

DUCKETT CREEK SEWER DISTRICT
LOW PRESSURE SEWER SYSTEM
SPECIFICATIONS



Revised July 2016

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SECTION A: PURPOSE AND INTENT

1. With the publication of these specifications which amends and supersedes previous specifications, Low Pressure Sewer Systems constructed as specified herein will be considered for approval for use in the Duckett Creek Sanitary District.
2. The type of Low Pressure Sewer System specified herein shall consist of individual private home/unit Grinder Pump Station with pressure discharge line connection to a pressurized Common Collector Main. Grinder pumps, vaults, check valves, shutoff valves, valve boxes, clean-outs, air release valves and other appurtenances shall meet or exceed District specifications. Each lot, home residence or commercial unit shall have its own individual Grinder Pump Station and pressure discharge line to the Common Collector Main.
3. The District's intent is to provide an alternative method to sewer undeveloped property presently considered impractical for conventional gravity sewers, and/or existing septic tank subdivisions which may be too hazardous or disruptive to sewer by conventional gravity sewers.
4. Conventional gravity sewers are still the preferred sewage collection method. Low Pressure Sewer Systems (LPSS) are not meant to replace gravity sewers. The District will continue to require the use of gravity sewers as the primary sewer method, but will consider LPSS systems when certain criteria apply.
5. In order for the District to consider approval of LPSS system(s):
 - a. For new Subdivision, Developers must demonstrate that;
 1. Gravity sewers are impractical, for reasons such as; two or more on-site public lift stations serving less than 10 homes each will be required; or extraordinary excavation is required; other reasons which would prevent gravity installations (Engineer must specify) and/or;
 2. The site system will not be needed for future sewer access from adjacent properties: (LPSS systems generally can be designed to handle "on-site" demand only) and/or;
 3. Other specific site concerns must be addressed.
 - b. For existing septic tank subdivisions, it must be demonstrated that;
 1. Gravity sewers are impractical or too hazardous, i.e., too deep, too congested area, confined working areas, restoration too costly, and/or;
 2. The site system will not be needed for future sewer access from adjacent properties, and/or;
 3. Other specific site concerns must be addressed.

SECTION A: PURPOSE AND INTENT (CONT'D)

6. For reasons of system uniformity, for an unspecified probative time period, the District will approve the use of Environment-One Corporation semi-positive displacement pumps and appurtenances only.
7. The District reserves the right to approve or reject any or all submittals, additions, modifications or revisions of connections to the existing or future systems.
8. The District reserves the right to modify, revise, delete or add to the specifications and requirements stated herein.
9. Construction Permit for LPSS Systems in the District, shall be applied for by the Subdivision Developer. Upon proper completion of construction, establishment of easements and District field approval, the District may accept the public dedication of the common collector mains to include the branch mains and valve vaults. Individual grinder pumps and related individual pressure discharge laterals will not be accepted for public dedication by the District. As such, the individual grinder pumps and pressure discharge laterals will be the responsibility of the respective home owner or Homeowner's Association.

SECTION B: SYSTEM RESPONSIBILITIES

1. All construction shall be in accordance with all applicable State, Federal or Local codes, restrictions and specifications.
2. All components of the pressurization/pressurized system require District review and approval.
3. Upon proper completion of installation of the system, ownership and responsibility for maintenance and operation of all parts of the L.P.S.S. system shall be as follows:
 - a. Upon completion of construction, establishment of easements, final field approval by the District, and proper execution of all required Connection and Dedication Agreements, the District may accept the public dedication of the **Common Collector Mains**, to include collector main lines, appurtenances directly attached to the main, branch mains and valve vaults.
 - b. The gravity lateral, grinder pump station, control panel, electric service, and pressure discharge lateral for each individual

SECTION B: SYSTEM RESPONSIBILITIES (CONT'D)

home/unit/connection, will belong to, and be the responsibility of the owner of each respective home/unit/connection. Pressure lateral connections to the valve vault on the public main is the responsibility of the respective home owner. Connections must be done in a proper manner and require inspection approval from the District.

