTALLATION AND # OF TURNS TO OPEN.
2. SUBGRADE SHALL BE COMPACTED AS PER SPEC OF CATCHES
3. VALVE CASTINGS SHALL BE ADJUSTED TO GRADE AFTER FINAL LIFT OF OVERLAY IS IN PLACE.
4. CLEAN VALVE BOX OF ALL DEBRIS DOWN TO THE BASE OF THE VALVE.
5. REMOVE EXISTING SEWER PIPE DOWN 18" AND REPLACE TO THE NEW ELEVATION USING NEW PIPE AND A COLLAR CASTING.
6. WHEN CAST IRON CASTINGS TO BE REMOVED ROUTINE EXCAVATION GREATER THAN 30" DEEP, CONTRACTOR MAY ELECT TO FILL EXCAVATION WITH CONTROLLED LOW STRENGTH MATERIAL TO THE UNDERSIDE OF THE CONCRETE PAVEMENT PATCH IN LIEU OF COMPACTED BACKFILL.
7. REINFORCING STEEL SHALL MEET SPECIFICATIONS.
8. VALVE BOXES MUST BE INSTALLED IN A STRAIGHT, VERTICAL POSITION.
9. VALVE MARKERS SHALL BE INSTALLED BEHIND EACH VALVE BOX WHEN VALVE IS LOCATED WITHIN EASEMENT OR ELSEWHERE.

NOT TO SCALE

| | | | |
|---|---|---|---|
| PROPERTY OF CRYSTAL CLEAR | TYPICAL IRON VALVE BOX DETAILS | M&S ENGINEERING | APPROVED: JUNE 2016 / REVISION: AUGUST 2018 |
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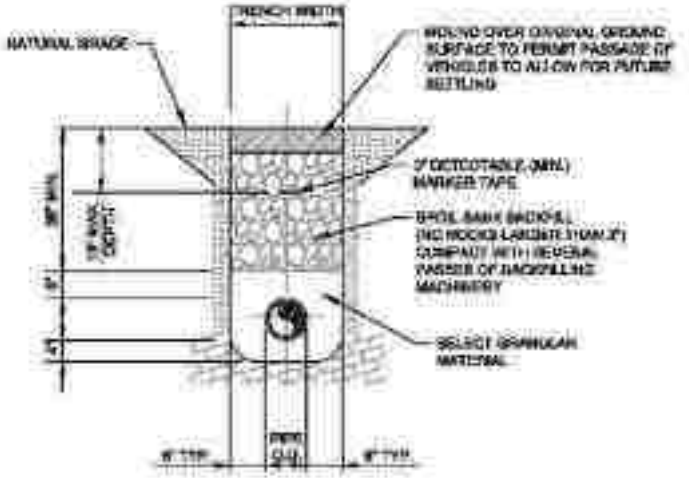



TRENCHING NOTES

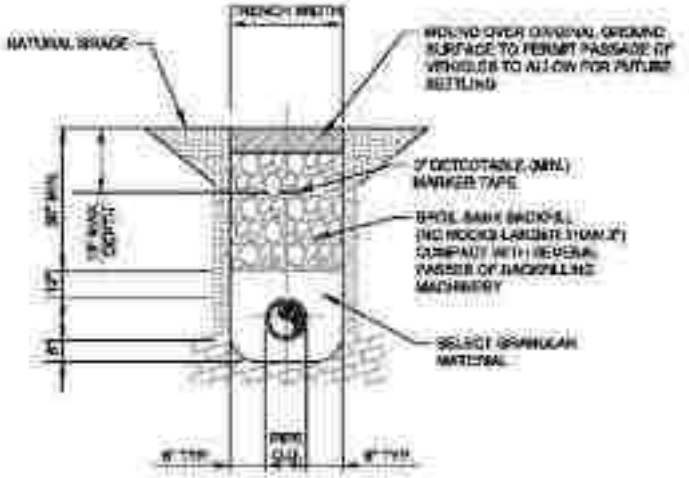
1. ADEQUATE BARRICADES & WARNING SIGNS SHALL BE ERECTED BEFORE ANY WORK IS STARTED IN PUBLIC RIGHT-OF-WAY.
2. REFER TO SPECIFICATIONS FOR ANY SPECIAL REQUIREMENTS OR CONDITIONS.
3. BACKFILL SHALL BE COMPLETED IMMEDIATELY AFTER PIPELINE LAYING WITHIN PUBLIC RIGHT-OF-WAYS OR CROSSING PUBLIC RIGHT-OF-WAYS & PRIVATE DRIVEWAYS.

TRENCH SAFETY NOTES

1. TRENCH SAFETY SYSTEM, SHORING OR SIDE SLOPES TO BE IN ACCORDANCE WITH OSHA STANDARDS.
2. TRENCH SAFETY SYSTEM PLAN TO BE PROVIDED BY CONTRACTOR PRIOR TO CONSTRUCTION.

NOT TO SCALE

| | | | |
|---|---|---|---|
| PROPERTY OF CRYSTAL CLEAR SPECIAL UTILITY DISTRICT | TYPICAL TRENCH BACKFILL 4-INCH OR SMALLER WATER LINES DETAIL | M&S ENGINEERING | APPROVED: JUNE 2018 / REVISION: APRIL 2019 / SHEET 1 OF 1 |




TRENCHING NOTES

1. ADEQUATE BARRICADES & WARNING SIGNS SHALL BE ERECTED BEFORE ANY WORK IS STARTED IN PUBLIC RIGHT-OF-WAY.
2. REFER TO SPECIFICATIONS FOR ANY SPECIAL REQUIREMENTS OR CONDITIONS.
3. BACKFILL SHALL BE COMPLETED IMMEDIATELY AFTER PIPELINE LAYING WITHIN PUBLIC RIGHT-OF-WAYS OR CROSSING PUBLIC RIGHT-OF-WAYS & PRIVATE DRIVEWAYS.

TRENCH SAFETY NOTES

1. TRENCH SAFETY SYSTEM, SHORING OR SIDE SLOPES TO BE IN ACCORDANCE WITH OSHA STANDARDS.
2. TRENCH SAFETY SYSTEM PLAN TO BE PROVIDED BY CONTRACTOR PRIOR TO CONSTRUCTION.

NOT TO SCALE

| PROPERTY OF CRYSTAL CLEAR | TYPICAL TRENCH BACKFILL 6-INCH AND LARGER WATER LINES DETAIL | M&S ENGINEERING | APPROVED: JUNE 2016 | REVISION: APRIL 2019 |
|---|---|---|---|---|
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# Orenco Sewer Equipment Specifications

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# PART 1 GENERAL

## 1.01 DEFINITIONS

A. Wherever used in these specifications and printed with initial bold capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof.

1. *Bid* – The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the work to be performed.
2. *Bidder* – The individual or entity who submits a Bid directly to the Owner.
3. *Contractor* – The individual or entity with whom Owner has entered into the agreement.
4. *Engineer* – The individual or entity named as such in the agreement.
5. *Inspector* - The specific individual designated by the Owner, Engineer, Contractor, and Manufacturer to ensure quality control by inspecting and certifying that each STEP/STEG unit is in compliance with the Manufacturer's recommendations and requirements.
6. *Manufacturer* – A supplier, fabricator, distributor, materialman, or vendor having a direct contract with Contractor or Owner to furnish materials or equipment to be incorporated in the work by contractor.
7. *Owner* – The individual or entity with whom Contractor has entered into the agreement and for whom the work is to be performed.

## 1.02 GENERAL DESCRIPTION

The **MANUFACTURER** shall furnish a complete factory built and tested STEP pump package(s), each consisting of a pump vault, effluent screen, discharge assembly, anti-siphon valve, ball valve, check valve, splice box, and controls.

## 1.03 SUBMITTALS

The **MANUFACTURER** shall furnish six (6) sets of shop drawings and technical data sheets. The submittals shall clearly specify the materials of construction, equipment compatibility, along with drawings for each unique package being supplied.

## 1.04 OR-EQUAL EVALUATIONS

A. Throughout the equipment specifications you will find the term "or approved equal." For this project, this term "approved equal" shall mean equal in the judgment of the **ENGINEER**. Should the **CONTRACTOR** seek approval of a product other than the brand or brands named in the specifications, it shall furnish written evidence that such product conforms in all respects to the specified requirements, and that it has been used successfully elsewhere under similar conditions. It will not be the responsibility of the **ENGINEER** to research, review, or determine equality, nor the responsibility of the **MANUFACTURER** specified within these specifications to provide research, documentation, or data supporting the difference between the "or equal" and the specified product. This will be the sole responsibility of the **CONTRACTOR** seeking the approval.

B. Where the specified requirements involve conformance to recognized codes or standards, the **BIDDER** shall furnish evidence of such conformance in the form of test or inspection reports, prepared by a recognized agency, and bearing an authorized signature. Manufacturer's standard data and catalog cut sheets will not be considered sufficient in themselves, and the **ENGINEER** will not be responsible for seeking further data from the manufacturer, or for otherwise researching the product. Failure to provide complete data will be cause for rejection of the product. The submission shall include any impacts that could be expected

from the alternative product and shall also indicate any product that would require a license or royalty, the actual fees, and a note that these fees would be handled by the **BIDDER**. The **BIDDER** shall provide submissions; meeting the above parameters no less than TWO WEEKS prior to **BID** opening for review by the **ENGINEER**. **CONTRACTORS** seeking approval of "or equal" products or systems shall provide, at minimum, the following.

C. Product/System submittals, including, but not limited to;

The number of years the **MANUFACTURER** has been in business of manufacturing relevant products/systems.

a. Size of company, including
    1) Number of employees related to relevant products/systems
    2) Number of engineers on staff related to relevant products/systems
b. Product specifications and a detailed description of how each product or component is "equal" to the specified product, system, or component. A side by side comparison is required.
    1) Equipment/system warranty along with exclusions
    2) Performance claims, including, but not limited to;
        a) Effluent filter design
            - Flow area
            - Surface area
            - Maintenance frequency
        b) Pump motor description
            - Manufacturer and origin
            - Length of service
            - Number of units in operation
            - Life-cycle cost (repair and replacement frequency)
            - Warranty
        c) Pump liquid end description
            - Manufacturer and origin
            - Length of service
            - Number of units in operation
            - Life-cycle cost (repair and replacement frequency and cost). Note liquid ends must be removeable, repairable, and cleanable.
            - Warranty
        d) Corrosion resistance
        e) Pump Lead description
            - Lead must be SOOW, extra heavy duty cord (600V) CSA approved.
        f) Control panel components
            - Manufacturer and origin
            - Length of service
            - Number of units in operation
            - Warranty
            - Enclosure description
c. Evidence of successfully obtaining approval for a system with similar permit requirements with the regulating authority
d. Summary of product/system track record and history, including, but not limited to;
    1) Number of similarly sized systems
    2) Detailed summary of, at minimum, ten (10) similarly sized systems, at least five (5) years old, including, but not limited to;
        - Project name, location, and application
        - Years in operation
        - Current average daily flows and design flows

- Operator name and contact information

1. **BIDDER** shall specify and furnish documentation related to manufacturer (or representative) support services, including, but not limited to;
    1) Installation training program and support material
    2) Installation oversight program and support material
    3) Operator training program and support material
    4) Startup services program and support material

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

E. **CONTRACTOR** may not knowingly contract with a supplier or manufacturer if the individual or entity who prepared the plans and specifications has a corporate or financial affiliation with the supplier or manufacturer. Owner's officers, employees, or agents shall not engage in the award or administration of this Contract if a conflict of interest, real or apparent, would be involved. Such a conflict would arise when: (i) the employee, officer or agent; (ii) any member of their immediate family; (iii) their partner or (iv) an organization that employs, or is about to employ, any of the above, has a financial interest in **CONTRACTOR** . Owner's officers, employees, or agents shall neither solicit nor accept gratuities, favors or anything of monetary value from **CONTRACTOR** or subcontractors.

F. During the bidding process, any approved "or equal" or substitute shall be accepted by the **ENGINEER** and released in as an addendum to the Contract Documents.

1.05 EXPERIENCE CLAUSE

The equipment furnished shall be manufactured and supplied by a company experienced in the design and manufacture of effluent sewer systems. **MANUFACTURERS** shall have at minimum ten (10) years experience in the design and manufacture of effluent sewers systems of similar size and equipment specified. **MANUFACTURERS** shall have at minimum of twenty-five (25) successful installations of effluent sewer systems, with each installation having a minimum of ten (10) pumps discharging into a common force main.

