Turkey Creek Regional Sewer District

March 14, 2016, **Rev August 16, 2022**

SWAP GRINDER PUMP SYSTEM
Material & Installation Specifications

PART 1 GENERAL

1.01 SCOPE

A. The Property Owners will purchase and install their own grinder pump station. The Grinder pump station shall conform with these specifications unless prior approval of deviations from the specifications is received from the Turkey Creek Regional Sewer District.

B. Any Contractor installing any portion of the Grinder Pump System must be preapproved by the Turkey Creek Regional Sewer District (Sewer District) and comply with the following specification for the installation of the Grinder Pump System.

PART 2 PRODUCTS

2.01 GENERAL

A. The Property Owner's Contractor shall furnish and install a simplex, duplex or triplex sewage grinder pump system at the location directed by the Property Owner. The system(s) shall include one, two or three sewage grinder pumps (as required by Property Owner), mercury switch level controls, discharge piping with check valves and isolation valves, pump mounting plates, lifting cables or chains, guiding rails. A NEMA 4X, weatherproof control enclosure with pump controls shall be provided and installed at the pump station site as shown on the Drawings.

B. All electrical work shall be in full compliance with Local, State and National Building Codes and National Electric Codes.

2.02 GRINDER PUMPS AND MOTORS

A. The pumps shall be nonclog, submersible sewage grinder pumps with two-stage cutter or lobed cutting rotor assemblies to macerate solids into a particulate slurry and centrifugal impellers to lift the slurry at the given heads. Pump performance shall be as scheduled in Part 4.

B. Submersible pump stations shall comply with all applicable NEC Codes and regulations governing submersible grinder pump stations.

C. The oil-filled motor with stainless steel shaft and double mechanical shaft seals shall be capable of driving the pumps at all points on the published pump curve. Minimum motor horsepower shall be 2 HP.

D. Motors shall have upper and lower bearings and seals. The upper bearing shall be mounted directly to the cast iron pump casing to take thrust loads. The seals shall be a mechanical tandem seals each with separate spring assemblies. Seal leak probes shall be provided along with a moisture detection system. A 20-ft power cable and sensor cable shall be provided, longer lengths shall be available per request by home owner.

E. The stationary and rotating cutters shall be made of hardened 440C stainless steel and be easily removable for proper maintenance. Cutters shall have Rockwell hardness of 58C to 62C. The rotating cutters and bronze impeller shall be keyed to the shaft for positive drive. The vortex impellors shall be bronze.

F. The pump, motor, and discharge check valve shall be mounted so that they can be easily raised and lowered from the surface on stainless steel (

G. 16 ga. min.) guide rail(s).

H. All rails, rail guides, brackets, pump lifting chains, or any other metal part (except cast iron) exposed to the pump station interior environment shall be stainless steel or other non-corrosive material. All fasteners shall be stainless steel. Grinder pumps which utilize single rail guide systems shall be provided with straightening vane arrangements which extend from the pump up to one foot above the high water alarm level.

2.03 SUMP LEVEL CONTROLS

A. A minimum of four sealed float-type mercury or mechanical switches shall be supplied to control sump level and high and low level signals in simplex pump stations. The mercury tube switches shall be sealed in a solid polyurethane float, the support wire shall have a heavy Neoprene jacket, and a weight shall be attached to the cord above the float to hold the switch in place. The pump controls shall be wired so that the low alarm float switch shall shut off the pump(s) in case the normal pump turnoff float switch has malfunctioned. All level switches shall be adjustable for level setting from the surface.

2.04 ELECTRICAL CONTROL PANEL

A. The control panel shall have a NEMA 4X, weatherproof enclosure. A lock hasp shall be provided on the door. A circuit breaker shall be provided for each pump along with a magnetic starter including overload protection. Alternating relays, interlocking relays, auxiliary contacts on starters, H-O-A switches and run lights for pumps, terminal strips for pumps, control wires, and alarm system shall be provided. A non-resettable elapsed time meter operable on 115 volts shall be provided for each pump. All operator and control devices shall be mounted on an inner, dead front panel. No devices shall be mounted on the outer door panel. An electrical power cord with cord grip type connection to the pump shall be furnished and installed between each pump and control enclosure. The cord grip shall have a male taper pipe thread threaded into a female taper pipe thread in a cord cap. The cord cap shall be sealed into the motor housing with a Buna-N O-ring providing an electrical connection which is completely watertight, yet may be easily removed for service by taking out two cap screws. Conduit entry into the control panel shall be sealed completely to prevent explosive/corrosive gases from entering the control panel.