4. District approval and inspection is required for the entire common collector main portion of the system.
5. District approval and inspection is required for the connections to the valve box, and any septic tank demolition(s) encountered in existing subdivisions. County Building Department Permits or Inspections are required for the electrical or plumbing work. The individual owners or builders are required to secure said Permits and/or Inspections.
6. District reserves the right to reject or disallow pressure lateral connection to Valve Box when non-specified equipment is used in the aforementioned "private individual portion" of the system. See sections A.6, A.7, and B.3.
7. Upon connection to the system, each individual homeowner will be responsible for payment of their own respective sewer user charges and applicable surcharges, as determined by the District and in accordance with its 'Rules, Rates and Regulations'. Non-payment of said sewer user charges and/or applicable surcharges by the homeowner to the District, may result in placement of lien on property, discontinuance of water supply or disconnection from the common public main system, or other measures necessary as determined by the District. All sewer users are subject to the 'Rules, Rates and Regulations' of the District.
8. Homeowners are responsible for supply and maintenance of their own respective electrical power source.
9. Off-site connections to a LPSS system require approval from the District. The Design Engineer shall consider connections to the system from adjacent off-site properties when necessary. Engineer shall designate probable off-site connections on the plan, profile and hydraulic calculations. Engineer shall provide appropriate documentation in the event 'on-site' LPSS system cannot accommodate off-site connections.

SECTION C: CONSTRUCTION PLAN SUBMITTALS

1. Construction Plan submittals should include the same site and profile design, construction details, etc., information typically required for conventional sewer plan submittals.
2. Site specific hydraulic design information regarding pumps and collection system sizing and layout should be included as an integral part of the construction plan.
3. Pressure Sewer Systems shall be designed and sized for a specific number of units. Extending or adding on to any portion of the original pressure system piping to accommodate additional flow will not be allowed, unless by design. District approval is required.
4. Construction Escrow for the “**common collector main**” portion (see Section B.3.a.) shall be required for new subdivision construction plan approval. District Escrow Agreement document shall be used.
5. Sanitary Sewer Connection Fees shall be paid in total prior to District approval of Subdivision Construction Plan.
6. Application for Construction Permit shall be completed by the Developer/Design Engineer. The District shall be specified as the Operating Authority, for the public collector mains only.

SECTION D: COLLECTOR MAIN SPECIFICATIONS

1. All Collector Main construction requires plan approval and field inspection by the Duckett Creek Sanitary District. An Engineer’s Report shall accompany all plan submittals and shall specify appropriate strength, sizing and type of all materials. Self-cleaning velocities and six (6) hour maximum retention times are recommended.
2. All Collector Mains, main branches and Valve Boxes shall be placed in dedicated Recorded Public right-of-way or easement.
3. The Collector Pressure Main shall discharge to a District gravity sewer 42” I.D. manhole at or within one foot of the gravity low flow line. Connections to a 48” I.D. manhole may be performed utilizing District approved “inside-drop pipe”. All connections to gravity manholes should provide a smooth transition from pressure to gravity, minimizing “free-fall” or splashing conditions.
4. 12 AWG tracer wire shall be placed on the entire length of the force main, to be accessed at existing gravity manholes, air-release valve vaults, clean-out vaults and other surface appurtenances.

SECTION D: COLLECTOR MAIN SPECIFICATIONS (CONT'D)

