TEXAS COMMISSION on ENVIRONMENTAL QUALITY
ORGANIZED SEWAGE COLLECTION SYSTEM
GENERAL CONSTRUCTION NOTES

1. This Organized Sewage Collection System must be designed and constructed in accordance with the Texas Commission on Environmental Quality's (TCEQ) Edwards Aquifer Rules 30 Texas Adminstrative Code (TAC) §213.5(c), the Design Criteria for Sewerage Systems 30 TAC §317.1, 30 TAC §30 TAC §317.3, and 30 TAC §317.13, and the City of _____ Standard Specifications.

2. All contractor conduction regulated activities associated with this proposed regulated project must be provided with copies of the Sewage Collection System plan and the TCEQ letter indicating the specific conditions of its approval. During the course of these regulated activities, the contractors must be required to keep on-site copies of the plan and the approval letter.

3. Prior to commencing any regulated activity, the applicant or his agent must notify the _____ Regional Office, in writing, of the date on which the regulated activity will begin.

4. Any modification to the activities described in the referenced SCS application following the date of approval may require the submittal of an SCS application to modify this approval, including the payment of appropriate fees and all information necessary for its review and approval.

5. The temporary erosion and sedimentation controls must be installed prior to initiating any other construction activity and maintained in accordance with the requirements of the construction plans. All temporary erosion and sedimentation controls must be removed when the construction area is stabilized.

6. The sewer line trench details showing the cross section with the dimensions, pipe placement, and backfill instructions are included on Plan Sheet ___ of ___ of these plans. All sewer pipes joints must meet the requirements in 30 TAC §317.2(a)(3).

   Gravity lines must be SDR 35 or less. Pressurized sewer systems must have pipe with a minimum working pressure rating of 150 psi.

   The ASTM, ANSI, OR AWWA specification numbers for the pipe(s) and joints are
   _____.

   The pipe material, the pressure classes, and the SDR and/or Dr designations are
   _____.

7. If any sensitive features are discovered during the wastewater line trenching activities, all regulated activities near the sensitive feature must be suspended immediately. The owner must notify the appropriate regional office of the Texas Commission on Environmental Quality in writing within two working days of the feature discovered. The applicant must submit a plan for ensuring the structural integrity of the sewer line or for modifying the proposed collection system alignment around the feature. The regulated activities near the sensitive feature may not proceed until the executive director has reviewed and approved the methods proposed to protect the sensitive feature and the Edwards Aquifer from any potentially adverse impacts to water quality while maintaining the structural integrity of the line.

8. Sewer lines located within or crossing the 5-year floodplain of a drainageway will be protected from inundation and stream velocities which could cause erosion and scouring of backfill. The trench must be capped with concrete to prevent scouring of backfill, or the sewer lines must be encased in concrete. All concrete shall have a minimum thickness of six (6) inches.

9. Blasting procedures for protection of existing sewer lines and other utilities will be in accordance with the National Fire Protection Association criteria. Sand is not allowed as bedding or backfill in trenches that have been blasted. If any sewer lines are damaged, the lines must be repaired and retested.

10. All manholes constructed or rehabilitated on this project must have watertight size on size resilient connectors allowing for differential settlement. If manholes are constructed within the 100-year floodplain, the cover must have a gasket and be bolted to the ring. Where gasketed manhole covers are required for more than three manholes in sequence or for more than 1500 feet, alternate means of venting will be provided. Bricks are not an acceptable construction material for any portion of the manhole.

    The diameter of the manholes must be a minimum of four feet and the manhole covers must have a minimum nominal diameter of two feet. These dimensions and other details showing compliance with the commission's rules concerning manholes and sewer line/manhole inverts described in 30 TAC 317.2(c)(5)(E) are included on Plan Sheet _____ of _____ .

    It is suggested that entrance into manholes in excess of four feet deep be accomplished by means of a portable ladder. Where steps are used, they shall be made of non-corrosive material and be in accordance with applicable OSHA specifications.

11. Where water lines and new sewer lines are installed with a separation distance closer that nine feet. (i.e., water lines crossing wastewater lines, water lines paralleling wastewater lines, or water lines next to manholes) the installation must meet the requirements of 30 TAC § 317.13 (Design of Sewerage Systems) or 30 TAC §290.44(e) (Water Hygiene).