B. Each control panel shall include a seal fail alarm, a thermal overload alarm, an elapse run time meter, event counter, manual alarm reset and inner door with control switches.

C. A control cable shall be run from each pump to the control panel for the seal failure controls and the motor thermal switch. All conduits and cables in or out of the control panel shall be sealed to prevent corrosive gases from entering the control panel.

D. Motor internal thermo switch shall be wired so that a manual reset is required to reset the motor for operation after the thermo switch has stopped the motor. The reset shall be mounted inside the control panel. Electrical power outage shall not require a manual reset, regardless of the duration of the outage.

E. All grinder pump stations shall have a 40 watt red light mounted on top of the control panel with the globe up for indication of failure in the pump station. Light shall be approved by UL for this outdoor application.

2.05 SUMP BASIN

A. Each sump basin shall consist of a preformed fiberglass basin approximately 2-ft. in diameter or greater. The covers shall be gasketed and bolted in place with stainless steel hardware. The sump basin shall be water tight.

B. A concrete anti-flotation collar shall be provided by Contractor and be cast in place around the base of the sump basin. The collar shall be at least 2-cubic feet of concrete for each foot of burial of a 2-ft. diameter sump basin. Larger basins will require more concrete.

C. The top of the sump basin shall be approximately 3-in. higher than the surrounding ground.

D. Pipe entry points shall be rubber gasketed with a compression seal and be water tight.

2.06 VALVES

A. A check valve shall be installed in the discharge piping for each pump and shall be removable with the pump assembly. The check valve, unless otherwise noted, shall be either swing type, iron bodied, and constructed for 150-lb. working pressure or ball check valves installed vertically with full-flow opening.

B. Isolation valves shall be PVC true-union ball valves for valves smaller than 2-inch and brass bodied resilient wedge gate valve with stainless steel shaft for valves 2-inch and larger. All valves and appurtenances shall conform to the requirements of AWWA Standard C509. Valves shall be of iron or bronze body with a nonrising stem. Valves shall be Clow F-6110 or equal. All iron parts shall be painted before leaving the shop with two coats of acceptable high grade bituminous paint.

C. Valves shall open by turning counterclockwise, the direction being indicated by an arrow cast where easily visible to the operator.

D. O-ring seals shall be used to seal the stem of the valve. The seal system used shall be replaceable without removing bonnet or rotating element. Gaskets shall be of rubber composition.

E. Bolts and nuts on buried valves shall be a low alloy steel cathodic to the valve body and having a minimum yield strength of 45,000 psi. All other nuts and bolts shall be low carbon steel conforming with the mechanical and chemical requirements of ASTM A-307, Grade B.

2.07 PUMP STATION PIPING

A. All internal piping, vents, and discharge piping, up to and including the connection to the public sewer at the edge of right of way shall be provided by the Property Owner's Contractor. Pump discharge piping on all residential grinder pump stations shall be increased to a 2-in. HDPE IPS DR-11 pipe size to match the District's connection point at the edge of right of way. The pipe size in the Grinder Pump Station shall be increased in size immediately outside of the sump basin. All fittings, valves, and appurtenances inside the sump basin shall be the same size as the pump discharge piping.

B. A 2-inch diameter vent shall extend from the sump top to an elevation at least 2-ft. higher than the 100 year flood plain elevation of El.860. The pump station below this elevation shall be water tight.

C. All piping installed shall be restrained to withstand pressures up to 100 psi. Following installation and prior to startup of the pump station, the interior and exterior piping shall be hydrostatically pressure tested for a period of 2 hours with no loss in pressure.