5. Unless special design parameters dictate otherwise (provide Engineering documentation), all **Common Collector Pressure Mains** shall:
- a. Be laid using “equal to or stronger than”, bell and gasketed SDR 21 PVC pressure pipe. Glued Schedule 80 PVC fittings shall be allowed within the valve box interiors and as shown on detail. Bury at minimum 36” Depth for frost protection.
 - b. Maintain a minimum pipe inside diameter of two inches.
 - c. All PVC fittings on the Collector Pressure Main shall be SDR 21 PVC.
 - d. Force main flushing clean-outs shall be provided appropriately to facilitate complete flushing of the Collector Pressure Main. One and one-half inch (1-1/2”) I.D. bronze Cam-lock female Disconnect fittings are recommended. In general, clean-outs should be installed at the terminus end of each main, every 1,000 feet on straight runs of pipe, and whenever two or more mains come together and feed into another main.
 - e. Air-release valves shall be provided at all high points on the Collector Pressure Main. Cleanout flushing fixtures may be placed within the Air-Release valve vault. Increase size of vault to 48” I.D. to accommodate additional fixtures.
 - f. Isolation valves shall be provided at junctions of two or more mains.
 - g. Concrete thrust blocks shall be provided for all elbows and tee fittings on the Collector Pressure Main.
 - h. All appurtenances on the collector main requiring surface access, such as flushing clean-outs, air-release valves, isolation valves, etc., shall be housed within a 42” minimum I.D. concrete type vault, with cast-iron frame and cover. Materials shall be of strength similar to standard gravity sewer manhole construction. It is anticipated that some vaults may fall in paved driveway or roadway areas, wherein lock type lid will be required.
 - i. Any permits, licenses, easements or approvals required to work on public or private properties or roadways are the responsibility of the developer.
 - j. Individual pressure main branches from the Collector Pressure Main to the valve box shall be 1 1/2” i.d. SDR 21 PVC, however, 1 1/4” i.d. may be used for single valve vault branches. Bury at minimum 36” depth for frost protection.
 - k. Pressure main stub branches shall terminate within a valve box located within either dedicated recorded public right-of-way or easement adjacent to ROW. District must access valve boxes from public roadway. A lockable ball/gate valve and check valve shall be provided for each individual pressure lateral connection within the valve box. Direct burial of valves not allowed.
 - l. Check valve and ball valve sets shall be placed in valve vault for each individual pressure lateral connection.

SECTION D: COLLECTOR MAIN SPECIFICATIONS (CONT'D)

Recommend Ball Valve, Brass, female x female McDonald #2131 or Ford 1 1/4" x 1 1/4" or approved equal. Bronze body valves will be considered only if internal parts and fasteners are stainless steel. Recommend Check Valve compatible and equal to E-1 Corporation. Unions on both sides of valves must be utilized to allow removal and/or replacement valves within the valve box. Placement of multiple check and ball valve sets within valve vault require District approval.

- m. It shall be the Developer/Homeowner's responsibility to maintain proper match of grade-to-top elevation of the Valve Box. All adjustments of the Valve Box top elevations require District inspection.
- n. Inside diameter of valve vaults for single valve connections shall be a minimum of 42". 48" inside diameter vaults shall be utilized for all duplex valve connections.
- o. The Contractor shall apply a liner or Epoxy Seal Coat to the interior of the existing gravity manhole(s) receiving the LPSS discharge, for protection against Hydrogen Sulfide damage.
- p. Material for bedding and immediate backfill for pressure pipes in the Common Collector Main shall be Select Earth unless otherwise noted on the construction plan.
- q. Successful Field Pressure Testing of the Common Collector Main system shall be required prior to initial 90% Escrow Release. Contractor shall perform test in presence of DISTRICT Inspector.
 - 1. Pressure tests shall be made only after the completion of backfilling operations and after the concrete thrust blocks have set for at least thirty-six (36) hours.
 - 2. The pipe line shall be slowly filled with water. During filling of the pipe and before applying the specified pressure, all air shall be expelled from the pipeline via exercise of the Air Release Valves, Valve Vault Valve Sets and/or Clean-outs. Contractor to verify said Air Release Valve operation.
 - 3. The specified pressure measured at the lowest point of elevation shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Design Engineer and/or Inspector. (Typically, via a Clean-Out fixture on the main).
 - 4. Test pressure of seventy (70) PSI to ninety (90) PSI shall be maintained for a duration of one (1) hour unless otherwise directed by the Engineer and/or Inspector. Minimum allowable pressure shall be fifty (50) PSI.

SECTION E: INDIVIDUAL PUMP STATION/PRESSURE LATERAL SPECIFICATIONS

A. GENERAL:

1. Developer shall furnish and install Package Grinder Pump Stations completely factory built and tested, each consisting of a grinder pump suitably mounted in a fiberglass basin. All parts and accessories indicated, specified or required for proper installation, operation and maintenance shall also be provided.
2. All package grinder sewage pump stations in a Low Pressure Sewer System shall be of one manufacturer.
3. Developer shall furnish a computer printout showing system pipe sizing and branch analysis for the system as shown on the drawings. Information is to demonstrate total head losses and velocities at peak flows.
4. Submittals for District review shall include, but not limited to, the following data: (Hydraulic Institute Standards, ANSI Standards and ASTM Standards apply):
 - a. Pumps: Name of manufacturer
Type and model
Rotation speed
Net weight of pump
Complete performance curves showing capacity versus head.
 - b. UL Certification
 - c. Show drawings specifically prepared for this project.
 - d. Product data such as standard printed information on manufactured products that has not been specifically prepared for the project.
 - e. Miscellaneous submittals such as specially prepared and standard printed warranties, testing and certification reports, operating and maintenance manuals.