1.06 MANUFACTURER

The **MANUFACTURER** shall be Orenco Systems®, Inc. or approved equal. The **MANUFACTURER** shall furnish a complete factory built STEP pump package(s), each consisting of a pump vault, effluent screen, discharge assembly, anti-siphon valve, ball valve, check valve, splice box, and controls. The **MANUFACTURER** shall supply detailed installation and O&M instructions**.** The **MANUFACTURER** shall also provide the following support personnel:

- Professional engineer or personnel under the direct supervision of a professional engineer dedicated to supporting the project through design, construction, and O&M.
- Asset Management Department dedicated to assisting operators with operational and maintenance activities.

1.07 WARRANTY

The effluent system pump **MANUFACTURER** shall provide a warranty of five (5) years to include, but not limited to the pump vault, hose and valve assembly, control panel, splice box and a separate warranty of ten (10) years for the effluent pump. Warranty term shall ensue after

**OWNER'S** acceptance and system startup procedures are complete. The **MANUFACTURER** shall submit detailed exclusions from the warranty or additional cost items required to maintain the equipment in warrantable condition. The warranty shall be documented in product literature.

1.08 SERVICABILITY

The STEP package(s) shall be completely serviceable, with easy access to the pump(s), effluent screen, and floats. The pump shall be designed for removal without removing the effluent screen and floats.

1.09 PUMPS

The pump must be approved for use in pump vault as described in these specifications. Pump shall be 1/2 to 1.5 hp, 115/230 VAC, single phase, 60 Hz, two-wire motor, with 10 foot long extra heavy duty (SOOW) electrical cord with ground. The pumps must be submersible High-Head Effluent pumps. Pumps shall be UL and CSA listed for use with effluent. The pumps must have a minimum 24-hour run dry capability without water lubrication. The pumps shall have a 1/8-inch bypass orifice to ensure flow circulation for motor cooling and to prevent air bind. The pump shall have a floating impeller design to protect against up thrust and increase pump life. The pump liquid ends must be repairable (by replacing impellers and/or diffusers) for better long-term cost of ownership. The motor must be rated for continuous use and frequent cycling, at least 100 cycles per day. The motor cable must be suitable for Class 1, Division 1 and 2 applications. The pumps shall be lightweight for easy removal and maintenance. The pump intake screen must be 1/8-inch mesh polypropylene. The pump shall have internal thermal overload protection and internal lightning protection. All pumps shall undergo 3-point (Dead head, Design Flow, and Design Flow + 30%) wet testing at the factory to confirm performance.

1.10 BUILDING SEWER

Building side sewers shall be watertight and installed by a Contractor licensed to such work as per the local and state licensing requirements. Building sewer materials, installation and testing shall be per the current local plumbing code.

PART 2 TANKS

2.01 GENERAL REQUIREMENTS

A. The **MANUFACTURER** shall provide the structural design and certification to the **ENGINEER** for review. The design shall be in accordance with accepted engineering practice. Precast concrete or fiberglass or polyethylene tanks shall have been designed by a registered engineer and approved by state or local regulatory agencies or authorities. To achieve effective performance and minimize pump-out occurrences, residential interceptor tanks shall have a nominal liquid capacity of 1,250 gallons for up to 4 bedrooms, 1,500 gallons for up to 5 bedrooms, and, for more than 5 bedrooms, the sizing shall be determined based on an occupancy assessment and shall be in accord with Figure 1.

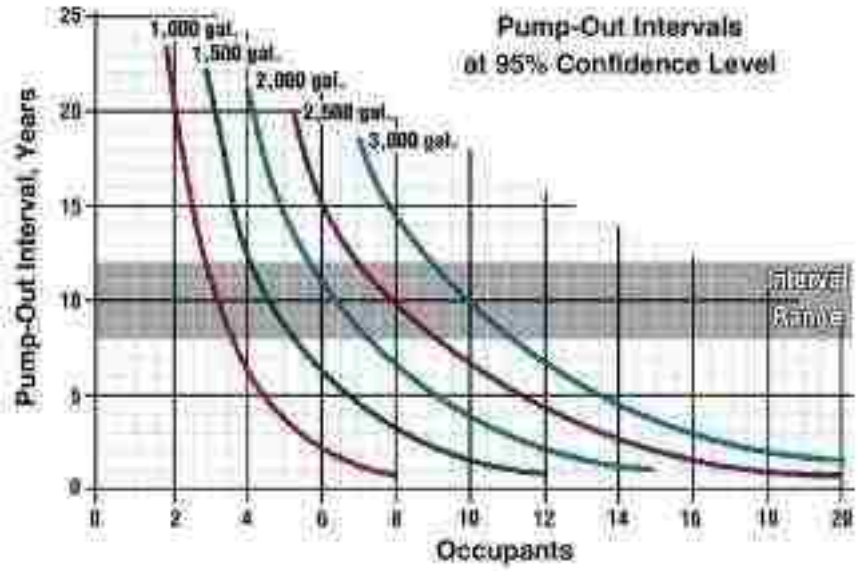



**Figure 1. Interceptor Tank Pump-Out Intervals**

B. Average flow ($Q_a$) is based upon typical weekly discharges. Wastewater flows for single-family dwellings typically range from *40 to 60 gallons per capita per day (gpcd)*; **50 gpcd** is a commonly used design parameter and is the value used in calculations herein. The number of individuals (capita) is assumed to average three per dwelling. Typical occupancies and flow relationships are shown in Table 1.

a. Table 1: Relationship between Number of Bedrooms, Occupancies, and Flow

| **Bedrooms** | **$Q_p$**[a] *gpd/DU* | **Occupants**[b] *capita* | **$Q_c$** *gpcd* | **$Q_a$** *gpd/DU* |
|---|---|---|---|---|
| 1 | 200 | 2 | 55 | 110 |
| 2 | 300 | 3 | 50 | 150 |
| 3 | 375 | 4 | 50 | 200 |
| 4 | 450 | 5 | 45 | 225 |

*a. Peak day bedroom flows ($Q_p$) are based on typical administrative rules.*

*b. Occupancy is based on typical usage of two occupants for the first bedroom and one occupant per additional bedroom.*

C. Loading Criteria:

a. There shall be 140 lbs./cu.ft. for minimum weight of saturated backfill, or 127 lbs./cu.ft. for unsaturated backfill (500 lbs./sq.ft. minimum).
b. Minimum lateral loading shall be 62.4 lbs./cu.ft. Lateral loading shall be determined from ground surface.
c. The tank shall also support a concentrated wheel load of 2500 lbs.

D. There are four (4) typical loading conditions that should be analyzed:

1. 4 ft. Bury + Full Exterior Hydrostatic Load
2. 4 ft. Bury + Full Exterior Hydrostatic Load + 2500 lb. Wheel Load.
3. 1 ft. Bury + 2500 lb. Wheel Load.
4. Tank Full, Interior Hydrostatic Load and Unsupported by Soil.

*Load Case 4 represents the tank full of liquid at 62.4 lbs/cu.ft. This condition addresses seam and haunch stress-strain relationships that occur during watertightness testing, as well as poor soil bedding conditions that provide inadequate support.*

E. Tanks requiring deep burial (>48") or subject to truck or heavy traffic loading require special consideration. (A minimum soil cover of 12" shall be used, unless specified otherwise by **MANUFACTURER**.)

F. All tanks shall be structurally sound and watertight and shall be guaranteed in writing by the tank **MANUFACTURER** for a period of two years from the date of final acceptance. **MANUFACTURER'S** signed guarantee shall accompany **BID**. The tank guarantee/warranty shall be furnished at the time of submittal. Tank warranty shall not be limited liability to replacement cost of the tanks. The interceptor tank shall be capable of withstanding long-term hydrostatic loading, in addition to the soil loading, due to a water table maintained at ground surface.

G. Tanks shall be manufactured and furnished with access openings 20" in diameter and of the configuration shown on the manufacturer's drawings. Modification of completed tanks will not be permitted.

H. Inlet plumbing shall include an inlet tee that penetrates 18" into the liquid from the inlet flow line. (The depth may vary depending on the tank's height; in all cases, though, the inlet should extend to a level below the bottom of the maximum scum depth.) The inlet plumbing shall allow for natural ventilation back through the building sewer and vent stack.

I. Tanks shall be capable of successfully withstanding an aboveground static hydraulic test and shall be individually tested.

J. All tanks shall be installed in strict accordance with the **MANUFACTURER'S** recommended installation instructions

## 2.02 CONCRETE TANKS

A. All concrete tanks will be pre-approved by the ENGINEER. Walls, bottom and top of reinforced concrete tanks shall be designed across the shortest dimension using one-way slab analysis. Stresses in each face of monolithically constructed tanks may be determined by analyzing the tank cross-section as a continuous fixed frame.

B. The walls and bottom slab shall be poured monolithically; alternatively, water stops may be provided. Mid-seam or clamshell tanks are not acceptable.

C. Reinforcing steel shall be ASTM A-615 Grade 60, fy = 60,000 psi. Details and placement shall be in accordance with ACI 315 and ACI 318.

D. Concrete shall be ready-mix with cement conforming to ASTM CI50, Type II. It shall have a cement content of not less than six (6) sacks per cubic yard and maximum aggregate size of 3/4". Water/cement ratio shall be kept low (0.35±), and concrete shall achieve a minimum compressive strength of 4000 psi in 28 days. The Contractor shall submit a concrete mix design to the **ENGINEER** for review and approval. Three (3) concrete sample cylinders shall be taken and tested for each tank manufactured until the **MANUFACTURER** and **ENGINEER** are satisfied that the minimum compression strength is being obtained. To ensure compliance, the **MANUFACTURER** shall then make and set three (3) sample cylinders for a minimum of 20% of the remaining tanks at the discretion of the **ENGINEER** . If the minimum compressive strength is not being obtained, the **MANUFACTURER** shall be required to make and test sample cylinders for each tank manufactured. Calcium chloride will not be allowed in the mix design. The cost of testing cylinders shall be the tank **MANUFACTURER'S** responsibility. The tank manufacturer may supply a Swiss hammer for compressive testing in the field in lieu of sample cylinders.

E. Tanks may be protected by applying a heavy cement-base waterproof coating, on both inside and outside surfaces, in compliance with Council of American Building Officials (CABO) report #NRB-168; 6181; however, the tank should be watertight without the addition of seal coatings.
F. Form release used on tank molds shall be Nox Crete™ or approved equal. Diesel or other petroleum products are not acceptable.
G. Tanks shall not be moved from the manufacturing site to the job site until the tank has cured for seven (7) days or has reached two-thirds of the design strength.
H. Tanks shall be manufactured and furnished with access openings of the size and configuration to accommodate individual packaged pump systems. The risers can be cast into the tanks.
I. The septic tank and the top slab shall be sealed with a preformed flexible plastic gasket. The flexible plastic gasket shall be equal to the flexible butyl resin sealant congeal CS-102 or CS-202 as manufactured by Concrete Sealants, Inc. of New Carlisle, Ohio, and shall conform to federal specification SS-S-00210(2iOA) and AASHTO M-198. A mechanical fastening method shall be used if the seasonal groundwater level may reach the top slab seam of the tank.
J. In order to demonstrate watertightness, tanks shall be tested at the factory and again on-site prior to acceptance. Inlets to the septic tank will be watertight pipe seal Cast-A-Seal™ (Manufactured by Press-Seal Gasket Corporation) or approved equal. Each tank shall be tested at the factory, prior to shipping, by filling with water to the soffit and letting stand. After 24 hours, the tank shall be refilled to the soffit and the exfiltration rate shall be determined by measuring the water loss during the next two (2) hours. Any leakage shall be cause for rejection. After installation is completed and before backfilling, each tank shall be filled with water to a point 2" above the top of the tank and the water loss measured after a twenty four-hour period. After it has been determined that there is no leakage, test the access riser seam. Backfill to a minimum depth of 2" above the riser seam to prevent damage from hydrostatic uplift. Fill the tank to a point 2" above the riser seam (the field test period may be reduced to not less than two (2) hours). No tank will be accepted if there is any leakage over the two (2) hour period.