D. HDPE Pipe:

1. Polyethylene pipe shall conform to the material designations of PPI and ASTM, PE3408, and ASTM F714. The pipe shall be made from a high density, molecular weight resin that is classified as a Type III, Grade P34, Class C, Category 5 by ASTM D3350. The resin shall contain antioxidants and be stabilized for protection against ultra-violet degradation. Pipe shall have a cell classification of PE 345434C and meet or exceed all requirements of ASTM D3350. Pipe shall have a designated use color stripe applied during production.

2. Pipe size shall be IPS nominal diameters. The minimum wall thickness for the directional drilling installation process shall be DR 11.

3. PIPE FITTINGS

a. HDPE fittings, including but not limited to, elbows, tees, branch saddles, adaptors and transitions shall be HDPE. Fittings shall have the same or better cell classification as the pipe.

b. HDPE fittings shall be IPS DR-11 (min.) and provide a pressure rating equal to or better than the HDPE pipe.

c. All HDPE fittings shall be butt fused or electro fused unless specified or required otherwise.

d. DIP fittings shall not be used on this project unless specifically indicated otherwise.

e. HDPE fittings for service taps (laterals) shall be fused with one-half or full saddles with butt fused outlets. Curb stop with swing check valve assemblies shall be connected to the service saddles with compression joints.

4. PIPE JOINING

a. Joining of pipe and fittings shall be done in accordance with manufacturer recommendations.

b. HPDE pipe shall be joined by heat fusion butt welds. Where conditions are not conducive to allow or manufacturer does not recommend heat fusion butt welds, an electrofusion coupling shall be used.

c. Joining of HDPE to PVC pipe shall be accomplished by means of Poly-Cam fitting (Series 735 or equal) using HDPE DR11 and SS 316 materials.

d. Joining of HDPE to valves and tees shall be accomplished by means of butt fused connections with HDPE valves or restrained mechanical joint connections where shown below ground, in manholes or in the pump station.

5. TRACER WIRE

1. Tracing Wire shall be installed on all underground pipe. The wire shall be Direct Burial No. 12 AWG Solid (0.0808-inch diameter), 21 percent conductivity copper-clad annealed high carbon steel high strength tracer

wire, 1150 pound average tensile break load, 45 mil, high molecular weight, high density polyethylene jacket complying with ASTM D-1248, 30 volt rating. Soloshot™ extra high strength No. 1245 as manufactured by Copperhead Industries, LLC, or equal. Wire shall be secured to the pipe with tape at intervals not to exceed 10 feet.

a. Tracer wire installed on pipe by horizontal directional drilling shall be continuous without any splices.

b. Heat shrink splices are permissible only on tracer wire at pipe connections.

2. Tracer wires shall terminate inside all structures including but not limited to, air relief structures, valve box assemblies, indicated on plans. Tracer wire shall be connected to the tracer wire installed by the District at the edge of right of way. The connection shall conform to recommendations by the manufacturer.

E. POLYVINYL CHLORIDE (PVC) GRAVITY SEWER PIPE:

1. For pipe 15 inch diameter and smaller: Pipe, fittings, and jointing systems shall conform to ASTM D-3034, except that the standard dimension ratio of the outside diameter of the pipe to wall thickness shall not exceed 35.

2. Joint systems shall be elastomeric seal (gasket) type. Seals shall conform to ASTM F-477 requirements. Joint materials and testing shall conform to ASTM D-3212 requirements.

3. All service connections shall be made using a wye and a bend. Tees shall be used only as directed. Tees and wyes shall be die cast or factory fabricated. All service pipe shall be SDR 35. Cleanouts shall be installed to facilitate cleaning of the gravity sewer pipe.

4. Gravity sewers shall be place in granular bedding material. The bedding material shall consist of pea gravel and be placed at a minimum depth of 4-in. around the pipe.

2.08 CURB STOP SWING CHECK VALVE ASSEMBLY:

A. A curb stop with swing check valve assembly shall be provided for each lateral and connected to the Sewer District's force main in the right of way. The assembly shall be attached directly to a 6-in. long section of HDPE pipe connected to the service saddle on the Sewer District's force main. The curb stop and swing check valve shall be preassembled to a 6-in. section of HDPE pipe (DR11, IPS) of the same size as the lateral. The assembly shall be model no. GR6211 by The Lateral Connection Corp. or equal.