B. OPERATING CONDITIONS:

1. The pumps shall be capable of delivering 11 gpm against a total dynamic head of 92 feet (40 psig) and 8 gpm at 138 feet (60 psig). The pumps must also be able to operate at negative heads without overloading the motors.
2. The grinder pump stations shall be of simplex or duplex design as indicated on the drawings. All pumps shall be of the same horsepower throughout the project area.
3. Characteristics of the liquid to be pumped: domestic wastewater.

C. GENERAL CONSTRUCTION:

1. Pump and Appurtenances:
 - a. PUMP - The pump shall be custom designed, integral, vertical rotor, motor driven, solids handling pump of the progressing cavity type with mechanical seal. The rotor shall be through-hardened, highly polished, precipitation hardened stainless steel. The stator shall be of a specifically compounded ethylene propylene synthetic elastomer. The material shall be suitable for domestic wastewater service. Its physical properties shall include high tear and abrasion resistance, grease resistance, water and detergent resistance, temperature, stability, good aging and properties, and outstanding wear resistance.

- b. GRINDER - The grinder shall be positioned immediately below the pumping elements and shall be direct-driven by a single, one-piece motor shaft. The grinder impeller assembly shall be securely fastened to the pump motor shaft. The grinder will be of the rotating type with a stationary hardened and ground chrome steel shredding rings spaces close annular alignment to the driven impeller assembly, which shall carry two hardened type 400 stainless steel cutter bars. The assembly shall operate without objectionable noise or vibration over the entire range of recommended operating pressures.

The grinder shall be constructed as to eliminate clogging and jamming under all normal operating conditions including starting. Sufficient vortex action shall be created to scour the tank free of deposits and sludge banks which would impair the operation of the pump. These requirements shall be accomplished by the following items in conjunction with the grinder tank pump:

- 1) The grinder shall be positioned in such a way that solids are fed in an up-flow direction.
 - 2) At maximum flow, the average inlet velocity should not exceed .2 feet per second.
 - 3) The impeller disc shall rotate at a nominal speed of 1725 RPM, or less.
- c. TANK - The tank shall be custom molded of fiberglass reinforced polyester resin or thermoplastic or thermo-set material and shall be furnished with one PVC closed inlet flange to accept a 4-inch ASTM 3034-ADR 35 pipe. Tank capacities and dimensions shall be as shown on the contract drawings. The accessway shall be an integral extension of the FRP tank and shall be custom molded of fiberglass reinforced polyester resin and have a minimum burial of depth as shown on the contract drawings. It shall have an access opening at the top to accept a lockable fiberglass cover with skirt.

All discharge piping shall be constructed of 304 Series Stainless Steel and terminate outside the accessway bulkhead with a stainless steel, 1 ¼ inch female NPT fitting. The discharge piping shall include a stainless steel ball valve rated for 200 psi WOG. The bulkhead penetration shall be factory installed and warranted by the manufacturer to be watertight.

The accessway shall include a NEMA 4X junction box, factory installed with accessway penetrations warranted by the manufacturer to be weathertight. The accessway shall also include a 2 inch PVC vent to prevent sewage gases from entering accessway.

- d. PUMP UNIT - The grinder pump shall be easily removed from the basin.
- e. MECHANICAL SEAL - The core shall be provided with a mechanical shaft seal to preclude leakage between the motor and pump. The seal shall have a stationary ceramic seat and carbon rotating sealing surface with faced precision lapped and held in position by a stainless steel spring.

f. VALVES.