## PART 3 TANK ACCESS EQUIPMENT

### 3.01 RISERS

Risers **MANUFACTURER** shall be Orenco Systems®, Inc. Risers shall be required for access to internal vaults and access into the septic tanks for septage pumping. All risers shall be constructed watertight. The risers shall be attached to the tanks such that a watertight seal is provided. Risers shall extend 3" above original grade to allow for settlement and to ensure positive drainage away from the access. Risers for inspection ports shall be a minimum of 18" in nominal diameter. Risers containing pumping assemblies or electrical splice boxes shall be a minimum of 24" in diameter and shall be of sufficient diameter to allow removal of internal vaults without removing splice boxes, etc. Risers shall be a minimum of 30" in nominal diameter when the depth of bury is 36" or greater or duplex pumping assemblies are used. All other risers shall be a minimum of 24" in nominal diameter and shall vary in height depending on the depth of bury on the various tanks. Adhesive required to adhere the PVC or fiberglass risers to either fiberglass or ABS tank adapters shall be a two-component methacrylate structural adhesive or approved equal. To ensure product compatibility, a single manufacturer shall supply risers, lids, and attachment components.

### 3.02 INLET RISERS

Inlet risers shall be Orenco Systems®, Inc. Model Ultra-Rib, KOR FLO or **ENGINEER**-approved equal. The material shall be PVC as per ASTM D-1784 and tested in accordance with AASHTO M304M-89. The risers shall be constructed of non-corrosive material and designed-to-be buried in soil. Risers shall have a minimum stiffness of 10 psi, when tested according to

ASTM D2412. Risers shall be capable of withstanding a truck wheel load (54 square inches) of 2,500 pounds for 60 minutes with a maximum vertical deflection of a 1/2 an inch. Risers shall extend to 3 inches above the ground surface to allow for settlement and shall have a minimum nominal diameter of 18 inches.

## 3.03 OUTLET RISERS

Outlet risers shall be Orenco Systems®, Inc. Model Ultra-Rib, KOR FLO or engineer-approved equal. The material shall be PVC as per ASTM D-1784 and tested in accordance with AASHTO M304M-89. The risers shall be constructed of non-corrosive material and designed-to-be buried in soil. Risers shall have a minimum stiffness of 10 psi, when tested according to ASTM D2412. Risers shall be capable of withstanding a truck wheel load (54 square inches) of 2,500 pounds for 60 minutes with a maximum vertical deflection of 1/2 an inch. Risers shall be at least 12 inches high, shall have a minimum nominal diameter of 24 inches for simplex pumping applications or 30 inches when used in a duplex pumping application and shall be factory-equipped with the following:

## 3.04 RISER-TO-TANK ATTACHMENT

If risers are not cast into the tank lids, then all attachment components shall be constructed of waterproof, non-corrosive materials, such as PVC, ABS, fiberglass, or stainless steel. Adhesives and sealants shall be waterproof, corrosion resistant and approved for the intended application. The riser-to-tank connection shall be watertight and structurally sound. The riser-to-tank connection shall be capable of withstanding a vertical uplift of 5000 pounds to prevent riser separation due to tank settlement, frost heave, or accidental vehicle traffic over the tank. Risers shall be attached to tanks with one of the following attachment systems, or approved equal:

a. Orenco Systems®, Inc. Model PRTA24-2 (24” diameter riser) tank adapter cast into tank lid and a two-component methacrylate structural adhesive for the riser connection.

b. Orenco Systems®, Inc. Model RRFTA30 (30” diameter riser) tank adapter bolted down to the tank lid using Orenco’s bolt down kit, Model RRFTA30BDKIT (stainless steel concrete anchor bolts and butyl sealant tape), and a two-component methacrylate structural adhesive for the riser connection.

## 3.05 LIDS

One lid shall be furnished with each access riser. Lids shall be Orenco Systems®, Inc. DuraFiber Model FLD24G, or FLD30G or **ENGINEER**-approved equal, as appropriate, fiberglass with green non-skid finish, and provided with stainless steel bolts. **MANUFACTURER** shall provide evidence that lids have been used successfully in continuous field service for a minimum of five years to demonstrate long-term integrity and suitability for the application. Lids shall be waterproof, corrosion resistant and UV resistant. Lids shall be flat, with no noticeable upward dome; a crown or dome of no more than 1/8” is allowable. Lids shall not allow water to pond on them. Lids shall have a green non-skid finish. Self-lubricating plastics, such as polyethylene, shall not be considered non-skid without addition of a non-skid coating. Lids shall form a watertight seal with the top of riser. Lids shall be capable of withstanding a truck wheel load (81 square inches) of 2500 pounds for 60 minutes with a maximum vertical deflection of 3/4 of an inch. Lids shall be provided with tamper-resistant stainless steel fasteners and a tool for fastener removal. Tamper-resistant fasteners include recessed drives, such as hex, Torx, and square. Fasteners that can be removed with common screwdrivers, such as slotted and Phillips, or fasteners that can be removed with standard tools, such as pliers or crescent wrenches, are not considered tamper-resistant. To prevent a tripping hazard, fasteners shall not extend above the surface of the lid. Optional components may include the following:

a. Traffic bearing lid: The traffic bearing lid shall be a cast iron frame and cover, part number 6024, 3060, 4036, as manufactured by Sather Manufacturing Co., Inc., or approved equal, which will fit over a standard lid. The cover shall have the word SEWER cast into it.

3.06 RISER INSTALLATION

Riser installation shall be accomplished according to the **MANUFACTURER'S** instructions. For cold weather areas, risers shall be backfilled with 3/8" pea gravel or other similar granular material to prevent frost heave.

PART 4 SEPTIC TANK EFFLUENT PUMPING ASSEMBLIES (SINGLE FAMILY RESIDENCES)

The Collection System On-Lot Package shall be certified to have been manufactured by Orenco Systems®, Inc., Sutherlin, Oregon. Orenco shall provide a unique Certificate of Origin with each Collection System On-Lot Package that lists all products in the Collection System On-Lot Package. Orenco warrants that any Products that comprise a Collection System On-Lot Package that are sold under an Orenco Certificate of Origin, will be free from defects in materials and workmanship for a period of five (5) years, with the exception of the pump which will be for a period of ten (10) years from the date of installation of the equipment, in accordance with, and subject to, the terms and conditions in effect at the time of sale.

Pump package systems shall be manufactured by Orenco Systems®, Inc. High-Head Pumping Assemblies or **ENGINEER**-approved equal, composed of:

4.01. RISERS AND LIDS

See PART 3.

4.02 PUMP VAULT

Orenco Systems®, Inc. Model PVU Series, Universal Biotube® Pump Vault or **ENGINEER**-approved equal, installed in conformance with the **ENGINEER'S** plans. The filter shall have a minimum effective screen area of no less than 14.5 square feet. The Biotube pump vault shall consist of a 12-inch diameter polyethylene vault with eight (8) 2-inch diameter holes evenly spaced around the perimeter, located appropriately to allow for maximum sludge and scum accumulation before requiring pumping (approximately 70% of minimum liquid level). Housed inside the polyethylene vault shall be the Biotube assembly consisting of 1/8-inch mesh polypropylene tubes. Attached to the vault is a flow inducer to accept one or two high-head effluent pumps.

4.03 DISCHARGE HOSE AND VALVE ASSEMBLY

For most single-family residences, Orenco Systems®, Inc. Model HV100BFCASQPRX or **ENGINEER**-approved equal. Discharge assembly shall be 1-inch diameter and include 150 psi PVC ball valve, anti-siphon valve, flow controller, high pressure flex hose with working pressure rating of 250 psi, and Schedule 40 PVC pipe with cam coupler adapter for quick disconnect.

4.04 FLOAT SWITCH ASSEMBLY

Float switch shall be mercury-free Orenco Systems®, Inc. Model MFPB with two mechanical switch floats mounted on a PVC stem attached to the filter cartridge. The floats must be adjustable and must be removable without removing the pump vault. The high level alarm and on/off function shall be preset as shown in the **ENGINEER'S** plans. Each float lead shall be secured with a nylon strain relief bushing at the splice box. The on/off float shall be rated for a minimum of 5.0A @ 120 VAC.

4.05 HIGH-HEAD EFFLUENT PUMP

All pumps shall comply with general requirements set forth in section I (above). Residential pumps shall be an Orenco Systems®, Inc. Model PF100511CV, 1/2 hp, 115 VAC, single phase, 60 Hz, two-wire motor, with 10 foot long extra heavy duty (SOOW) heavy duty electrical cord with ground. Pump shall include an internal check valve and shall be capable of delivering 18 GPM at a pressure of 14 ft, 10 GPM at 171 ft, and 0 GPM at 250 ft. When used in conjunction

with a flow controller, the pump shall be capable of providing 5 gpm against a head of 190 feet.

## 4.06 ELECTRICAL SPLICE BOX

Orenco Systems®, Inc., Model SB series internal splice box or **ENGINEER**-approved equal, UL approved for wet locations, equipped with three (3) electrical cord grips and a 1-inch outlet fitting. Also included shall be UL listed waterproof wire nuts. The use of a UL-approved conduit seal kit accessible above ground shall be required to prevent the passage of gases, vapors, or flames through the conduit to the control panel. An additional UL classified sealant shall be added to the splice box coupling to prevent condensation accumulation in the splice box. The following UL approved sealants shall be used:

a. UL classified moisture-cure polyurethane quick drying foam or **ENGINEER**-approved equal with an R-5 rating for each inch of foam.

b. UL classified silicone sealant or **ENGINEER**-approved equal consiting of a neutral cure silicone, non-acetic, non-corrosive silicone able to withstand temperatures to 450° F.

## 4.07 CONTROLS AND ALARMS

Controls and alarms shall be listed per UL 508. Panels shall be repairable in the field without the use of soldering irons or substantial disassembly. For most single family home applications, an Orenco Systems®, Inc. Model S1 Series or **ENGINEER**-approved equal control panel meeting the following:

Standard Components

a. Motor-Start Contactor: 120 VAC, 1hp, 16 FLA, 60 Hz; 2.5 million cycles at FLA (10 million at 50% of FLA).

b. Toggle Switch: Single-pole, double-throw HOA switch. 20 amps, 1 hp.

c. Controls Circuit Breaker: 10 amps, OFF/ON switch. Single-pole 120 VAC. DIN rail mounting with thermal magnetic tripping characteristics.

d. Pump Circuit Breaker: 20 amps, OFF/ON switch. Single-pole 120 VAC. DIN rail mounting with thermal magnetic tripping characteristics.

e. Audio Alarm: 95 dB at 24", warble-tone sound.

f. Visual Alarm: 7/8" diameter red lens, "Push-to-silence." NEMA 4, 1-watt bulb, 120 VAC

g. Panel Enclosure: Measures 11.5" high x 9.3" wide x 5.4" deep. NEMA 4X rated. Constructed of UV-resistant fiberglass; hinges and latch are stainless steel.

h. S1 Panel Ratings: 120 VAC, 1 hp, 14 amps, single phase, 60 Hz.

## 4.08 INSTALLATION

All pumping system components shall be installed in accordance with the **MANUFACTURER'S** recommendations, the **ENGINEER'S** plans, and all state and local regulations.

## 4.09 LOCATION

The pump control panel shall be mounted on a post or exterior wall nearest the tank and pump. If mounting to an exterior wall, try to select a garage or outbuilding where the sound of the motor contactor engaging will not be noticed. If a garage or outbuilding wall isn't available, installation should include use of sound-deadening insulation. (Post and panel mounting assemblies are acceptable.) The control panel shall be located within 50 feet and in sight of the pump motor or shall be provided with a lockable disconnect switch. The panel, when possible, should be mounted in the shade and protected from the weather. The panel should be located at a convenient height (usually about five feet above the ground) and where it will be accessible for

maintenance.

## PART 5 SEPTIC TANK EFFLUENT PUMPING ASSEMBLIES (COMMERCIAL CONNECTIONS)

The Collection System On-Lot Package shall be certified to have been manufactured by Orenco Systems®, Inc., Sutherlin, Oregon. Orenco shall provide a unique Certificate of Origin with each Collection System On-Lot Package that lists all products in the Collection System On-Lot Package. Orenco warrants that any Products that comprise a Collection System On-Lot Package that are sold under an Orenco Certificate of Origin, will be free from defects in materials and workmanship for a period of five (5) years from the date of installation of the equipment, in accordance with, and subject to, the terms and conditions in effect at the time of sale.

Systems shall be Orenco Systems®, Inc. High-Head Pumping Assemblies or **ENGINEER**-approved equal, composed of:

### 5.01 TANK

See PART 2 above. Tank volumes and configurations serving commercial connections shall follow the most current edition of Orenco's AdvanTex Design Criteria, NDA-ATX-1, Table A. Recommended Minimum HRTs, Primary Tankage and Configurations.

