SECTION 15400

Sewage Treatment Plant

PART 1 GENERAL

1.01 SCOPE OF WORK

1. The Contractor shall furnish all labor, tools, equipment, material, and performing all operations necessary to install a sewage treatment plant at the indicated site and as shown on the Drawings. This work includes connection to building drain, service cleanouts, sewage treatment plant, discharge line, abandonment of existing septic tank, fittings, and appurtenances in accordance with these specifications and Drawings.
2. The sewage treatment plant shall be constructed at the location shown on the Drawings. Field changes in location and orientation may be required as directed by the Owner or Owner’s Representative at the time of construction. Backfilling, compaction, and any needed dewatering shall be completed in accordance with Section 02220.
3. Pipe joints and fitting installation shall be in accordance with the manufacturer’s recommendations. All pipes and joints shall be approved by the Owner or Owner’s Representative prior to backfilling. The work will not be accepted until satisfactory backfilling, compaction, and cleanup is complete. Final grading should prevent surface water runoff from pooling around installed facilities. If the work does not meet the specified requirements of this section, the Contractor shall remove and replace at the Contractor’s expense. The Contractor shall leave each premise in a neat and orderly condition, restoring it as near as possible to its original condition and to the approval of the Owner or Owners’ Representative.

1.02 SUBMITTALS

A. Provide the following information to confirm compliance with the specification in addition to the submittal requirements specified in Section 01340.

1. Complete description of all materials including the material thickness of all components.

2. Installation drawings showing all details of construction, details required for installation, dimensions, and support locations.

1.03 QUALITY ASSURANCE

A. Qualifications

1. Manufacturer Qualifications: Minimum 5-year experience manufacturing similar products. The sewage treatment plant shall be furnished by a vendor organization that assures design, installation, and services coordination with the manufacturer.
2. The sewage treatment plant furnished shall have been tested according to requirements listed in NSF/ANSI Standard #40 and meets or exceeds Class 1 characteristic requirements.
3. The specification is based on the Aquasafe Model ASO500 as manufactured by Ecological Tanks Inc., 2247 LA-151, Downsville, LA 71234 and locally represented by E J Breaux Contractors LLC, 115 Leonie Street, Pierre Part, LA.

1.04 WARRANTY

1. The sewage treatment plant shall be warranted against functional failure due to defects in material and manufacturer's workmanship for a period of three (3) years from date of installation.

PART 2 MATERIALS

2.01 GENERAL

Inspect all materials to verify that they meet these specifications and match the approved submittals. Install all materials and equipment in strict accordance with the manufacturer’s recommendations, applicable codes and regulations and these specifications. The unloading, handling and storage of the pipe and materials shall be conducted in a safe manner. Inspect all materials prior to installation to ensure that they are in new condition. Inspect pipe and fittings for defects. Plastic pipes with scratches, gouges, grooves, or discoloration shall be rejected. Remove all materials from site that are defective, damaged, used, unsound or that otherwise do not meet the specifications.

2.02 Pipe and Fittings: Solid pipe and fittings utilized for sewage treatment plant and discharge including sewer service line (from building to sewage treatment plant), cleanouts, discharge piping (from sewage treatment plant to east waterway), observation ports, and appurtenances shall meet the following:

1. 4-inch diameter PVC SDR 35 pipe with pipe and fittings conforming to ASTM D3034 or Schedule 40 PVC pipe with pipe and fittings conforming to ASTM D1785.
2. Gasketed joints shall be bell-ended and conform to ASTM D3212. All joints and connections in the pipe shall be watertight. Use elastomeric gaskets conforming to ASTM F477.
3. The standard pipe length shall be 20 feet. Each length of pipe shall be clearly marked with the following: manufacturer, nominal pipe size, PVC cell classification, type PSM PVC sewer pipe, ASTM designation and pipe class.
4. Only rigid couplers will be allowed, such as PVC fittings, shielded Fernco or approved equal. Nonrigid couplers will not be allowed.

2.03 Cleanouts: Double service line (two-way) cleanout piping and fittings shall be 4-inch diameter PVC pipe matching the chosen sewage treatment plant drain piping material. The cleanout piping and cap shall be threaded.

1. The cleanouts shall be installed with a brass hex socket plug equal to Tyler A Low Square Head cleanout plug. The cleanout ferrule shall be a Tyler 4-3 ½ or approved equal.
2. The poly seal foam wrapped around the cleanout ferrule shall be Sill Seal underlayment foam or approved equal.
3. The double service line cleanout shall be installed in a 20-inch x 40-inch x 4-inch concrete pad (collar) as shown in the detail drawings. The wire mesh used for the concrete pad shall be ASTM approved W 1.4 (1/8 inch) wire mesh on 6-inch centers.