- 1) Check Valve - The pump discharge shall be equipped with factory installed, gravity operated, flapper-type integral check valve or ball check valve built into the stainless steel discharge pipe. The check valve will provide a full-ported passageway when open, and shall introduce a friction loss of less than 6 inches of water at maximum rated flow. Working parts of the flapper-type check valve will be made of a 300 series stainless steel and fabric reinforced synthetic elastomer to ensure corrosion resistance, dimensional stability, and fatigue strength. A non-metallic hinge shall be an integral part of the flapper assembly providing a maximum degree of freedom to assure seating even at a very low back pressure. Working parts of the ball check valve will be made of 300 series stainless steel. The valve body of the flapper type check valve shall be a high gloss injection molded part made of PVC and the valve body of the ball check valve shall be cast iron.
- 2) Redundant Check Valve - Each grinder pump station shall include in its package one separate check valve for installation in the 1 1/4" service lateral between the Grinder Pump Station and the sewer main. The redundant check valve shall be a 1 1/4" gravity-operate, flapper-type check valve or ball check valve. This redundant check valve shall be constructed of the identical materials as specified for the check valve.
- 3) Anti-Siphon Valve - The pump shall be constructed in a positively-primed flooded suction configuration. As added assurance that the pump cannot lose prime, even under negative pressure conditions in the discharge piping system, the pump shall be equipped with a factory installed, anti-siphoning air relief valve, in the discharge piping immediately below the check valve. This valve will automatically open when the pump is off.

g. ELECTRIC MOTOR - The motor shall be a 1 HP, 1725 RPM, 240 volt, 60 Hertz, 1 Phase capacitor start, ball bearing, squirrel cage, induction type with a low starting current not to exceed 30 amperes and high starting torque of 8.4 foot pounds. Inherent protection against running overloads or locked rotor conditions for the pump motor shall be provided by the use of an automatic-reset, integral thermal overload protector incorporated in the motor. This motor protector combination shall have been specifically investigated and listed by Underwriters Laboratories, Inc., for the application.

h. CONTROLS - Non-fouling wastewater level detection for controlling pump operation shall be accomplished by monitoring the pressure changes in an integral air-bell sensor connected to a pressure switch. The level detection device shall have no moving parts in direct contact with the wastewater. High-level sensing will be accomplished in the manner detailed above by a separate air-bell sensor and pressure switch of the same type.

Each level control shall have its own built-in fail safe design which will prevent the entrance of moisture into the controls. To assure reliable operation of the pressure sensitive switches, each pump shall be equipped with a quick disconnect breather assembly, complete with a check valve to prevent accidental entry of water into the motor compartment.

The grinder pump will be furnished with a minimum of two ten foot (10) lengths of type UF cable, pre-wired and water tight.

- i. ALARM DISCONNECT PANEL - Each grinder pump station shall include a NEMA 3R, UL listed ALARM/DISCONNECT PANEL suitable for wall or pole mounting. The NEMA 3R enclosure shall be manufactured of thermoplastic or fiberglass to assure corrosion resistance. The enclosure shall include a hinged, pad lockable cover, secured dead front and component knockouts.

For each pump, the panel shall contain one (1) – double pole circuit breaker for the power circuit and one (1) – single pole circuit breaker for the alarm circuit. The panel shall contain terminal blocks, integral power bus, and a complete alarm circuit.

The Alarm/Disconnect Panel shall include an audio-visual alarm device with alarm sequence as follows:

- 1) When liquid level in sewage wet-well rises above alarm level, visual and audio alarms will be activated.
- 2) Audio alarm may be silenced by means of the externally mounted, push-to-silence button.
- 3) Visual alarm remains illuminated until sewage in wet-well returns to normal operating level.

The visual alarm shall be a red fluted lens at least 2 5/8" in diameter and 1 11/16" in height. Visual alarm shall be mounted to the top of the enclosure in such a manner as to maintain rain proof integrity. For duplex units, in addition to the above, two high level indicator lights shall be mounted behind the access cover. During a high level alarm condition the appropriate light will illuminate to indicate which pump requires service.

The audio alarm shall be a minimum 86 dB horn or buzzer. The audio alarm shall be capable of being de-activated by depressing a push-type silence switch which is encapsulated in a weatherproof silicone boot and mounted on the bottom of the enclosure.

The entire Alarm/Disconnect Panel as manufactured, shall be listed by Underwriters Laboratories, Inc.

- j. WIRING - Contractor shall be responsible to furnish and install service entrance equipment and/or branch circuit protection and all wiring to the grinder pump leads, in compliance with national and local electric codes. Contractor shall be

responsible for providing power to the pumping stations as indicated on the drawings.