12. Where sewers lines deviate from straight alignment and uniform grade all curvature of sewer pipe must be achieved by the following procedure which is recommended by the pipe manufacturer:
_____.

If pipe flexure is proposed, the following method of preventing deflection of the joint must be used:
_____.

Specific care must be taken to ensure that the joint is placed in the center of the trench and properly bedded in accordance with 30 TAC §317.2(a)(%).

13. New sewage collection system lines must be constructed with "stub outs" for the connection of anticipated extensions. The location of such "stub outs" must be marked on the ground such that the location of stub "stub outs" can be easily determined at the time of connection of the extensions. Such "stub outs" must be manufactured wyes or tees that are compatible in size and material with both the sewer line and the extension. At the time of original construction, new "stub outs" must be constructed sufficiently to extend beyond the edge(s) of any street pavement under which they will pass to the property line. All "stub outs" must be sealed with a manufactured cap to prevent leakage. Extensions that were not anticipated at the time of original construction or that are to be connected to an existing sewer line not furnished with "stub outs" must be connected using a manufactured saddle and in accordance with accepted plumbing techniques.

If no stub-out is present an alternate method of joining laterals is shown in the detail on Plan Sheet ____ of ____. (For potential future laterals):

The private service lateral stub-outs must be installed as shown on the plan and profile sheets on Plan Sheet _____ of _____ and marked after backfilling as shown in the detail on Plan Sheet _____ of _____.

14. Trenching, bedding and backfill must conform with 30 TAC §317.2(a)(5). The bedding and backfill for flexible pipe must comply with the standards of ASTMD D-2321, Classes IA, IB, or III. Rigid pipe bedding must comply with the requirements of ASTM C 12(ANSI A 106.2) classes A, B or C.

15. Sewer lines must be tested from manhole to manhole. When a new sewer line is connected to an existing stub or clean-out, it must be tested from existing manhole to new manhole. If a stub or clean-out is used at the end of the proposed sewer line, no private service attachments may be connected between the last manhole and the cleanout unless it can be certified as conforming with the provisions of 30 TAC §213.5(c)(3)(E).

16. All sewer lines must be tested in accordance with 30 TAC §317.2(a)(4). The engineer must retain copies of all test results which must be made available to the executive director upon request. The engineer must certify in writing that all wastewater lines have passed all required testing to the appropriate regional office within 30 days of test completion and prior to use of the new collection system. Testing method will be:

(A) Infiltration of Exfiltration Tests. The total exfiltration as determined by a hydrostatic head test, must not exceed 50 gallons per inch diameter per mile of pipe per 24 hours at a minimum test head of two feet above the crown of the pipe at the upstream manhole. When pipes are installed below the groundwater level an infiltration test must be used in lieu of the exfiltration test. The total infiltration, as determined by a hydrostatic head test, must not exceed 50 gallons per inch diameter per mile of pipe per 24 hours at a minimum test head of two feet above the crown of the pipe at the upstream manhole, or at least two feet above existing groundwater level, whichever is greater. For construction within the 25 year flood plain, the infiltration or exfiltration must not exceed 10 gallons per inch diameter per mile of pipe 24 hours at the same minimum test head. If the quantity of infiltration or exfiltration exceeds the maximum quantity specified, remedial action must be undertaken in order to reduce the infiltration or exfiltration to an amount within the limits specified.

(B) Low Pressure Air Test. The procedures for the low pressure air test must conform to the procedures described in ASTM C-924, ASTM F-1417 or other appropriate procedures, except for testing times. The test times must be as outlined in this section. For sections of pipe less than 36-inch average inside diameter, the following procedure must apply unless the pipe is to be joint tested. The pipe must be pressurized to 3.5 psi greater than the pressure exerted by groundwater above the pipe. Once the pressure is stabilized, the minimum time allowable for the pressure to drop from 3.5 pounds per square inch gauge to 2.5 pounds per square inch gauge must be computed from the following equation:

where: $$T = \frac{0.085 \times D \times K}{Q}$$

T= time for pressure to drop 1.0 pound per square inch gauge in seconds
K= 0.000419 X D X L, but not less than 1.0
D= average inside pipe diameter in inches
L= length of line of same size being tested, in feet
Q= rate of loss, 0.0015 cubic feet per minute per square foot internal surface will be used.