### 5.02 RISERS AND LIDS

See PART 3 above.

### 5.03 PUMP VAULT

Orenco Systems®, Inc. Model PVU Series, Universal Biotube® Pump Vault or **ENGINEER**-approved equal, installed in conformance with the **ENGINEER'S** plans. The filter shall have a minimum effective screen area of no less than 14.5 square feet. The Biotube pump vault shall consist of a 12-inch diameter polyethylene vault with eight (8) 2-inch diameter holes evenly spaced around the perimeter, located appropriately to allow for maximum sludge and scum accumulation before requiring pumping (approximately 70% of minimum liquid level). Housed inside the polyethylene vault shall be the Biotube assembly consisting of 1/8-inch mesh polypropylene tubes. Attached to the vault is a flow inducer to accept one or two high-head effluent pumps. (Note: Commercial and multiple-user tanks may require a larger or multiple Biotube Pump Vaults, the sizes of which must be individually determined and spelled out in the specifications.)

### 5.04 DISCHARGE HOSE AND VALVE ASSEMBLIES

Orenco Systems®, Inc. Model HV125BCASQPRX or **ENGINEER**-approved equal, 1-1/4-inch diameter, 150 psi PVC ball valve, 150 psi PVC check valve, high pressure flex hose with working pressure rating of 250 psi, and Schedule 40 PVC pipe with cam coupler adapter for quick disconnect.

### 5.05 FLOAT SWITCH ASSEMBLY

Float switch shall be mercury free Orenco Systems®, Inc. Model MF3P with three switch floats mounted on a PVC stem attached to the filter cartridge. The floats must be adjustable and must be removable without removing the pump vault. The high/lag, pump on, pumps off and low-level alarms shall be preset as shown in the **ENGINEER'S** plans. Each float lead shall be secured with a nylon strain relief bushing at the splice box. The floats shall be UL or CSA listed.

### 5.05 COMMERCIAL HIGH-HEAD EFFLUENT PUMPS

All pumps shall comply with general requirements set forth in PART 1.10 (above). All commercial applications shall use Duplex (2) pumping systems for redundancy. Pumps shall be Orenco Systems®, Inc. Model PF Series High Head pump, 1.0 Hp, 230 VAC, single phase, 60 Hz, two-wire motor, with 10 foot long extra heavy duty (SOOW) heavy duty electrical cord with

ground. The pumps shall be capable of delivering 20 GPM at a pressure of 150 ft, 0 GPM at 255 ft, and 30 GPM at 39 ft.
Pump models and capabilities will vary based upon application and will vay by site.

## 5.06 ELECTRICAL SPLICE BOXES

Orenco Systems®, Inc. Model SBEX series external splice boxes or **ENGINEER**-approved equal, UL approved for wet locations, equipped with up to four (4) electrical cord grips and two 3/4-inch outlet fittings. Also included shall be UL listed waterproof butt splice connectors. The use of a UL-approved conduit seal kit accessible above ground shall be required to prevent the passage of gases, vapors, or flames through the conduit to the control panel. An additional UL classified sealant shall be added to the splice box coupling to prevent condensation accumalation in the splice box. The following UL approved sealants shall be used:

a. UL classified moisture-cure polyurethane quick drying foam or **ENGINEER**-approved equal with an R-5 rating for each inch of foam.

b. UL classified silicone sealant or **ENGINEER**-approved equal consisting of a neutral cure silicone, non-acetic, non-corrosive silicone able to withstand temperatures to 450° F.

## 5.07 CONTROLS AND ALARMS

Control panel shall be Orenco Systems®, Inc. MVP DAX Series. Control panel shall be a duplex control panel. Controls and alarms shall be listed per UL 508. Panels shall be repairable in the field without the use of soldering irons or substantial disassembly. Panel shall be Orenco Systems, Inc. Model MVP Series control panel meeting the following:

Standard Components

a. Programmable Logic Unit: 120/240 VAC programmable logic unit with built-in LCD screen and programming keys. Provides control functions and timing for panel operation**.**

b. Motor-Start Contactor: 120 VAC 16 FLA, 1 hp, 60 Hz; 2.5 million cycles at FLA (10 million at 50% FLA). 240 VAC 16 FLA, 3 hp, 60 Hz; 2.5 million cycles at FLA (10 million at 50% FLA).

c. Toggle Switch: Single-pole, double-throw HOA switch. 20 amps, 1 hp.

d. Controls Circuit Breaker: 10 amps, OFF/ON switch. Single-pole 120 VAC. DIN rail mounting with thermal magnetic tripping characteristics.

e. Pump Circuit Breaker: 20 amps, OFF/ON switch. Single-pole 120 VAC, double-pole 240 VAC. DIN rail mounting with thermal magnetic tripping characteristics.

f. Audio Alarm: 95 dB at 24", warble-tone sound.

g. Visual Alarm: 7/8" diameter red lens, "Push-to-silence." NEMA 4, 1-watt bulb, 120 VAC

h. Panel Enclosure: NEMA 4X rated, constructed of UV-resistant fiberglass or NEMA 4 rated, constructed of steel; hinges and latch are stainless steel. Conduit couplings provided.

i. MVP: Panel Ratings: 120 VAC, 1 hp, 16 amps, single phase, 60 Hz.; 240 VAC, 3 hp, 16amps, single phase, 60 Hz.

## 5.07 INSTALLATION

All pumping system components shall be installed in accordance with the **MANUFACTURER'S** recommendations, the **ENGINEER'S** plans, and all state and local regulations.

## 5.08 LOCATION

The **CONTRACTOR** shall locate the pump control panel on a post or exterior wall nearest the tank and pump. If mounting to an exterior wall, try to select a garage or outbuilding where the sound of the motor contactor engaging will not be noticed. If a garage or outbuilding wall isn't

available, installation should include use of sound-deadening insulation. (Post and panel mounting assemblies are acceptable.) The control panel shall be located within 50 feet and in sight of the pump motor or shall be provided with a lockable disconnect switch. The panel, when possible, should be mounted in the shade and protected from the weather. The panel should be located at a convenient height (usually about five feet above the ground) and where it will be accessible for maintenance.

5.09 SERVICE CONNECTION

Orenco Systems®, Inc. Model SC100 (1"), SC125 (1.25"), SC150 (1.5"), or SC200 (2") or **ENGINEER**-approved equal. Service connection will include a swing check valve factory connected to a ball valve. All components will be PVC Schedule 40 and rated for 150psi.

a. Service connection shall be enclosed in PVC access riser as manufactured by Orenco Systems®, Inc. or **ENGINEER**-approved equal. Risers shall extend to two inches above the ground surface to allow for settlement and shall have a minimum nominal diameter of 8-inches.

b. One lid shall be furnished with each access riser. Lids shall be Orenco Systems®, Inc. Model FL8G or **ENGINEER**-approved equal, fiberglass with green non-skid finish.

5.10 SERVICE LINE TESTING

An air compressor may be used to bring the line to its test pressure; the test is a success if the pressure holds for 60 seconds or more. Any leakage will require the line to be repaired and retested.. When the service line can be filled with water from the tank test, particularly if the service line is short and doesn't require a large volume to fill it, a small hand pump with pressure guage can be employed for the pressure test.

PART 6 TOOLS FOR SEPTAGE MEASUREMENT

6.01 SCUM MEASURING UTILITY GUAGE (SMUG)

**CONTRACTOR** shall provide a minimum of one scum measuring utility gauge. The gauge shall consist of a minimum 3/8" diameter stainless steel rod with an incremental scale for measuring scum levels. The rod shall be bent at a 90-degree angle at the base to aid in identifying the scum "by feeling." The gauge shall be Orenco Systems®, Inc. Model SMUG or **ENGINEER**-approved equal.

6.02 SLUDGE MEASURING DEVICE

**CONTRACTOR** shall provide a minimum of one **ENGINEER**-approved sludge-measuring device.

PART 7 FORCEMAIN COMPONENTS & TESTING

7.01 COMBINATION AUTOMATIC AIR/VACUUM RELEASE VALVE

A.R.I Model D-021 or **ENGINEER**-approved equal. Valve base shall be made of reinforced nylon and include a Buna N rubber base O-ring seal. Body shall be constructed of reinforced nylon housing a foamed polypropylene float and stainless steel stem. Valve will also include a polypropylene elbow to expel air horizontally. Valve shall be corrosion resistant and operable with a minimum line pressure of 3 psig.

a. Piping shall be Orenco Systems®, Inc. Model ARA or **ENGINEER**-approved equal. Piping shall be constructed of Schedule 40 PVC and include a 2-inch diameter PVC isolation valve, a 3/4-inch diameter PVC ball valve for bypass, and a pressure guage connection. All components shall be rated for 150psi working pressure.

b. Air release assembly shall be enclosed in ribbed PVC access riser as manufactured by Orenco Systems®, Inc. or **ENGINEER**-approved equal. The material shall be PVC as per ASTM D-1784 and tested in accordance with AASHTO M304M-89. Risers shall

extend to two inches above the ground surface to allow for settlement and shall have a minimum nominal diameter of 30.

c. Orenco Systems®, Inc. Model FLD30G or **ENGINEER**-approved equal, fiberglass with green non-skid finish, and provided with stainless steel bolts, and wrench. The riser and lid combination shall be sealed for watertightness and able to support a 2500 lb. wheel load. (Note: This is not to imply that PVC risers are intended for traffic areas.)

## 7.02 MANUAL VALVES

Orenco Systems®, Inc. Model ARA or **ENGINEER**-approved equal as listed above. Valves will include the following piping:

a. Piping shall be constructed of Schedule 40 PVC and include a 2-inch diameter PVC isolation valve, a 3/4-inch diameter PVC ball valve for bypass, and a pressure guage connection. All components shall be rated for 150 psi working pressure and allow the installation of a combination air/vacuum release valve.

b. Air release assembly shall be enclosed in ribbed PVC access riser as manufactured by Orenco Systems®, Inc. or **ENGINEER**-approved equal. The material shall be PVC as per ASTM D-1784 and tested in accordance with AASHTO M304M-89. Risers shall extend to two inches above the ground surface to allow for settlement and shall have a minimum nominal diameter of 30.

c. Orenco Systems®, Inc. Model FL30G or **ENGINEER**-approved equal, fiberglass with green non-skid finish, and provided with stainless steel bolts, and wrench. The riser and lid combination shall be sealed for watertightness and able to support a 2500 lb. wheel load. (Note: This is not to imply that PVC risers are intended for traffic areas.)

## 7.03 FORCEMAIN TESTING

A. The **CONTRACTOR** shall adhere rigorously to all hydrostatic testing procedures and requirements. Allowable AWWA leakages should be the maximum, not to be exceeded. Zero leakage should be the goal.

**Hydrostatic Test Procedure**

1. Fill the line with water to expel air.
2. Pressurize to the desired pressure at the lowest point.
3. Hold for two hours to ± 5 PSI of test pressure.
4. Accurately record time, pressure readings, and amount of leakage.
5. For further details, refer to AWWA C 600 Section 4.

**Allowable Loss Gal/Hr/1000 ft. of Line**

| Test Pressure | 3 in. | 4 in. | 6 in. | 8 in. | 10 in. | 12 in. |
|---|---|---|---|---|---|---|
| 150 psi | 0.28 | 0.37 | 0.55 | 0.74 | 0.92 | 1.10 |
| 125 psi | 0.25 | 0.34 | 0.50 | 0.67 | 0.84 | 1.01 |
| 100 psi | 0.23 | 0.30 | 0.45 | 0.60 | 0.75 | 0.90 |

$$L = \frac{S\ D\ \sqrt{(P)}}{133200}$$

Where:

L = Allowable leakage for push-on or mechanical joints, GPH. *

S = Length of pipe tested, feet.

D = Nominal pipe diameter, inches.

P = Average test pressure, PSI, at lowest location on test section.

*Add 0078 gal/hr/in of nominal valve size for each metal-seated gate valve pumped against.

B. Portions of the line that are critical or suspect should be left exposed throughout the hydrostatic test to allow visual inspection. Leaks detected visually should be repaired regardless of test results. The use of dye during initial filling and testing of a mainline section makes isolating leaks much easier especially in areas having high ground water.

C. Check valve failure in service lines is difficult to diagnose and may misrepresent mainline integrity. Therefore, service line connections should remain closed until mainline testing has been completed. Accurate records must be kept to assure all service line connections have been opened after the mainline system has been approved.