- k. CORROSION PROTECTION - All materials exposed to wastewater shall have inherent corrosion protection i.e., cast iron, fiberglass, stainless steel, PVC. Any exterior steel surfaces are to be suitably protected against corrosion. Galvanized steel is prohibited.
- l. SERVICEABILITY - The grinder pump shall have lifting eyes with nylon/polypropylene rope used to facilitate easy removal of the pump from the tank when necessary.
- m. SAFETY - The grinder pump shall be free from electrical and fire hazards as required in a residential environment. As evidence of compliance with this requirement, the completely assembled and wired grinder pump in its tank shall be listed by Underwriters Laboratories, Inc.
- n. SPARE PUMPS - Furnish three (3) complete spare grinder pump units. Each unit shall include motor, grinder, pump, check valve, anti-siphon valve and pressure switch assemblies of the same type as furnished for the grinder pump stations to assure replacement or repair within a reasonable period of time.
- o. MANUALS - Each grinder pump unit shall be furnished to the Owner with three (3) copies of detail wiring diagrams, operation and maintenance manual and detailed installation instructions for each type of unit.
- p. Developer shall provide one complete 300-lb. capacity tripod lifting hoist for use in grinder pump removal including winch, tripod, pulleys, cables, and necessary accessories.

D. INSTALLATION:

Installation procedures grinder pump station shall be as recommended by the pump manufacturer, the Hydraulic Institute Standards, and as required herein.

Individual customer pump station and pressure discharge piping from the pump to the valve box shall conform to the following:

- a. Developer/Homeowner shall be responsible for obtaining appropriate Building (Plumbing, Electrical, etc.) Permit(s). Installation of the pump station/control panel shall be by Permit, and Inspected by the appropriate City or County Building Department, and this District.
- b. Pressure discharge pipe from the pump to the Valve Box shall be sized appropriately (typically 1-1/4") and either SDR 21 or schedule 40. Bury at minimum 36" depth for frost protection.
- c. Connections of the individual pressure discharge pipe to the connection in the Valve Box requires approval and inspection by the Sewer District, 24 hours advance notification required. The Sewer

District shall verify that the connection to the Valve Box has been completed correctly and that the proper authorized brand pump has been installed in the pump station. District reserves the right to deny connection for an unauthorized or improper pump station.

- g. Individual Electric Control Panel shall be installed per applicable Building Codes/Building Permit, and shall be installed within eye-sight of the corresponding pump station.
- h. It is the Developer/Homeowner's responsibility to make proper installations and obtain inspections where applicable of the gravity lateral, pump station, electrical controls, and pressure discharge pipe in accordance with applicable building and plumbing codes.
- i. Manufacturer/Installer to affix permanent I.D. plate or tag on the pump station and control box identifying the Mfr. name and emergency service instructions/24 hr. service phone number. The District also recommends that a foil type I.D. sticker tag be applied to the home's interior electrical breaker panel box which is not exposed to exterior weather conditions.
- j. It shall be the Developer/ Homeowner's responsibility to maintain proper match of grade-to-top elevation of the pump station.

E. PERFORMANCE TESTING:

Each grinder pump shall be submerged and operated for five (5) minutes (minimum). At no time during the installation or testing of the grinder pump station shall water be introduced into the access way of the station. Contractor shall consult with the pump manufacturer. Included in this procedure will be the testing of all appurtenances components such as, the anti-siphon valve, check valve, discharge piping, level sensors, each unit's dedicated controls, respective alarm/disconnect panel, etc. All factory tests shall incorporate each of the above listed items. Actual appurtenances and motor controls which will be installed in the field, shall be particular to the tested pump only, a common set of appurtenances and motor controls for all pumps will not be acceptable. Certified test results shall be supplied showing the operation of each grinder pump at three (3) different points on its curve, with the maximum pressure not less than 60- psi.

F. MANUFACTURER'S INSTALLATION AND START-UP SERVICES:

Manufacturer shall provide a factory-trained serviceman to perform installation, start-up, and field testing services prior to acceptance by the Owner. Services shall include: (1) train Contractor on proper installation of equipment, (2) train Contractor on proper testing procedures, (3) inspect all installations and review all test results. All equipment and materials necessary to perform testing shall be the responsibility of the Contractor. This will include, as a minimum, a portable generator (if temporary power is required), ammeter, and water in each basin.