1. Thermoplastic curb stop valves for forced sewer lateral applications shall be manufactured from Polypropylene compound and be ISO 9002 certified. All valves shall be rated for 200 PSI Service. Each valve shall have an operating handle profiled for manual or service key operation. The handle shall have a built-in safety feature that disengages and ratchets in either direction when operating torque exceeds 20 ft. lbs.. Five operating wrenches shall be provided to the Owner. Valves shall have end connections to accommodate the specified service tubing. Curb stops shall be by The Lateral Connection Corp. or equal.

2. Swing check valves for forced sewer services shall be manufactured from Ultra High Impact PVC Material. All valves shall be rated for 150 PSI working pressure. Valves shall have end connections to accommodate the specified service tubing. Swing check valves shall be by The Lateral Connection Corp. or equal.
3. The curb stop and swing check valve shall have an interior O-Ring for a seal and compression joints for HDPE piping. The compression joint shall have a split ring made of acetalic resin POM or comparable material with ridges to grip the HDPE pipe. If the later pipe is PVC, a gripper ring shall be used to restrain the joint. The assembly shall be IPS (OD) and meet ASTM-F714 / ASTM-D3035 / ASTM-D-1599-99.

2.09 GREASE TRAPS

A. A grease trap is required for all non-single residential units that have wastewater containing high levels of grease, oils and other pollutants that will adhere to the interior surface of the force mains and restrict flow.

B. The grease trap shall be sized in accordance with applicable building codes. The grease trap can be placed inside the building or below ground outside of the building, prior to the grinder pump station. If place underground, the grease trap shall be constructed of non-corrosive material and be water tight to prevent infiltration and inflow.

C. The grease traps shall be cleaned on a routine basis and records of cleaning maintained. The grease, after removal from the grease trap, shall be disposed of at a landfill. The grease trap shall be accessible for routine inspection by the Sewer District.

D. Drawings of the grease trap along with sizing calculations shall be given to the Sewer District for approval prior to purchase and installation.

PART 3 EXECUTION

3.01 INSTALLATION

A. Installation of each grinder pump unit shall be done in accordance with written instructions provided by the manufacturer.

B. The Contractor will make final adjustments, provide initial start-up, and instruct the Owner's personnel in the operation and maintenance of the equipment.

C. Prior to start-up, influent and effluent lines shall be temporarily plugged to prevent sanitary flow from entering the pump station. Installed valves may be used for this purpose.

D. The Contractor shall provide the District with 2 working days notice prior to testing and start-up.

E. The District reserves the right to delay start-up until receiving sewers are available to receive the pump station discharge and to comply with their schedule of startup of other grinder pump systems. .

3.02 EXCAVATION, BACKFILL, AND SITE PREPARATION

A. The Contractor shall strip the immediate area of topsoil and stockpile the topsoil as directed by the Property Owner. A minimum of 6-inch of topsoil shall be stripped, stockpiled and replaced after backfill and compaction of the soil is performed.

B. Excavation and backfill for each grinder pump unit and force main shall conform to the pump manufacturer's specifications. The backfill within the trench and around the grinder pump station shall be compacted to at least 98% density.

C. All surface areas disturbed by the construction of the grinder pump system shall be restored.

D. Pavement, brick and landscaping removed shall be replaced as required by the Property Owner. New pavement shall be installed to match existing.

E. The Contractor shall construct and maintain stilling basins with overflows to receive pump age or surface drainage from excavation as required to prevent siltation to nearby streams and lakes.

3.03 TESTING/INSPECTION

A. The interior and exterior pressure piping installed for the grinder pump and force main shall be pressure tested. The piping shall be filled with clear water, the valves upstream and downstream closed and the pressure held for a period of 2 hours at 100 psi with no loss in pressure. The pressure test is intended to illustrate the water tightness of the pipe and joints and also verify the integrity of the pipe connections.

B. Gravity sewers (both new and existing) shall be water tight. The existing sewer pipe and new sewer pipe shall be completely exposed by the Contractor from the grinder pump station to the building or house. The Sewer District representative will visually inspect the pipe and joints to verify the integrity of the pipe and joints. If required, the existing pipe shall be replaced to meet current standards.