D. Testing long segments of line should be avoided whenever possible. A lengthy segment of line may pass the leakage test, yet still have an isolated leak that is excessive and which could prove to be a problem later. Testing shorter segments of line reduces this possibility and more readily isolates any leaks. The most common recommendation is to limit the test length to 12,000/D, where D is the diameter in inches and the length of the segment is in feet.

E Because air escapes from pipelines more rapidly than does liquid, it is important that all air is purged from a section of line prior to hydrostatic testing. Failure to do so may give misleading test results, possibly causing the section of line to appear to fail the test.

## PART 8 SUPPORT, TRAINING, TESTING, AND OVERSIGHT

### 8.01 PRECONSTRUCTION CONFERENCE

Before any work at the site is started, a conference attended by the **OWNER**, **CONTRACTOR**, **ENGINEER,** and **MANUFACTURERS (or their** agents) and others as appropriate will be held to establish a working understanding among the parties as to the work involved for installing each STEP unit. At this conference, the **OWNER**, **CONTRACTOR**, **ENGINEER**, and **MANUFACTURER** shall designate, in writing, a specific individual to act as **INSPECTOR** for the installation of each STEP unit. Any cost or fees associated with the services of the **INSPECTOR** or the **ENGINEER** during construction will be the responsibility of the **OWNER.**

### 8.02 INSTALLATION AND FIELD TESTING TRAINING

A. The **MANUFACTURER** shall provide the services of a trained representative to instruct the installing **CONTRACTOR'S** crew and **INSPECTOR** regarding the proper installation and field testing of each STEP unit per the **MANUFACTURER'S** recommendations and requirements. The **MANUFACTURER** shall have a trained representative provide installation and field testing training services for a minimum of one (1) visit of a minimum of one (1) eight-hour day at the beginning of construction, unless the contracotr is already familiar with installing Manufacturer's STEP systems.

B. As part of the **MANUFACTURER's** installation training and to help ensure that subsequent installations are installed in accordance with **MANUFACTURER's** installation instructions, the **MANUFACTURER** or an approved representative, shall inspect and submit an inspection checklist report for the first (complete) installation. Subsequent installations shall

not commence until the first install is inspected by the **MANUFACTURER**, **INSPECTOR**, and accepted by the **ENGINEER**.

8.03 QUALITY CONTROL

A. To ensure quality control, the **INSPECTOR** shall inspect and certify that an initial installation of each STEP unit is in compliance with the **MANUFACTURER'S** recommendations and requirements, using the "Orenco Sewer Inspection Checklist" online form that can be found here: http://forms.orenco.com/cn/a3spb/orencosewerinspectio

B. Upon completion of the inspection, the **INSPECTOR**, in coordination with the **ENGINEER**, shall perform or direct the **CONTRACTOR** to perform any required adjustments to the equipment and place into operation under the supervision of the **ENGINEER**. All equipment and materials required to perform the testing shall be the responsibility of the **CONTRACTOR.** The completed inspection checklist shall be signed by the **INSPECTOR** and copies emailed to the **ENGINEER** and **MANUFACTURER** within one (1) week of each corresponding STEP unit being installed and prior to System Commissioning.

8.04 SYSTEM COMMISSIONING

A. The **MANUFACTURER** shall provide the services of a trained representative for training the **OWNER'S** service provider, and, when directed, randomly inspecting STEP installation's throughout the project. The inspection will include items covered in "Orenco Sewer Inspection Checklist" as well as the effluent package, wiring, and control panel placement. Upon system commissioning, the **MANUFACTURER'S** trained representative shall provide the **ENGINEER** a written report of findings. The **ENGINEER** should then perform or direct the **CONTRACTOR** to perform any required adjustments to the equipment and place into operation. All equipment and materials required to perform additional testing shall be the responsibility of the **CONTRACTOR.**

B. The **MANUFACTURER** shall provide the services of a trained representative for a minimum of one (1) visit of a minimum of one (1) eight-hour day for the purpose of system commissioning.

PART 9 OPERATION AND MAINTENANCE

9.01 OPERATION AND MAINTENANCE MANUAL

The **MANUFACTURER** shall provide five (5) operation and maintenance manuals to be sent to the **OWNER.**

9.02 RECOMMENDED SPARE PARTS

One spare pump, six (6) spare floats, check valve, anti-siphon valve, controls, and various other necessary components for every 50 pump systems (to be purchased by the OWNER).

9.03 RECOMMENDED OPERATION AND MAINTENANCE TOOLS

A. BIOTUBE CARTRIDGE CLEANING CRADLE

Cradle shall be Orenco Systems®, Inc. Model OM-BIOTUBE CRADEL or **ENGNEER**-approved equal for housing the Biotube Biotube pump vault filter cartridges for cleaning and maintenance.

B. BIOTUBE CARTRIDGE CLEANING BRUSH

Brush shall be Orenco Systems®, Inc. Model OM-BIOTUBE BRUSH or **ENGINEER**-approved equal for cleaning Biotube pump vault filter cartridges.

M&S ENGINEERING

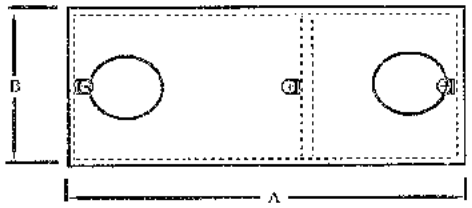
# Comal Concrete Products, Inc.

4222 FM 482 NEW BRAUNFELS, TX 78132
EMAIL:comalconcrete@comalconcrete.com
830-608-1699 SA Metro: 830-606-4732 Fax: 830-608-1396

## 1500 GALLON
SEPTIC TANK

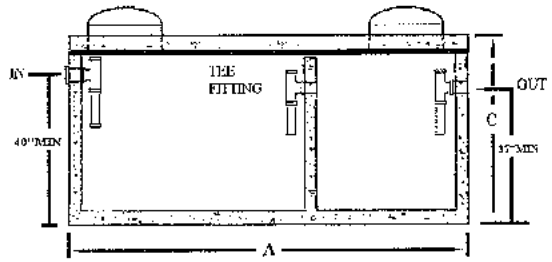
PLAN VIEW TOP
2 - 20" ACCESS PORTS

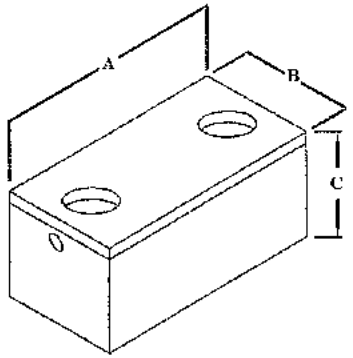
NOTE: DRAWING NOT TO SCALE

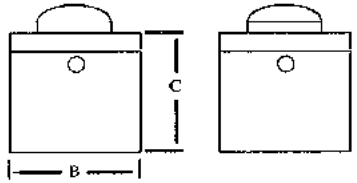



| GALLON CAP | DIM. A | DIM. B | DIM. C |
|---|---|---|---|
| 1500 | 148 | 80 | 50 |

SECTION:ELEVATION




SEPTIC TANK

DESIGN CONFORMS TO: ASTM C 1227

CONCRETE:

4500 PSI CONFORMING TO ASTM C 150

STEEL REINFORCEMENT:

GRADE 60 CONFORMING TO ASTM A 615

BEDDING SPECIFICATION:

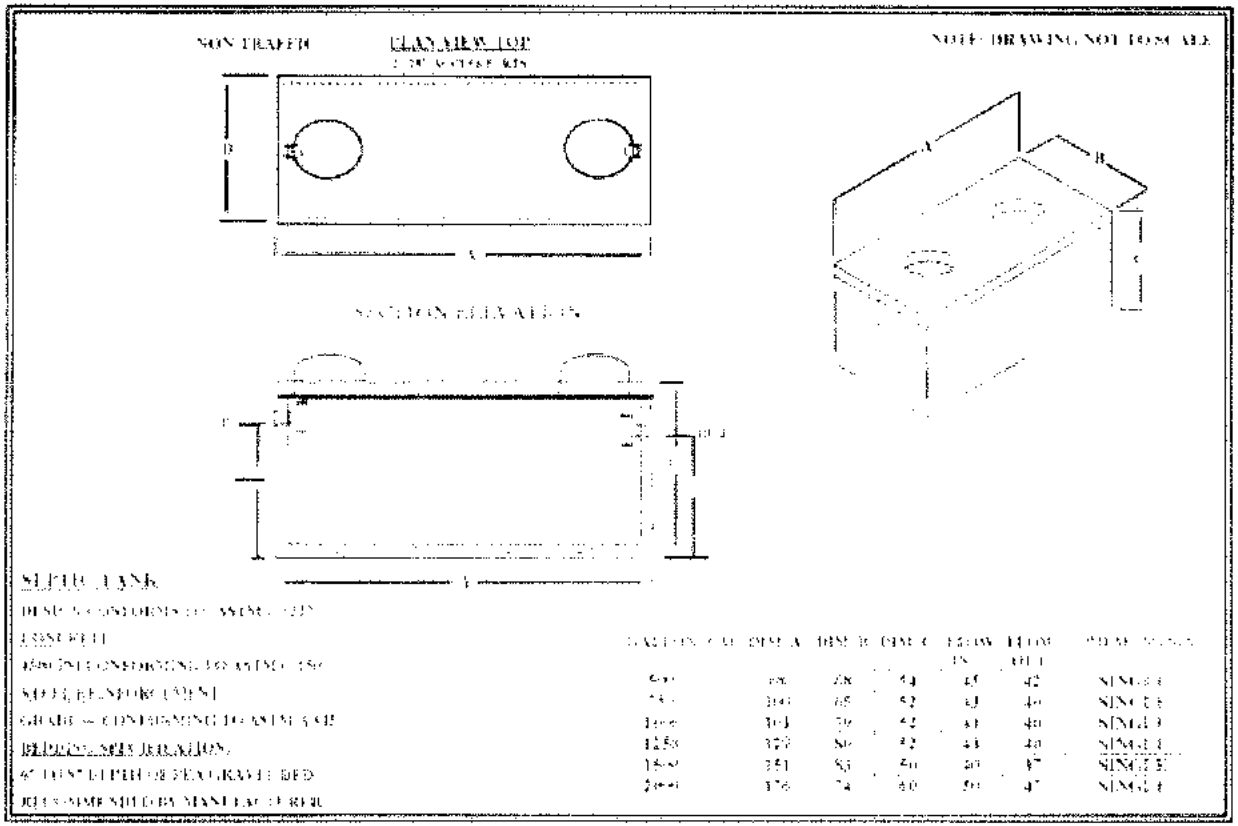
6" TO 8" DEPTH OF PEA GRAVEL BED

RECOMMENDED BY MANUFACTURER

# Comal Concrete Products, Inc.

4222 FM 482 NEW BRAUNFELS, TX 78132
EMAIL: comalconcrete@comalconcrete.com
830-608-1699 SA Metro: 830-606-4732 Fax: 830-608-1396

**500 GALLON TO 2000 GALLON SEPTIC TANKS**



# AdvanTex®

# AX-MAX General Specifications

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**AX-MAX GENERAL SPECIFICATIONS** ..... 289

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# PART 1 - GENERAL

## 1.01 DEFINITIONS

A. Wherever used in these specifications and printed with initial bold capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof.

8. *Bid* – The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the work to be performed.
9. *Bidder* – The individual or entity who submits a Bid directly to the Owner.
10. *Contractor* – The individual or entity with whom Owner has entered into the agreement.
11. *Engineer* – The individual or entity named as such in the agreement.
12. *Inspector* - The specific individual designated by the Owner, Engineer, Contractor, and Manufacture to ensure quality control by inspecting and certifying that the installation of the AX-MAX treatment system is in compliance with the Manufactures recommendations and requirements.
13. *Manufacture* – A supplier, fabricator, distributor, material man, or vendor having a direct contract with Contractor or Owner to furnish materials or equipment to be incorporated in the work by contractor.
14. *Owner* – The individual or entity with whom Contractor has entered into the agreement and for whom the work is to be performed.
15. *Operator* – The individual or entity with whom the owner has entered into an agreement and for whom operation and maintenance shall be performed.

## 1.02 GENERAL DESCRIPTION

The **MANUFACTURER** shall furnish a complete advanced treatment package(s), consisting of a pump, discharge assembly, ball valve, check valve, splice box, treatment system, and controls.