Since a K value of less than 1.0 will not be used, there are minimum times for each pipe diameter as outlined below:

PIPE D IAMETER (INCHES)	MINIMUM TIME (SECONDS)	LENGTH FOR MINIMUM (FEET)	TIME FOR LONGER LENGTH (SECONDS)
6	340	398	0.855(L)
8	454	298	1.520(L)
10	567	239	2.374(L)
12	680	199	3.419(L)
15	850	159	5.342(L)
18	1020	133	7.693(L)
21	1190	114	10.471(L)
24	1360	100	13.676(L)
27	1530	88	17.309(L)
30	1700	80	21.369(L)
33	1870	72	25.856(L)

The test may be stopped if no pressure loss has occurred during the first 25% of the calculated testing time. If any pressure loss of leakage has occurred during the first 25% of the testing period, then the test must continue for the entire test duration as outlined above or until failure. Lines with a 27-inch average inside diameter and larger may be air tested at each joint. Pipe greater than 36 inch diameter must be tested for leakage at each joint. If the joint test is used, a visual inspection of the joint must be performed immediately after testing. The pipe is to be pressurized to 3.5 psi greater than the pressure exerted by groundwater above the pipe. Once the pressure has stabilized, the minimum time allowable for the pressure to drop from 3.5 pounds per square inch gauge to 2.5 pounds per square inch gauge must be 10 seconds.

(C) Deflection Testing. Deflection test must be performed on all flexible pipes. For pipelines with inside diameters less than 27 inches, a rigid mandrel must be used to measure deflection. For pipelines with a inside diameter of 27 inches and greater, a method approved by the executive director must be used to

test for vertical deflections. Other methods must provide a precision of ± two tenths of one percent (0.2%) deflection. The test must be conducted after the final backfill has been in place at least 30 days. No pipe will exceed a deflection of five percent. If a pipe should fail to pass the deflection test, the problem must be corrected and a second test must be conducted after the final backfill has been in place an additional 30 days. The test must be performed without mechanical pulling devices. The design engineer should recognize that this is a maximum deflection criterion for all pipes and a deflection test less than five percent may be more appropriate for specific types and sizes of pipe. Upon completion of construction, the design engineer or other Texas Licensed Professional Engineer appointed by the owner must certify, to the Executive Director, that the entire installation has passed the deflection test. This certification may be made in conjunction with the notice of completion required in §317.1(e)(1) of this title (relation to General Provisions). This certification must be provided for the Commission to consider the requirements of the approval to have been met.

(i) The rigid mandrel shall have an outside diameter (O.D.) equal to 95% of the inside diameter (I.D.) of the pipe. The inside diameter of the pipe, for the purpose of determining the outside diameter of the mandrel, shall be the average outside diameter minus two minimum wall thickness for O.D. controlled pipe and the average inside diameter for I.D. controlled pipe, all dimensions shall be per appropriate standard. Statistical or other "tolerance packages" shall not be considered in mandrel sizing.

(ii) The rigid mandrel shall be constructed of a metal or a rigid plastic material that can withstand 200 psi without being deformed. The mandrel shall have nine or more "runners" or "legs" as long as the total number of legs is an odd number. The barrel section of the mandrel shall have a length of at least 75% of the inside diameter of the pipe. A proving ring shall be provided and used for each size mandrel in use.

(iii) Adjustable or flexible mandrels are prohibited. A television inspection is not a substitute for the deflection test. A deflectometer may be approved for use on a case by case basis. Mandrels with removable legs or runners may be accepted on a case by case basis.