2.04 Sewage treatment plant: Sewage treatment plant shall be a circular, dual compartment tank that employs an extended aeration activated sludge process. It shall have a minimum capacity of 500 gallons per day. The minimum B.O.D. loading shall be 1.25 lbs./day.

1. The circular tank shall be composed of two compartments – an outer aeration mixing compartment and an offset clarifier compartment.
2. The tank shall be constructed of precast, reinforced concrete of sufficient strength to withstand hauling and handling stresses and shall meet all state and local regulations for the state and localities for which it is installed.
3. Sewage treatment plant shall be water-tight and shall have a 28-day compressive strength of at least 3,000 psi.
4. Chipped and honey combed tanks shall not be approved and will be rejected if delivered and installed.
5. The dimensions of the sewage treatment plant shall be labeled on the detail or the design drawings. Minimum wall thickness shall be 3-inches. Minimum distance between inlet and outlet of the tank shall be six (6) feet. The minimum width of the tank shall be six (6) feet.
6. The sewage treatment plant shall be of monolithic construction below the liquid line. Tank shall be cast as one piece with a lid cast as the top of the tank. If tank is cast as a clamshell, with two pieces, then the joints below the liquid line shall be interlocking V-notch, shiplap or tongue and groove. All joints shall be sealed with an epoxy-based sealing compound or Ram-Nek flexible gasket or equal to prevent water infiltration of exfiltration. All joints below the liquid level shall be tested prior to backfilling and shall not have any leaks.
7. The bottom of the outlet invert of the tank, for a baffle or a sanitary tee shall be at least two (2) inches lower than the bottom of the inlet invert of the tank. Install tank with the tank inlet (higher invert penetration) facing towards the building. A minimum of one (1) inch of clear space shall be provided between the top of the baffles or tees and the underside of the tank.
8. Final fabrication dimensions and details of the structure shall be approved by the Owner or Owner’s Representative in writing prior to fabrication and installation.

2.05 Sewage treatment plant Manholes: Manholes, a minimum of 24 inches in diameter, must be installed to provide access to the inlet of the sewage treatment plant for pumping/maintenance purposes and to the outlet of the sewage treatment plant to access the effluent filter.

1. Manholes shall have approved watertight seals to the tank.

2.06 Paint: Paint used for all exposed PVC material shall be an epoxy or enamel UV protectant paint that bonds well with PVC and is green in color.

PART 3 EXECUTION

* 1. INSTALLATION

Verify that dimensions and elevations are as indicated on the plans.

A. Sewer Service Line: Sewer service lines shall be furnished and installed by the Contractor from the sewage treatment plant to the point of connection as shown on the plans or as directed by the Owner or Owner’s Representative.

1. Connection to Building:

a) Sewer service lines shall be connected to the building stub out sewer drain with approved fittings or rigid couplers which shall be installed in accordance with the manufacturer’s recommendation.

b) If clamps/bands are required on the couplers, they shall be at a minimum 300 series stainless steel.

c) For connecting beneath the station, place pipe hangers at a maximum distance of four (4) feet apart for horizontal PVC pipe.

d) Minimum cover over solid sewer pipe shall be 12 inches or as approved and shown on the plans.

2. Pipe Slope and Bends:

a) All 4-inch PVC piping from the building stub out sewer drain to the sewage treatment plant shall be laid at a minimum grade of 2% or 1/4-inch per foot and maximum grade of 4% or1/2-inch per foot.

b) From the sewage treatment plant to the discharge pipe, the four (4) inch PVC pipe shall be laid at a minimum grade of 1% or 1/8-inch per foot).

c) Buried pipe shall have six (6) inches of crushed limestone bedding within a trench lined with filter fabric.

d) Any changes or deviations in line alignment shall be made with bends not exceeding an angle of 45 degrees and shall obtain approval from the Owner or Owner’s Representative prior to making change.

e) Connections to existing building drains which result in a change of direction of the line by more than 45 degrees requires the installation of a two-way cleanout at that location.

f) There shall be no 90-degree bends in the pipe between the building and the sewage treatment plant.

3. Pipe Installation Requirements:

a) Installation of pipe, including joint lubrication and assembly, solvent welding, pipe bending and joint deflection shall be in accordance with the manufacturer’s recommendations.

b) Sewer service lines and connections must be constructed with maximum joint deflection not to exceed the manufacturer’s recommendations and in no case shall exceed 1 inch per foot in any joint. Larger changes in direction must be made by use of standard 1/16 or greater bends.

B. Cleanouts: Sewer service line cleanouts shall be installed at the locations to allow for rodding/snaking the sewer line both towards the building and towards the sewage treatment plant.

C. Sewage treatment plant: The sewage treatment plant shall be installed at the location in the Drawings. Install tank in accordance with the manufacturer’s recommendations.