## 1.03 SUBMITTALS

The **MANUFACTURER** shall furnish six (6) sets of shop drawings and technical data sheets. The submittals shall clearly specify the materials of construction, equipment compatibility, along with drawings for each unique package being supplied.

## 1.04 OR-EQUAL EVALUATIONS

A. Throughout the equipment specifications you will find the term “or approved equal.” For this project, this term “approved equal” shall mean equal in the judgment of the **ENGINEER**. Should the **CONTRACTOR** seek approval of a product other than the brand or brands named in the specifications, it shall furnish written evidence that such product conforms in all respects to the specified requirements, and that it has been used successfully elsewhere under similar conditions. It will not be the responsibility of the **MANUFACTURER** specified within these specifications to provide research, documentation, or data supporting the difference between the “or equal” and the specified product. This will be the sole responsibility of the **CONTRACTOR** seeking the approval.

B. Where the specified requirements involve conformance to recognized codes or standards, the **BIDDER** shall furnish evidence of such conformance in the form of test or inspection reports, prepared by a recognized agency, and bearing an authorized signature. Manufacturer’s standard data and catalog cut sheets will not be considered sufficient in themselves, and the engineer will not be responsible for seeking further data from the manufacturer, or for otherwise researching the product. Failure to provide complete data will be cause for rejection of the product. The submission shall include any impacts that could be expected from the alternative product and shall also indicate any product that would require a license or royalty, the actual fees, and a note that these fees would be handled by the

**BIDDER**. The **BIDDER** shall provide submissions; meeting the above parameters no less than TWO WEEKS prior to **BID** opening for review by the **ENGINEER** for **CONTRACTORS** seeking approval of "or equal" products or systems shall provide, at minimum, the following.

C. Product/System submittals, including, but not limited to;

1. The number of years the **MANUFACTURER** has been in business of manufacturing relevant products/systems

    a. Size of company, including

        1) Number of employees related to relevant products/systems

        2) Number of engineers on staff related to relevant products/systems

    b. Product specifications and a detailed description of how each product or component is "equal" to the specified product, system, or component. A side-by-side comparison is required.

        1) Equipment/system warranty along with exclusions

        2) Performance claims, including, but not limited to;

            a) Treatment design

                - Surface area
                - Maintenance frequency

            b) Pump motor description

                - Manufacturer and origin
                - Length of service
                - Number of units in operation
                - Life-cycle cost (repair and replacement frequency)
                - Warranty

            c) Pump liquid end description

                - Manufacturer and origin
                - Length of service
                - Number of units in operation
                - Life-cycle cost (repair and replacement frequency and cost). Note liquid ends must be remove-able and repairable and cleanable.
                - Warranty

            d) Corrosion resistance

            e) Pump Lead description

                - Lead must be SOOW, extra heavy duty cord (600V) CSA approved.

            f) Control panel components

                - Manufacturer and origin
                - Length of service
                - Number of units in operation

- Warranty
- Enclosure description

c. Evidence of successfully obtaining approval for a system with similar permit requirements with the regulating authority

d. Summary of product/system track record and history, including, but not limited to;

1) Number of similarly sized systems

2) Detailed summary of, at minimum, ten (10) similarly sized systems, at least five (5) years old, including, but not limited to;

a) Project name, location, and application

b) Years in operation

c) Current average daily flows and design flows

d) Operator name and contact information

2. **BIDDER** shall specify and furnish documentation related to manufacturer (or representative) support services, including, but not limited to;

a. Installation training program and support material

b. Installation oversight program and support material

c. Operator training program and support material

d. Startup services program and support material

1.05 EXPERIENCE CLAUSE

The equipment furnished shall be manufactured and supplied by a company experienced in the design and manufacture of advanced treatment systems. **MANUFACTURERS** shall have a minimum ten (10) years experience in the design and manufacturer of advanced treatment systems of similar size and equipment specified. **MANUFACTURERS** shall have at minimum of twenty-five (25) successful installations of advanced treatment systems.

1.06 MANUFACTURER

The **MANUFACTURER** shall be Orenco Systems®, Inc. or approved equal. The **MANUFACTURER** shall furnish a complete factory built advanced treatment system. The **MANUFACTURER** shall supply detailed installation and O&M instructions. and evidence of an adequate service provider network shall be submitted to the **ENGINEER.** The **MANUFACTURER** shall also submit evidence that the local supplier has spare parts, equipment repair ability, and experienced service personnel. The **MANUFACTURER** shall also provide the following support personnel:

- Professional engineer or personnel under the direct supervision of a professional engineer dedicated to supporting the project through design, construction, and O&M.
- Asset Management Department dedicated to assisting operators with operational and maintenance activities.

1.07 WARRANTY

The advanced treatment system **MANUFACTURER** shall provide a three (3) year warranty for the entire treatment system, including, but not limited to the pump, pump vault, hose and valve assembly, control panel, and splice box. Warranty term shall ensue after **OWNER'S** acceptance and system startup procedures are complete. The **MANUFACTURER** shall submit detailed exclusions from the warranty or additional cost items required to maintain the equipment in warrantable condition. The warranty shall be documented in product literature.

1.08 SERVICABILITY

The advanced treatment system components shall be completely serviceable, with easy access to the pump(s), treatment system, and floats. The pump shall be designed for removal without removing the floats.

1.09 PUMPS

The pump must be approved for use in the treatment unit as described in these specifications. Pump shall be 3/4 to 2.0 hp, 230 VAC, single phase, 60 Hz, two-wire motor, with 30 foot long extra heavy duty (SOOW) electrical cord with ground. The pumps must be submersible High-Head Effluent pumps. Pumps shall be UL and CSA listed for use with effluent. The pumps must have a minimum 24-hour run dry capability without water lubrication. The pumps shall have a 1/8-inch bypass orifice to ensure flow circulation for motor cooling and to prevent air bind. The pump shall have a floating impeller design to protect against up thrust and increase pump life. The pumps liquid ends must be repairable (by replacing impellers and/or diffusers) for better long-term cost of ownership. The motor must be rated for continuous use and frequent cycling, at least 100 cycles per day. The motor cable must be suitable for Class 1, Division 1 and 2 applications. The pumps shall be lightweight for easy removal and maintenance. The pump intake screen must be 1/8-inch mesh polypropylene. The pump shall have internal thermal overload protection and internal lightning protection. All pumps shall undergo 3-point (Dead head, Design Flow, and Design Flow + 30%) wet testing at the factory to confirm performance.

If three phase power is available, then the pumps shall be 3/4 to 2.0 hp, 230 VAC, three phase, 60 Hz, with 30 foot long extra heavy duty (SOOW) electrical cord with ground. Pumps shall be in accordance with the specifications listed above.

## PART 2 - PRODUCTS

2.01 PUMPS / OPERATING CONDITIONS

Pump model will vary based upon treatment system configuration and the power available to the site.

PF300512 – Pre-Anoxic Return (Rnox) Pump

Pump shall comply with general requirements set forth in section I (above). Orenco Systems®, Inc., Model PF300512 series or engineer-approved equal 1/2Hp, 230 VAC, single phase, 60 Hz, two-wire motor, with 10 - 30 foot long extra heavy duty (SO) electrical cord with ground. Pump shall be UL and CSA listed as an effluent pump.

PF500712 – Optional Flow Equalization Pumps or Discharge Pumps

All pumps shall comply with general requirements set forth in section I (above). Orenco Systems®, Inc., Model PF5007 series or engineer-approved equal 3/4Hp, 230 VAC, single phase, 60 Hz, two-wire motor, with 10 - 30 foot long extra heavy duty (SO) electrical cord with ground. Pump shall be UL and CSA listed as an effluent pump.

PF501012 – Optional Flow Equalization Pumps or Discharge Pumps

All pumps shall comply with general requirements set forth in section I (above). Orenco Systems®, Inc., Model PF5010 series or engineer-approved equal 1Hp, 230 VAC, single phase, 60 Hz, two-wire motor, with 10 - 30 foot long extra heavy duty (SO) electrical cord with ground. Pump shall be UL and CSA listed as an effluent pump.

PF751012 – Duplex Recirculation Pumps

All pumps shall comply with general requirements set forth in section I (above). Orenco Systems®, Inc., Model PF7510 series or engineer-approved equal 1Hp, 230 VAC, single phase, 60 Hz, two-wire motor, with 10- 30 foot long extra heavy duty (SO) electrical cord with ground. Pump shall be UL and CSA listed as an effluent pump.

Or

PF1452012 – Simplex Recirculation Pumps

All pumps shall comply with general requirements set forth in section I (above). Orenco Systems®, Inc., Model PF1452012 series or engineer-approved equal 2Hp, 230 VAC, single phase, 60 Hz, two-wire motor, with 10 - 30 foot long extra heavy duty (SO) electrical cord with ground. Pump shall be UL and CSA listed as an effluent pump.

## 2.02 AX-MAX ADVANTEX® TREATMENT SYSTEM

A. The treatment system shall be an Orenco Systems®, Inc. AdvanTex® AX-MAX facility. The facility shall be a complete, fully plumbed wastewater treatment system for receiving and processing septic tank effluent. The unit(s) shall be a modular packed bed media filter that incorporates the recirculation tank, media, lateral piping, pumps, ventilation plumbing, etc. The vessel housing the equipment shall be constructed of 4-inch insulated walls. The lateral piping network that recirculates water from the recirculation tank shall be mounted atop hanging textile media. The media shall be a hanging textile media having a surface area of greater than 2,000 sq.ft/cu.ft. The treatment unit should have a hydraulic design capacity of 25 gpd/sf based upon everyday Average Daily Flow and 50 gpd/sf based upon a Maximum Daily Flow (occurring once in a 7 day period).

B. Plant configuration and number of units will vary based upon daily flows, anticipated organic and nitrogen loading rates and expected discharge permit limits. Please consult with Orenco Systems, Inc. for a proposed configuration and sizing.

## 2.03 AX MAX VENTILATION SYSTEM

INDIVIDUAL UNIT FANS

An Orenco Systems®, Inc. ventilation system shall be provided in the AX-MAX Series Treatment Facility or approved equal. The fan shall be UL recognized, 0.8 Hp, 115/230VAC, 1.4A/0.7A, 3400 RPM, and provide up to 245 CFM at 0" $H_2O$. The exhaust from the ventilation fan shall be forced through an enclosure with an adequate amount of activated carbon to remove any odors for a period of over one (1) year.

## 2.04 SPLICE BOX CONDUIT SEALS AND SEALANTS

As part of the treatment package, all AX-Max units will include re-installed splice boxes and UL listed waterproof butt splice connectors. The use of a UL-approved conduit seal kit accessible above ground shall be required to prevent the passage of gases, vapors, or flames through the conduit to the control panel. An additional UL classified sealant shall be added to the splice box coupling to prevent condensation accumulation in the splice box. The following UL approved sealants shall be used:

a. UL classified moisture-cure polyurethane quick drying foam or **ENGINEER**-approved equal with an R-5 rating for each inch of foam.

b. UL classified silicone sealant or **ENGINEER**-approved equal consisting of a neutral cure silicone, non-acetic, non-corrosive silicone able to withstand temperatures to 450° F.

2.05 CONTROLS

A. Controls and alarms shall be listed per UL 508. Panels shall be repairable in the field without the use of soldering irons or substantial disassembly.

B. An InGateway 601 series cellular modem, model IG601 shall be installed. Panel is required to allow real-time connectivity with the telemetry control panel and alarm communication. Phone dialers shall not be considered as an equivalent.

C. Panel shall be Orenco Systems®, Inc. TCOM™ control panel or engineer-approved equal, meeting the following:

1. Data Collection and Utilization: Logs data for system conditions and events such as daily flows, pump run time, pump cycles, and alarm conditions. Logs shall store data for at least a year.
2. Downloadable Logs: Download logs into a *.dif or ASCII format for simple conversion to common spreadsheet or word processor programs.
3. Multi-Level Password Security: Only qualified personnel can remotely access site.
4. Program Logic Rules: Simple "If … then" declarations.
5. Rules can be written based on several operands, including the following:
6. Input/output status
7. Point status
8. Date: mm/dd/yy format
9. Time of day: 24 hour clock
10. Timers
11. Historical data (allows for control optimization or detection of trends)
12. Schedule functions to control digital "Points" based on date or day of week/time.
13. Automatic daylight savings time adjustment.
14. Automatic call-out to pagers during alarm conditions when panel detects trends that could lead to system failure.