Upon completion of the start-up and testing, the Contractor shall obtain from Manufacturer and submit to Engineer the Manufacturer's start-up authorization form describing the results of the tests performed for each grinder pump station tested, and

bearing the signature of the manufacturer's authorized technician, signifying approval of the installation and test results. Final acceptance of the system will not occur until authorization forms have been received for each pump station installed.

G. WARRANTY AND GUARANTEE:

The Manufacturer shall warrant and guarantee to the Owner that all equipment will be in accordance with the foregoing specifications and will not be defective. All defective equipment, whether or not in place, may be rejected.

The Manufacturer shall provide the following warranty from the date of final acceptance of the project as established by the Owner. The warranty shall be a full parts and labor warranty covering every component of the station tank, pump housing, controls, wiring, direct burial cable, pump assembly, (including pump stator and controls), alarm disconnect panel, and any on site diagnostic time or travel time to pump station site.

Inclusive of this warranty, service provider will be responsible for providing and replacing any defective pump or component with a loaner pump or component during the time frame required to repair to the original pump and replacing original pump and retrieving loaner pump after repair is complete. The time and travel for this will also be covered by this warranty. Manufacturer shall be responsible for shipment costs and shipment scheduling of any pumps, parts, and/or any combination of the aforementioned items that make up the entire grinder pump station as an assembled unit.

The warranty shall include service with a maximum two (2) hour response time to the pump station site, twenty-four (24) hours a day, seven (7) days a week utilizing a toll free 1-800 number to a staffed answering service.

This warranty will begin at the date of final acceptance of the project by the Owner and according to the following schedule. This schedule represents the manufacturer's responsibility for parts, labor and other expenses on warranty items with the balance due by the Owner.

<u>Year</u>		<u>Year</u>	
1	100%	6	100%
2	100%	7	100%
3	100%	8	50%
4	100%	9	33.5%
5	100%	10	25%

Any and all service providers must be approved and trained by the Manufacturer. Corresponding Municipal Building Department may require written verification that pump/pump station has been installed by a Factory Authorized Installer. Installer shall be prepared to produce a Letter of Verification stating that he is an Authorized Installer and that the pump/pump station for referenced lot/address has been installed in accordance with the Factory requirements.

SECTION F: EASEMENTATION

1. The common Collector Pressure Main and pressure main branch stub and valve box shall be located within dedicated recorded easement or public right-of-way easily accessible by the District. Recordation of the easements shall be completed prior to final release of construction escrow for the collector mains by the District.

2. Record Easement Plats for parcels of land serviced by LPSS System(s) should include the following general information:
 - a. All pertinent geographic information locating the length and width of easements and specific information (metes & bounds) locating the easements on the parcels(s) or tracts of land.
 - b. Information specifying the Owner's name and Deed Book & Page numbers for the parcel(s) or tract(s) of land.
 - c. Other Plat or property information as required by the County Recorder of Deeds Office.
 - d. Easement Exhibits for individual parcels as may be required for installations in existing septic tank subdivision retrofit projects must include information for easement centerline description, temporary construction easementation, specific property metes & bounds description(s) and survey information regarding reference to established boundary monumentation.

3. Record Easement Plats for parcels of land serviced by LPSS System(s) shall include the following specific information:
 - a. This Subdivision is subject to the Indenture of Covenants and Restrictions for _____, as said Indenture is filed in Book _____, Page _____ of the St. Charles County Recorder of Deeds Office. (The District recommends inclusion of verbiage specifying homeowner's responsibility of individual grinder pump stations and pressure discharge laterals).
 - c. The undersigned declares that all roadway Rights-of-Way, Easements and easements delineated in Common Ground shown herein, are hereby dedicated and conveyed to Duckett Creek Sanitary District, their heirs, successors and/or assigns as their interests may appear, for sanitary sewers, with the right of temporary use of adjacent ground not occupied by improvements for the excavation of and storage of materials during installation, repair or replacement of said sewers.
 - d. Lots _____ are served by Low Pressure Sewer System. Notification is hereby given declaring the owner of lot(s), which is / are served by a pressure sewer system upon which is located or will be located, an individual pressurization unit such as a grinder pump, shall maintain and repair or replace the individual pressurization unit and

SECTION F: EASEMENTATION (CONT'D)

appurtenances in accordance with the Manufacturer's and Duckett Creek Sanitary District specifications at the lot owner's sole cost and expense. Failure of the lot owner to maintain and repair or replace any part of the individual pressurization unit and individual discharge system in accordance with municipal, county, state or Duckett Creek Sanitary District specifications may result in placement of lien on subject lot, and/or discontinuance of water service and/or discontinuation from the sanitary sewer system.

e. Individual lot owners utilizing said individual pressurization units shall be responsible for their respective individual pressurization unit's compliance with applicable City / County / State Health and Sanitation Codes and Ordinances.