1. In lieu of exposing the existing pipe, a pressure test maybe acceptable, solely at the discretion of the Sewer District. The existing gravity sewer shall be filed with water to create a positive hydrostatic head of 5-ft. min. in the pipe and the test held for 2 hours with no loss in static head.

C. The Contractor that is hired by the Property Owner will need to pay the Sewer District's Inspection Fee(s) and contact the Sewer District 2 days prior to connection into the Sewer District's force main. All underground work shall remain unburied and open for inspection until the District's representative can view the completed work and verify the pressure test.

PART 4 SPECIAL PROVISIONS

4.01 PUMP PERFORMANCE

A. The simplex grinder pumps for single residential units shall be 2 hp, 208/230 Volts and shall meet or exceed the design point of 33 gpm @ 60-ft. of head. with approximate points of 33 gpm @ 10-ft., 20 gpm @ 100-ft. and have a dead head of approximately 125-ft. The simplex pump station shall meet the requirements of these specification and be Zoeller 7012 (317-775-6282) **Liberty Pump LSGX200 – (2-Stage).**

B. The duplex/triplex grinder pumps for multi-residential, commercial and non-single residential units shall be designed for the flow anticipated but shall not be less than the following. Duplex or triplex grinder pump stations with grinder pumps equal to or greater than 2 hp, 208/230 Volts and each grinder pump shall meet or exceed the design

point of 60 gpm @ 60-ft. of head. with approximate points of 61 gpm @ 10-ft., 40 gpm @ 87-ft. and have a dead head of approximately 125-ft. The duplex or triplex pump station shall meet the requirements of these specification and be Zoeller 7013 (317-775-6282).

4.02 WARRANTY

A. The manufacturer of the grinder pump and controls shall provide a minimum one (1) year warranty from defects in material and workmanship.

B. The Contractor shall provide each Property Owner with a minimum 1 year warranty to cover all defects and deficiencies in the materials and workmanship for the installation of the Grinder Pump System.

C. The warranties shall start at the time the Sewer District inspects and approves the installation of the Grinder Pump System for each Property Owner.