1. Setting Tank:

a) Prepare an excavation site by digging a hole at least one (1) foot larger than the treatment plant and a depth to provide proper bedding and that will allow for sufficient coverage leaving approximately three (3) inches of the inspection port to extend above normal ground level. The depth of the plant will be controlled by the depth of the building, sewer outlet line plus the amount of proper fall required from the building outlet sewer line to the inlet invert of the plant. The prepared excavation should have a solid, level bottom that will eliminate plant settling.

b) The Contractor shall set the tank on a 6-inch thick, minimum, bed of sand or gravel to facilitate leveling the tank. The base bedding shall be compacted to 95% Modified Proctor Density.

c) The base bedding shall present a smooth, uniform and level surface.

d) Seal the tank inlet and outlet with temporary plugs until connections are made to the inlet and outlet lines.

2. Sealed Joints:

a) Seal all joints between inlet piping, outlet piping, riser, and etcetera, as approved by the Owner or Owner’s Representative.

b) The sewer service line shall be sealed with a rubber gasket (boot-type fitting) or masonry grouted at connection points to the inlet and discharge openings of the sewage treatment plant to prevent ground water infiltration.

3. Backfilling Tank:

a) Prior to backfilling, the tank elevation shall be checked at all corners to assure that placement is level and is set at the appropriate depth.

b) Backfill in 12-inch layers and thoroughly compact in a manner that will not produce undue strain on the tank.

c) Final backfill material shall be mounded 6 inches above the natural ground surface to allow for settlement.

d) Do not exceed 24 inches of cover unless tank is designed for a deeper bury depth and approval is obtained from the Owner or Owner’s Representative.

4. Groundwater:

a) If groundwater is present, dewater, as needed.

b) All work in setting the tank shall be done under dry conditions.

c) In these conditions, the sewage treatment plant may need be filled with water to prevent flotation of the tank.

5. Extended Aeration Sludge Activation Unit (Aerator):

a) Unit may be placed remotely to the sewerage treatment plant in a location approved by the Owner.

D. Backfilling:

* 1. Before backfilling, the system shall be inspected by the Owner or Owner’s Representative.
  2. Backfill material shall be hand selected to be free of organic and other potentially clogging material and hand placed to a point three (3) inches above the highest chamber perforation.
  3. Place and pack down soil at chamber interlocking joints. Backfill to cover the louvers. Backfill shall be packed down by walking along the edges of the trench to assure structural support of the chambers.
  4. The remaining backfill material may be mechanically placed.
  5. A minimum cover of 12 inches is required or as recommended by the manufacturer.
  6. Trench backfill material shall be mounded six (6) inches above the natural ground surface to allow for settlement and to divert away runoff water.
  7. After the system is covered, the site should be seeded to prevent erosion.

E. Filter Fabric: Filter fabric shall be installed in accordance with chamber manufacturer's recommendations. Filter fabric shall be installed directly on top of (draped over) the chambers prior to initial backfill. Use soil to hold the filter fabric in place and then backfill.

F. Observation Pipe: Observation pipes shall be constructed of solid four (4) inch PVC pipe and shall installed at the end of each chamber leg or as indicated on the plans.

1. The pipe shall be installed through the knockout ports on the chambers using couplings to keep the pipe from dropping into the chamber and preventing the removal of the pipe.

2. The riser shall extend between 18 inches and 24 inches above ground surface.

3. PVC threaded caps shall be installed on each riser as shown in the detail.

4. Observation pipe and caps shall be painted with two (2) coats of epoxy green spray paint for UV protection.

G. Inspection: The installed sewage treatment plant shall be inspected by the Owner or Owner’s Representative.

1. The Contractor shall provide the Owner or Owner’s Representative with a minimum of 24-hour notice on the need for inspection prior to final backfill of the sewage treatment plant and discharge pipe installation.

2. The sewer service lines, sewage treatment plant and discharge pipe shall remain uncovered until inspected and approved by the Owner or his/her representative.

3. Backfill prior to such approval will be cause for rejection of the construction for payment until disputed sections are uncovered for inspection purposes.

4. All such re-excavation shall be at the sole expense of the Contractor.

1. Septic Tank Abandonment: Existing septic tank to be disconnected and abandoned according to the following method:

1. The tank shall have the liquid and solids/sludge pumped by a septic pump truck so that the tank is left empty. The removed materials shall be disposed of properly according to state and federal requirements.

2. Remove and dispose of any interior pipes, plumbing, or pumps as directed by the Owner’s Representative.

3. Remove and dispose of concrete tank cover, risers and inspection pipes as directed by the Owner’s Representative.

4. The tank shall then be crushed in place and filled with its own crushed concrete debris.

5. The crushed tank shall then be backfilled with suitable, compactable, soil material, to fill the void left by the tank.

6. The backfilled soil shall be properly compacted to prevent subsidence and to bring the backfilled area to the same level as the surrounding grade.

**END OF SECTION**