SECTION G: CONDITIONS AND NOTES

1. Due to nature of Low Pressure Sewer Systems and operational policies of the District established herein, the District shall not be responsible for the operation or maintenance of individual gravity sewer lateral, individual pump station and appurtenances, or individual pressure discharge line to the connection in the Valve Box.
2. For LPSS systems in New Subdivision Construction the following notification shall be included on the Construction Plans, Record Easement Plat and also as a provision in the subdivision's Standard Covenants and Restrictions:
 - a. Lots _____ are served by Low Pressure Sewer System. Notification is hereby given declaring the owner of lot(s), which is served by a pressure sewer system upon which is located or will be located, an individual pressurization unit such as a grinder pump, shall maintain and repair or replace the individual pressurization unit and appurtenances in accordance with the manufacturer's and Duckett Creek Sanitary District specifications at the owner's sole cost and expense. Failure of the owner to maintain and repair or replace the individual pressurization unit and individual discharge system may result in placement of lien on property and/or discontinuance of water service and/or disconnection from the sanitary sewer system.
 - b. Failure of the homeowner to repair a malfunctioning pump station or pressure discharge line may result in violation of City/County/State Health Code Ordinances. Owner will be subject to and responsible for compliance with applicable BOCA and/or Health Code Ordinances.
 - c. Easements shall be granted to the Duckett Creek Sanitary District for sanitary sewers.

- d. The Duckett Creek Sewer District has no liability or responsibility regarding individual pressurization unit system failures or damages derived from said failure(s).
3. For LPSS systems in existing subdivision rehab construction, such as in the elimination of septic systems, the aforementioned paragraph 2a, 2b and 2c shall be included on the Construction Plan and included as a provision in the amended subdivision Standard Covenants and Restrictions. Special verbiage of similar form and function shall be included in each individual Sanitary Sewer Connection Agreement.
4. District Operation and Maintenance responsibilities shall be expressly limited to operation and continued operation of the Common Collector Main portion of the Low Pressure Sewer System.

SECTION H: CONSTRUCTION ESCROW REQUIREMENTS

1. For LPSS systems in New Subdivision construction approval, Developers shall be required by this District to establish sanitary sewer construction escrow for the common Collector Pressure Main and appurtenances thereon, individual branch stubs from the main to the valve box, and valve box units.
2. Escrow release and disbursements by the escrow holder to be made only upon written notification by the Sewer District, shall be typically of 90% of the Escrow Sum upon initial completion of installation of the Common Collector Main improvements and successful pressure testing of same. (See Section D.q.) Final 10% release of the Escrow Sum shall typically be authorized upon formal recordation of easementation and field inspection approval by the District.

SECTION I: CONNECTION AGREEMENTS

1. Execution of Site Specific Low Pressure Sewer System Connection Agreements are required prior to construction plan approval or prior to actual connection to the system in existing subdivision septic tank elimination situations.
2. The District reserves the right to modify or revise it's requirements to compensate for special situations.

SECTION J: CONSTRUCTION DETAILS

Page

1-3	(E-1) GP-2010 60 gal. PA 0908 PO 1 Detail
4-6	(E-1) GP-2012 120 gal. PA -0909 PO 1 Detail
7-9	Electrical Control Panel Detail
10-19	(E-1) GP 2010 Typical Installation Instructions
20	Standard Precast Manhole Section Detail
21	Inside Drop Manhole Detail
22	Cast Iron Manhole Frame
23	Cast Iron Manhole Covers
24	Lock Type Manhole Covers
25	Locking Device
26	Locking Device
27	Manhole Step Into Joint
28	Manhole Step
29	Thrust Block Detail
30	LPSS Typical Cleanout and Valve
31	LPSS End of Line Cleanout
32	LPSS Typical Valve Vault
33	LPSS Air Release Valve Vault