4.03 DRAWINGS

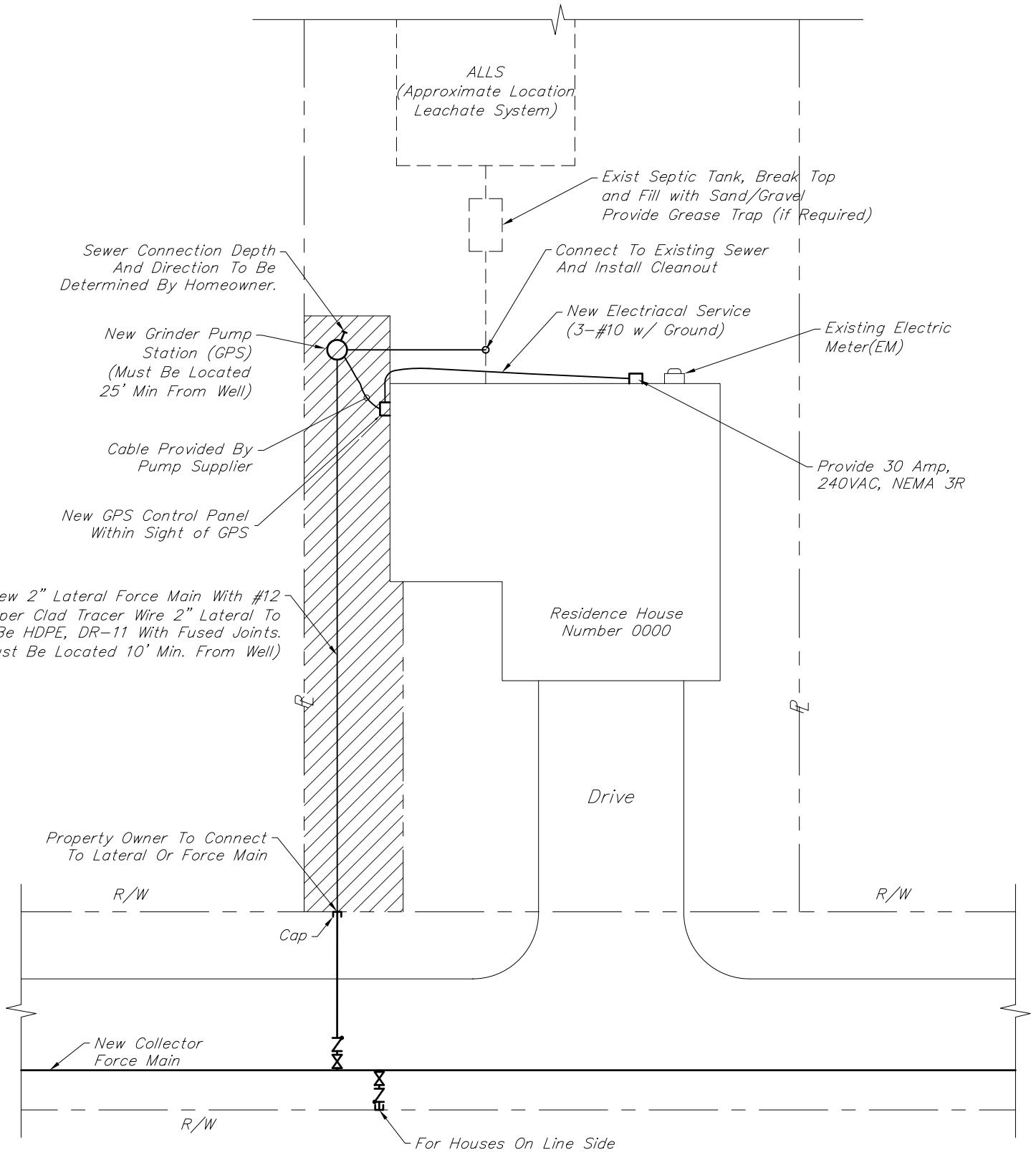
A. The attached drawings GP-1, GP-2 & GP-3 are provided as guidelines for a typical pump installation. The Contractor or Home Owner will need to comply with the pump manufacturer's recommended installation requirements along with applicable building codes.

4.04 INSURANCE

A. The Property Owner's Contractor will need to provide a certificate of insurance to the Sewer District showing a minimum $2,000,000 of Construction All-Risk Insurance.

B. The Contractor's Insurance Company will need to name the Property Owner(s), Turkey Creek Regional Sewer District and Jones & Henry Engineer's Ltd. as named insured.

C. The Contractor's insurance certificate must be files with the Sewer District before any work can be performed on site within the Sewer District's Service Area.



Note:

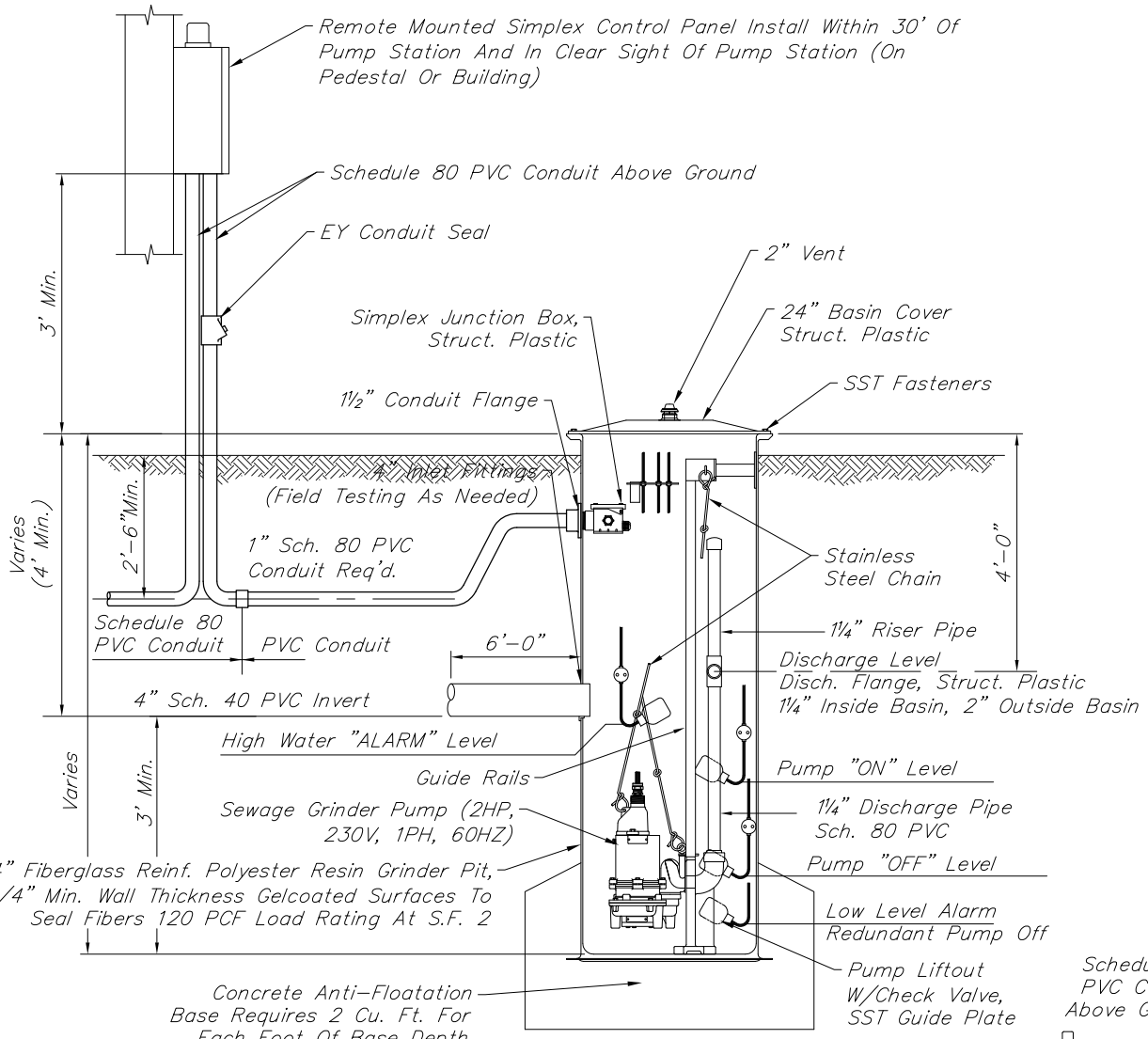
1. All Electrical Work Shall Comply With Latest Version Of National Electrical Code And All Local Codes.
2. Septic Tank Abandonment Shall Meet County Board of Health Requirements.
3. No Downspout or Clearwater Sump Pumps Can Be Connected to the Sewer.