D. In addition, the unit shall have the capability of real-time direct connection to the panel via laptop serial port, to allow the operator real-time access to detailed logged data and the ability to change point values.

1. Standard Components
    a. Motor-Start Contactor: 17 FLA, 1-2 hp, 60 Hz; 2.5 million cycles at FLA (10 million at 50% of FLA for 230VAC.
    b. HOA 3- Way Toggle Switch: Single-pole switch, Hands (manual) Off, Auto ON. 20 amps, 1 hp.
    c. Controls Circuit Breaker: 10 amps, OFF/ON switch. Single-pole 120 VAC. DIN rail mounting with thermal magnetic tripping characteristics.
    d. Pump Circuit Breaker: 20 amps, OFF/ON switch. Single-pole for 120 VAC or double-pole for 230 VAC. DIN rail mounting with thermal magnetic tripping characteristics.
    e. Audio Alarm: 80 dB at 24", warble-tone sound.
    f. 120VAC Ground Fault Interrupter (GFI)

g. Current Sensor: 120 VAC with adjustable high & low alarm set points.

h. Visual Alarm: 7/8" diameter red lens, “push-to-silence.” NEMA 4, 1-watt bulb, 115 VAC.

i. Panel Enclosure: NEMA 4, constructed of painted steel; hinges and latch are stainless steel. Conduit couplings provided.

j. Remote Telemetry Unit: ATRTU-Net; self powered 24 VDC at 10 mA max, 8 digital inputs, 8 analog inputs expandable to 16 with expansion board. On-board modem (9600 baud), Ethernet port (10 base T, RJ45jack) and Modbus port (R5422/485 terminals).

k. Touch Screen Display: interface module with 5.7 color touch screen, mounted in Panel Door.

l. Flow Meter – Siemens, electromagnetic flow meter model MAG 3100, with 5000/6000 series transmitter. In addition to logging daily flows, flow meter shall log flows on an hourly basis.

a. Pump Run Light: 7/8" green lens. NEMA 4, 1-watt bulb, 120 VAC.

b. Surge Arrestor: AG2401 120/230V, three 18” leads, rated for a maximum of 32,000amps, UL/CSA listed.

c. 3- Way (main, auto, off) manual transfer/disconnect switch

d. Effluent Alarm: 95db at 24", warble-tone sound.

2.06 CONTROL BUILDING

The control building shall be an Orenco Systems®, Inc. Fiberglass Shelter or engineered approved equal to house controls and chemical feeders. The shelter shall be a complete seamless, molded, one-piece enclosure constructed of an insulated foam-core wall monolithically poured. Wall thickness shall be no less then 4-inches thick with a minimum insulation value of R12. Shelter shall be capable of withstanding 160mph. The roof shall be capable of handling a 100psf live load. Manufacture will provide a 10-year limited warranty on workmanship.

2.07 INSTALLATION

All treatment, pumping system, and electrical components shall be installed in accordance with the **MANUFACTURE’S** recommendations, the engineer’s plans, and all state and local regulations.

2.08 LOCATION

The pump control panel shall be mounted within a building nearest the tank and pump. The panel, when possible, should be mounted in the shade and protected from the weather. The panel should be located at a convenient height (usually about five feet above the ground) and where it will be accessible for maintenance.

## PART 3 - EXECUTION

3.01 PRECONSTRUCTION CONFERENCE

Before any work at the site is started, a conference attended by the **OWNER**, **CONTRACTOR**, **ENGINEER, MANUFACTURE, OPERATOR** and others as appropriate will be held to establish a working understanding among the parties as to the work involved for installing each component of the treatment system. At this conference, the **OWNER**, **CONTRACTOR**, **ENGINEER**, and **MANUFACTURE** shall designate, in writing, a specific individual to act as **INSPECTOR** for the installation of the treatment system. Any cost or fees associated with the services of the **INSPECTOR** or the **ENGINEER** during construction will be the responsibility of the **OWNER.**

3.02 INSTALLATION AND FILED TESTING TRAINING

The **MANUFACTURER** shall provide the services of a trained representative to instruct the installing **CONTRACTOR'S** crew and **INSPECTOR** regarding the proper installation and field testing of each component per the **MANUFACTURE'S** recommendations and requirements. The **MANUFACTURER** shall have a trained representative provide installation and field testing training services for a minimum of one (1) visit of a minimum of one (1) eight-hour day at the beginning of construction.

3.03 QUALITY CONTROL

A. To ensure quality control, the **INSPECTOR** shall inspect and certify that an initial installation of the AdvanTex® system is in compliance with the **MANUFACTURE'S** recommendations and requirements.

B. Upon completion of the inspection, the **INSPECTOR**, in coordination with the **ENGINEER**, shall perform or direct the **CONTRACTOR** to perform any required adjustments to the equipment and place into operation under the supervision of the **ENGINEER**. All equipment and materials required to perform the testing shall be the responsibility of the **CONTRACTOR.** A letter of completion shall be signed by the **INSPECTOR** and copies faxed, emailed, or mailed to the **ENGINEER** and **MANUFACTURE** within one (1) week of the AdvanTex® system being installed and prior to System Commissioning.

C. The **MANUFACTURER** shall provide the services of a trained representative for a minimum of one (1) visit of a minimum of one (1) eight-hour day for the purpose of quality control during construction.

3.04 SYSTEM COMMISSIONING

A. The **MANUFACTURER** shall provide the services of a trained representative for training the **OWNER'S** service provider, and inspecting the AdvanTex® installation. The inspection will include items covered from the installation training. Upon system commissioning, the **MANUFACTURER'S** trained representative shall provide the **ENGINEER** a written report of findings. The **ENGINEER** should then perform or direct the **CONTRACTOR** to perform any required adjustments to the equipment and place into operation. All equipment and materials required to perform additional testing shall be the responsibility of the **CONTRACTOR.** The **MANUFACTURER** shall submit to the **ENGINEER** and **OWNER**, a detailed start-up checklist, according to the manufacturers inspection and startup procedures.

B. The **MANUFACTURER** shall provide the services of a trained representative for a minimum of one (1) visit of a minimum of one (1) eight-hour day for the purpose of system commissioning.

PART 4 – OPERATION AND MAINTENANCE

4.01 OPERATION AND MAINTENANCE MANUALS

The **MANUFACTURER** shall provide five (5) operation and maintenance manuals, four (4) to be sent to the **OWNER**, and one (1) sent to the **ENGINEER.**

4.02 SPARE PARTS

The **MANUFACTURER** shall provide a spare nozzles, spare pump, and spare control panel parts.

4.03 OPERATION AND MAINTENANCE TOOLS

A. AX LATERAL BRUSH CLEANING KIT

**MANUFACTURER** shall provide a minimum of one (1) AX Lateral Brush Cleaning Kit. This kit shall include 90-inch lateral cleaning brush used to clean 1-1/4" diameter laterals and shall be Orenco Systems®, Inc., OM-AX-LAT BRUSH CLEANING KIT or **ENGINEER**-approved equal.

B. AX SHEET CLEANING WAND

**MANUFACTURER** shall provide a minimum of one AX sheet-cleaning wand. Wand shall be Orenco Systems®, Inc. model OM-AX-CLEANING WAND or **ENGINEER**-approved equal. Cleaning wand shall have the ability to connect to a standard garden hose, and fit in between AX sheets to spray off debris.

C. FIELD TEST KIT

**MANUFACTURER** shall provide a field test kit to monitor the following parameters:

a. pH
b. Alkalinity
c. Ammonia ($NH_3$-N)
d. Nitrate/Nitrite ($NO_3$-N / $NO_2$-N)
e. Dissolved Oxygen (DO)
f. Chlorides
g. Turbidity
h. Temperature

The field test kit shall include:

a. pH test strips (0-14 pH)
b. Alkalinity test strips (0-240 ppm)
c. Ammonia (NH3-N) test strips (0-6 ppm)
d. Nitrate/Nitrite ($NO_3$-N / $NO_2$-N) test strips (0-50 ppm)
e. Dissolved Oxygen (DO) kit (1-12 ppm)
f. Chloride titrators (30-600 ppm & 300-6000 ppm)
g. Turbidity kit (0-200 NTUs)
h. Thermometer (0-240° F)

# APPENDIX A

e) AX-MAX INSTALLATION CHECKLIST

**SYSTEM OWNER:** _____ **DATE:** _____

**SITE ADDRESS:** _____

_____ **SYSTEM PROVIDER:** _____

**CONTRACTOR:** _____ **INSPECTOR:** _____

**AS-BUILT SITE DIAGRAM**

Please draw an as-built sketch of the site including approximate location of buildings, property boundaries, trees, fences, existing septic systems, existing wells, new septic tank, recirculation tanks, pump basins, AdvanTex® system, sewer piping, drainfield, etc. Include dimensions.

| *YES* | *NO* | *PRE-INSTALLATION* | *DATE/INITIAL:* |
|---|---|---|---|
| _____ | _____ | Tank and AX-MAX location approved per engineer | |
| _____ | _____ | Panel location approved per engineer | |
| _____ | _____ | Electrical supply (# circuits/disconnect) | |
| _____ | _____ | AX-MAX equipment package reviewed and approved | |
| _____ | _____ | Contractor has reviewed AX-MAX Installation Manual (NIM-ATX-AX-3) | |

| *YES* | *NO* | *TANK INSTALL (per Manufacture)* | *DATE/INITIAL:* |
|---|---|---|---|
| _____ | _____ | Tank Warranty | |

| | | |
|---|---|---|
| | | |
| | | Date manufacture specified |
| | | Factory leak test documentation |
| | | Inlet connection approved |
| | | Certificate of Origin |
| | | Inlet tee installed |
| | | Riser-to-Tank connections approved |
| | | Tank is level and properly bedded |
| | | Tank passes leak test/water tight test (tank filled 2" above tank/riser connection) |

| YES | NO | ACCESS RISERS | DATE/INITIAL: |
|---|---|---|---|
| | | Access risers installed per manufacture's instructions | |
| | | Splice Box location acceptable and installed per manufacture's instructions | |
| | | Discharge grommet holes installed properly and oriented per engineer's plans (if applicable) | |

| YES | NO | SITE PREP-INGROUND INSTALLATION | DATE/INITIAL: |
|---|---|---|---|
| | | Verify elevations and orientations per engineer's plans can be achieved | |
| | | If gravity from septic tank to AX-MAX, ensure 1/8-inch slope between vessels | |
| | | Outline and mark excavation site, excavate to depth shown on plans | |
| | | Bottom of excavation is free of debris, rocks, or sharp objects | |
| | | Proper bedding material laid and at least 4-inch thick by 7-1/2-feet wide and encompasses the length of the AX-MAX | |
| | | Bedding material leveled and compacted | |

| YES | NO | SET AX-MAX UNIT | DATE/INITIAL: |
|---|---|---|---|
| | | Installer has reviewed offloading instructions | |
| | | AX-MAX lid is above grade per engineer's plans | |
| | | AX-MAX units have proper spacing per engineer's plans | |

| YES | NO | ANTIBUOYANCY MEASURES | DATE/INITIAL: |
|---|---|---|---|
| | | Manufacture supplied anti-buoyancy flanges attached | |
| | | Concrete forms constructed per manufacture's instructions | |
| | | Rebar placed per manufacture's instructions | |
| | | Concrete poured into forms and set prior to backfilling | |
| | | | |

| YES | NO | PARTIAL BACKFILL/WATER TEST | DATE/INITIAL: |
|---|---|---|---|
| _____ | _____ | Proper backfill used and free of debris, rocks, or sharp objects | |
| _____ | _____ | AX-MAX backfilled in 12-inch lifts and compacted with mechanical compactor | |
| _____ | _____ | AX-MAX watertight tested per manufacture's instructions | |

| YES | NO | PUMPS/PLUMBING/VENTILATION | DATE/INITIAL: |
|---|---|---|---|
| _____ | _____ | All pumps and connections identified | |
| _____ | _____ | All pumps installed and connected to discharge assemblies, packing material removed | |
| _____ | _____ | All fittings, transport and plumbing lines installed and sized per engineer's plans | |
| _____ | _____ | Any exposed pipe painted with UV resistant paint | |