17. All manholes must be tested to meet or exceed the requirements of 30 TAC §317.2(c)(5)(H).

18. All private service laterals must be inspected and certified in accordance with 30 TAC §213.5(c)(3)(I). After installation of and, prior to covering and connecting a private service lateral to an existing organized sewage collection system, a Texas Licensed Professional Engineer, Texas Registered Sanitarian, or appropriate city inspector must visually inspect the private service lateral and the connection to the sewage collection system, and certify that it is constructed in conformity with the

applicable provisions of this section. The owner of the collection system must maintain such certifications for five years and forward copies to the appropriate regional office upon request. Connections may only be made to an approved sewage collection system..

THESE GENERAL CONSTRUCTION NOTES MUST BE INCLUDED ON THE CONSTRUCTION PLANS PROVIDED TO THE CONTRACTOR AND ALL SUBCONTRACTORS.

ADDITIONAL MISCELLANEOUS SAWS NOTES

January 26, 2006

1. This project is within the **Edwards Aquifer Recharge Zone**. All material and construction procedures within the scope of this contract shall be approved by the San Antonio Water System (SAWS) and comply with current specifications.

2. The Contractor shall not proceed with any pipe installation work until they obtain a copy of the approved G.C.P. from the Consultant and has been notified by SAWS Construction Inspection Division to proceed with the work and has arranged a meeting with the inspector and consultant for the work requirements.

3. The locations and depths of existing utilities, to include service laterals, shown in these plans are approximate only. It shall be the Contractor's responsibility to locate utility service lines 48 hours prior to excavation and to protect the same during construction.

San Antonio Water System **(Water, Sewer & Recycled Water)**	233-2010
Drainage	1-800-545-6005
Telephone	1-800-545-6005
City Public Service	1-800-545-6005
Paragon Cable TV	1-800-545-6005
Valero Energy Co.	1-800-545-6005

4. The Contractor shall maintain service to all existing sanitary sewers at all times during construction.

5. All work in Texas Highway Department and Bexar County right-of-way shall be done in accordance with respective with respective construction specifications and permit.

6. Due to Federal Regulations Title 49, Part 192.181, City Public Service must maintain access to gas valves at all times. The contractor must protect and work around gas valves that are in the project areas.

7. All manholes shall be constructed so that the top of the ring is at least four inches above the finished grade of the surrounding ground except when located in paved areas. In paved areas, the manhole ring shall be flush with pavement.

8. On any manholes to be abandoned, the rings and cover shall be salvaged in accordance with the Standard Specifications, Item 862, and the hole backfilled to the satisfaction of the Inspector.

9. The use of asbestos cement pipe will be prohibited under this contract. All ductile iron pipe used in this system shall be corrosion protected on both the interior and exterior surfaces. All corrosion protection shall be applied and installed in such a manner as to maintain a continuously protected surface after final pipe installation.

10. All PVC sewer pipe with over 14 feet of cover shall be extra strength, minimum pipe stiffness of 115 psi.

11. Sewer pipe connections to pre-cast manholes will be compression joints as approved by SAWS, Mechanical joint "Boot type" connections alone will not be allowed. "Boot type joints may be used in conjunction with compression joints as approved by SAWS. Any changes from these methods must be approved by SAWS.

12. All residential sewer service lateral shall be extended to the property line and capped and sealed. (item. No. DD-854-01).

13. Where required, concrete encasement shall be placed for full width of the trench to a plane 6" above the top of the pipe, with pay limits as shown on the item No. DD-858-01.

14. A minimum of 3 feet of cover is to be maintained over the sanitary sewer main and laterals at subgrade, otherwise concrete encasement will be required.

15. No blasting shall be performed within 75 feet of existing utilities.

16. Contractor is responsible for removal of all waste materials upon project completion. The Contractor shall not permanently place any waste materials in the 100-year flood plain without first obtaining an approval Flood Plain Development Permit.

17. The Contractor shall not place any materials on the Recharge Zone of the Edwards Aquifer without an approved water pollution abatement plan from the TCEQ.

18. Contractor and/or Contractor's independently retained employee or structural design/geotechnical/safety/equipment consultant, if any, shall review these plans and available geotechnical information and the anticipated installation site(s) within the project work area in order to implement Contractor's trench excavation safety protection systems, programs and/or procedures. The Contractor's implementation of the system, programs and/or procedures shall provide for adequate trench excavation safety protection that complies with as a minimum, OSHA standards for trench excavations. Specifically, Contractor and/or Contractor's independently retained employee or safety consultant shall implement a trench safety program in accordance with OSHA standards

governing the presence and activities of individuals working in and around trench excavation.