| YES | NO | CONTROL PANEL | DATE/INITIAL: |
|---|---|---|---|
| _____ | _____ | Incoming power to panel installed | |
| _____ | _____ | Phone line or high speed internet to the modem is installed | |
| _____ | _____ | Wiring from pumps and floats installed per manufacture's schematic | |
| _____ | _____ | Conduit seal installed before control panel for all conduits | |
| _____ | _____ | Control panel installed under awning or in control building | |
| _____ | _____ | Control panel documentation and schematics left in control panel | |

| YES | NO | BACKFILL INSTALLATION | DATE/INITIAL: |
|---|---|---|---|
| _____ | _____ | Backfill complete using 12-inch lifts and mechanically compacted | |
| _____ | _____ | Backfill brought to final grade per engineer's plans | |

| YES | NO | PREPARE FOR OPERATION | DATE/INITIAL: |
|---|---|---|---|
| _____ | _____ | AX-MAX filled half way for pump tests | |
| _____ | _____ | Nozzles are facing up and lateral flush valves are open | |
| _____ | _____ | Pumps turned on and laterals flushed of all debris | |
| _____ | _____ | Nozzles pointed down and lateral flush valves closed after flushing | |
| _____ | _____ | Manifold pressures adjusted to 3-3.5 psi | |
| _____ | _____ | All nozzles have a uniform spray and reach edge of splash guards | |
| _____ | _____ | Floats checked for proper operation by simulating a raising and lowering of the liquid level | |
| _____ | _____ | Fan is operational and there is air flow at the inlet and exhaust | |

| YES | NO | PREPARE FOR START UP | DATE/INITIAL: |
|---|---|---|---|

| | | |
|---|---|---|
| _____ | _____ | All plumbing connections have been completed and tested |
| _____ | _____ | All electrical connections have been completed and tested |
| _____ | _____ | All tanks have successfully been tested for watertightness |
| _____ | _____ | Phone or high speed internet line has been connected and is operational |
| _____ | _____ | Floats work as intended by simulating a rising and lowering of the liquid level |
| _____ | _____ | There is enough water in all tanks to perform pump and float operations |
| _____ | _____ | All exposed PVC is either protected by UV paint or insulation |

***Inspector:*** _____ ***Date:*** _____

END OF SECTION

Technical Data Sheet

# Orenco® TCOM Remote Telemetry Board

## Applications

Orenco's line of affordable TCOM remote telemetry units give facility managers, operators, and maintenance providers the ability to remotely monitor and control the performance of mechanical equipment in real time. Ideal for:

- Wastewater Collection and Treatment
- Water Systems
- Environmental Monitoring
- Industrial Processes

Orenco® Telecom® TCOM-A/TCOM-T versus previous model

## Features/Unique Specifications

To specify this panel for your installation, require the following:

- Automatic call-out to e-mail capable devices during alarm conditions or when panel detects trends that could lead to system failure
- Ability to maintain logs for system conditions and events, such as Motor Run Time, Motor Cycles, and Alarm Conditions
- Downloadable logs into a * dif or ASCII format for simple conversion to common spreadsheet or word processor programs
- No proprietary computer software needed for remote monitoring and control. VTRG protocol allows remote access and control from any computer medium (Mac or PC) with a simple communications program (e.g. Windows® HyperTerminal)
- Bluetooth® adapter available
- Multi-level password security to ensure that only qualified personnel can remotely access site
- Simple interface using status, reference, and control parameters (Portal). Points are viewable/editable by the operator. The following "point" types are supported:
  - Digital: on or off condition
  - Analog: numeric range (± 20,000,000)
  - Date: mm/dd/yy format
  - Time: 24 hour clock
  - Label: Text (7 character max)
- Program logic (rules) consists of simple conditional "If... Then" declarations. Rules can be written based on several operands, including the following:
  - Input / Output status
  - Point status
  - Date: mm/dd/yy format
  - Time of day: 24 hour clock
  - Timers
  - Historical data (allows for control optimization or detection of trends)
- Schedule Functions to control digital "Points" based on date or day of week / time
- Automatic daylight savings time adjustment
- Optional graphical interface software to view system status and permit interactive system control
- Ability to upload new programming remotely
- Ability to upload firmware updates remotely

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# TCOM Remote Telemetry Board (continued)

## Model: ATRTU-NET

### Hardware Specifications

***Physical Size***

- 3.75" x 8.0"

***Terminations***

- Removable terminal blocks with screw compression terminals
- Accepts 16 to 22 AWG solid or stranded wires

***Digital Input Features***

- Eight inputs
- Distinctive or pulse (25 pulses/sec maximum)
- Self-powered: 24 VDC at 10 mA maximum
- Active LED input indicators
- Optically isolated
- Expandable to 16 inputs with expansion board

***Analog Input Features***

- Eight inputs
- Expandable to 32 inputs with expansion board
- 0-5 VDC input signal, or 4-20 mA input with jumper)
- Linear or 10k ohm thermistor scaling
- 12 bit analog to digital resolution

***Digital Output Features***

- Eight outputs
- Expandable to 16 outputs with expansion board

***Analog Output Features***

- Two outputs
- 4-20 mA output signal
- 10 bit digital to analog resolution

***Communication Ports***

- RS-232 port – 4 pin (Bluetooth adapter available)
- On-board modem 300-4 baud (RJ11 device jack)
- Ethernet port (10 base T, RJ45 jack)
- Serial modbus port (RS422/485 terminals)

***Sensor/External Relay Power Supply***

- 5 VDC, 30 mA maximum
- 24 VDC, 350 mA maximum

***Power Requirements***

- 24 VDC, 1.2 A

***Environment***

- 32° F to 122° F (0° C to 50° C)
- 5% to 95% RH, non-condensing

### Firmware Specifications

***Safety Features***

- Non-volatile memory backup of program
- Lithium battery backup of data and program settings (1 year storage without power)
- Hardware Watchdog Timer to restart system in the event of a program corruption
- Battery backup to allow continued monitoring and alarm functions during power outage (optional)

***Logs***

- Activity log (a minimum of 2040 defined digital events)
- Alarm log (up to 240 total digital events)
- Custom designed user logs for recording flow, level, alarms, etc. (up to 30 individual logs, with a total of 91,022 logged data points)
- Maintenance log (up to 40 entries of 80 characters)

***Control Parameters (Points)***

- 672 available control parameters

***Program Logic (Rules)***

- 700 available rules

***Schedules***

- 64 available events (time and day or date-based) events

***Alarm Callout Capability (Mailboxes)***

- 16 destinations (mailboxes) available for alarm event notifications
- E-mail capable (POP3/SMTP e-mail server required)

***Networking Protocols***

- Ethernet
  - a. Modbus TCP capable (permits peer-to-peer communications, up to 16 peers)
  - b. HTTP Web server capable
  - c. TCP/IP and terminal compatible
- Serial modbus (permits our controller to act as master or slave)
  - a. As "master," modbus permits connection to off-the-shelf, low-proprietary devices that support modbus protocol. Can control and monitor up to 32 clients
  - b. As "slave," modbus permits connection to and communication with modbus sensors



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# Appendix D: RATES AND SERVICE FEES-THE CROSSINGS

Effective June 1, 2015

Purpose:

The wastewater rates and services charges contained in this special section are specific to The Crossings, a residential development located in Section D.1. All water rates and services charges are listed in Section G of the Crystal Clear SUD Rules and Regulations. These wastewater rates and services charges shall take effect upon delivery of service to each residential unit.

1. Class of User:

   All users in The Crossings of the District's wastewater services are identified as residential users and the rates and charges herein are for wastewater service only. For Water Service Rates and Charges, refer to Section G of the Rules and Regulations.

2. Deposit(s):

   At the time of application of service is approved, the applicant shall pay a Deposit for both water and wastewater to be held by the District, without interest, until settlement of customer's final bill. The Deposit shall be used to offset unpaid charges or bills.

   a. Residential applicants only

   b. The Deposit for residential wastewater service is $50 (See Section G for Water Service Deposit).

3. Easement Fee:

   When the District determines that private way utility easements and/or easements for facility sites are necessary to provide service to an applicant, the applicant shall be required to make a good faith effort to secure such easements on behalf of the District or pay all costs incurred by the District to validate, clear and obtain such easements, including but not limited to legal fees and court costs, in addition to tap fees and inspections fees otherwise required pursuant to the provisions of the Rules and Regulations [See Sections E.2(c)(2) and F.7(a)].

4. Septic Tank Effluent Pumping (STEP) Unit Installation:

   a. Unless the developer has already completed the installation of the STEP Unit per the District's and the TCEQ's specifications and requirements and conveyed it to the District, the District shall charge a connection fee for Wastewater Capacity Fee of $500 for standard STEP Unit service connection plus the actual costs for all labor, materials for construction, installation of the STEP Unit.

b. Additionally, the District will charge the following fees associated with the installation and connection by either party of the STEP Unit to the District's low pressure force main. These fees consist of an inspection fee of $100 for each stage of the installation:

(1) At the time of excavation and readying of the site for installation with all of the proper sizing and bedding (See CCR's);

(2) placement of the certified STEP Unit in the excavated site to ensure proper fit and fill material is used;

(3) completion of the installation to ensure proper dressing and completion of the installation:

(4) and, at the time of connection of the STEP Unit to the low pressure force main to ensure that it meets all TCEQ requirement.

5. Wastewater Service Capacity Reservation Fee:

The District shall charge a Wastewater Service Capacity Reservation Fee of $25 per month to either the developer or property owner (where the owner has not yet completed construction of the residence prior to being connected to the District's collection system).

6. Monthly Base Wastewater Service Fee:

The Monthly base Wastewater Service Fee for a residence who's STEP Unit has been installed and connected, including all applicable approved inspections, shall be $33.64. The Monthly Base Fee will be evaluated yearly and may be adjusted to ensure that all costs covering the Operations and Maintenance of the District's Wastewater System are met.

7. Monthly Wastewater Usage Fee:

The Monthly Wastewater Usage Fee for a residential unit covers the costs for processing the effluent created by the specific unit. The cost is determined utilizing the monthly amount of water used by the residential unit. If the water usage amount is greater than 5,000 gallons per month, the wastewater usage fee is calculated at 0.60 times $4.87/1000 gallons. If the water usage amount is less than 5.000 gallons per month, the usage fee is calculated at 0.60 times $4.43/1000 gallons. Examples:

a. Residence with monthly water usage of 7,500 gallons X 0.60 = 4,500 gallons X $4.87 = $21.915 Wastewater Usage Fee

b. Residence with monthly water usage of 3,000 gallons X 0.60 = 1800 gallons X $4.43 = $7.974 Wastewater Usage Fee

8. Maintenance and Repair of Wastewater Treatment and Collection System:

   The District is responsible for all maintenance and operation of the Wastewater Treatment and Collection System upon completion of the first residential unit in the development and after all of the facilities has been properly inspected by and conveyed to the District by the developer. The individual residential property owner has a responsibility to use the wastewater facilities in a proper manner, *i.e*.,

   a. No poisonous, flammable or hazardous material(s) shall be inserted into or sent into the system (STEP Unit). Should this occur, the owner shall be responsible for all damage and repair required to the system, regardless of where it occurs. Testing will be done should an event warrant it to determine the cause, and proper action taken by the District, including disconnection of both water and wastewater service, should circumstances prove that these materials are present in the system/STEP Unit.

   b. Under normal household conditions the buildup of sludge and grease in the STEP Unit will not create a problem and is included as part of the District's normal maintenance procedures which call for a STEP Unit Clean Up (sludge and grease removal) on a 10 year cycle. However, if abnormal buildup of sludge or grease is noted in the STEP Unit that may require a STEP Unit Clean Up in less than the 10 year cycle, the account will be notified and charged, at cost for removal of excess sludge and grease plus a District handling fee of $100, for maintenance procedure. Note: routine inspection, including the noting of the buildup of sludge and grease occurs every three (3) months at each STEP Unit. Early detection of abnormal buildup will be noted to the individual household so that remedial steps can be taken to avoid any early STEP Unit Clean Up; however, if the abnormal buildup continues, then the foregoing action will occur which may include in the case of excessive buildup of grease, the installation of a grease trap at the property owner's expense.

   c. The STEP Unit is connected to a monitoring and alarm unit mounted close-by. This monitoring and alarming unit measures and detects any problems associated with the operation of the STEP Unit and should an event occur that warrants attention, the light will flash and the alarm will continue to flash and sound on the monitoring and alarming unit until the unit reset has been by the District's service technicians. Anyone noticing the flashing of the light and the alarm sounding is advised to call the emergency number located on the monitoring and alarm box/unit.