19. A. The Texas Commission on Environmental Quality and Environmental Protection Agency (EPA) require erosion and sedimentation control for construction of sewer collection systems. Developer or authorized representative shall provide erosion and sedimentation control as noted on the project's plan and profile sheets.

B. At a minimum these controls shall consist of rock berms and/or silt fences constructed parallel to and down gradient from the trenches. The rock berm or silt fences shall be installed in a manner such that any rainfall runoff shall be filtered. Hay bales shall not be used for temporary erosion and sedimentation controls.

C. All temporary erosion and sedimentation controls must be installed prior to construction, shall be maintained during construction, and shall be removed when vegetation is established and the construction area is stabilized. Additional protection may be necessary if excessive solids are being discharged from the site.

20. All temporary erosion and sedimentation controls shall be removed by the Contractor at final acceptance of the project by the San Antonio Water System.

21. Placement of such controls shall be in accordance with the construction plans. Actual locations may vary slightly from the plans, but will be verified by the Engineer/Inspector in the field prior to sewer line construction. The Contractor and City Inspector shall inspect the controls at weekly intervals and after every significant rainfall to insure significant disturbance to the structures has not occurred. Sediment deposited after a significant rainfall shall be removed from the site or placed in an approved designated soil disposal area.

22. A deflection test shall be performed on all flexible pipe. The test shall be conducted after initial backfill has been in place at least 30 days. Item no. 849

23. All mains must pass air Testing per item No. 849 in the Standard Specifications prior to acceptance by the San Antonio Water System.

24. All mains must comply with item No. 868 of sewer main cleaning.

25. Water jetting the backfill within a street will not be permitted. Sanitary sewer trenches subject to traffic shall conform to the City of San Antonio Standard Specifications for Public Works Construction and SAWS item 804.

26. Sanitary sewer main connections made directly to existing manholes will require successful testing of the manholes in accordance with the Standard Specifications item 849.

27. After construction, testing will be done by T.V. camera by the Contractor and observed by Inspector, and Wastewater Engineering personnel as the camera is run through the lines. Any Abnormalities, such as broken pipe or misaligned joints, must be replaced by the Contractor at his expense.

28. A copy of all testing reports shall be forwarded to the San Antonio Water System Construction Inspection Division.

29. No extra payment shall be allowed for work called for on the plans but not included on the bid schedule. This incidental work will be required and shall be included under the pay item to which it relates.

30. The Developer dedicates the sanitary sewer mains upon completion by the developer and acceptance by the San Antonio Water System. The San Antonio Water System will own and maintain said sanitary sewer mains which are located within this particular subdivision. (As applicable)

31. The Developer will be responsible for the lift station maintenance fee in effect at the time of Certification. The current lift station maintenance fee per lift station will be collected prior to plat recordation.

32. WORK COMPLETED BY THE CONTRACTOR WHICH HAS **NOT** RECEIVED A GENERAL CONSTRUCTION PERMIT OR THE CONSENT OF THE SAN ANTONIO WATER SYSTEM CONSTRUCTION INSPECTION DIVISON WILL BE SUBJECT TO REMOVAL AND REPLACEMENT BY AND AT THE EXPENSE OF THE CONTRACTOR.

TRENCH EXCAVATION SAFETY PROTECTION

Contractor and/or contractor's independently retained employee or structural design/geotechnical/safety/equipment consultant, if any, shall review these plans and available geotechnical information and the anticipated installation site(s) within the project work area in order to implement Contractor's trench excavation safety protection systems, programs and/or procedures. The Contractor's implementation of the systems, programs and/or procedures shall provide for adequate trench excavation, safety protection that complies with as a minimum, OSHA standards for trench excavations. Specifically, Contractor and/or Contractor's independently retained employee or safety consultant shall implement a trench safety program in accordance with OSHA standards governing the presence and activities of individuals working in and around trench excavation.

NOTE MUST BE ON ALL PLAN & PROFILE SHEETS