TYPICAL GRINDER PUMP STATION CONNECTION

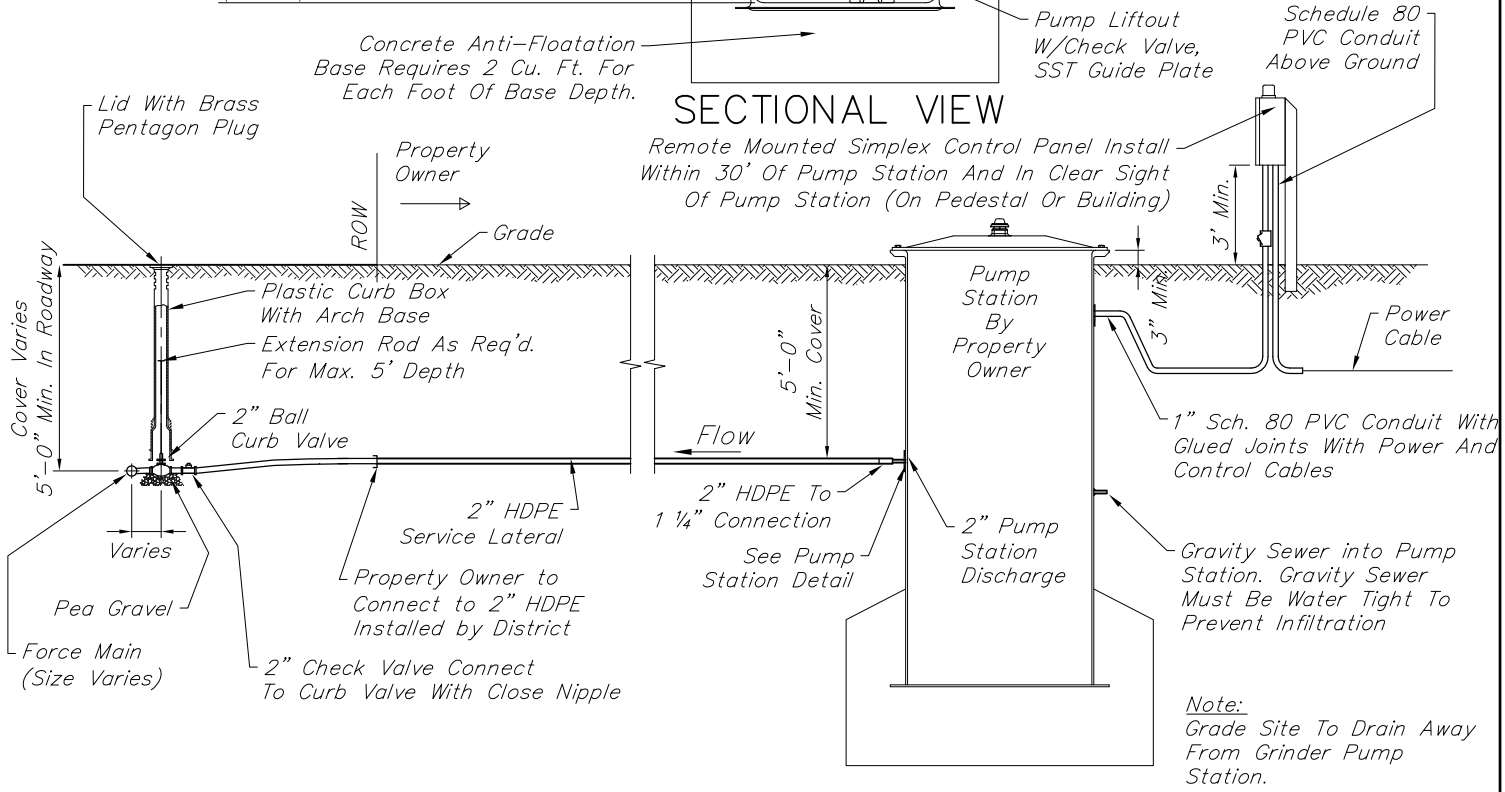
Jones & Henry Engineers, Ltd.
www.jheng.com Fluid Thinking.™

SHEET NO.
GP-1

868-6971.001



SECTIONAL VIEW



Note:
Grade Site To Drain Away From Grinder Pump Station.

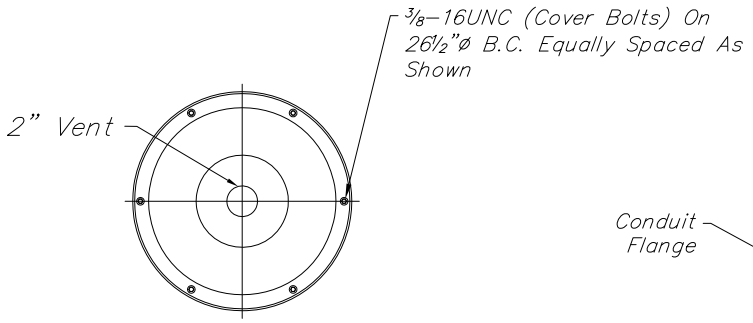
Note:
1. Provide Adaptors Between Dissimilar Pipe Materials And Sizes To Make Pressure Tight Connection.
2. All Joints Must Be Restrained for 150 psi.
3. Homeowner Will Be Required to Hydrostatically Pressure Test Force main at 100 PSI With No Loss of Pressure in 2 Hours.

SIMPLEX GRINDER STATION DETAILS (CENTRIFUGAL)

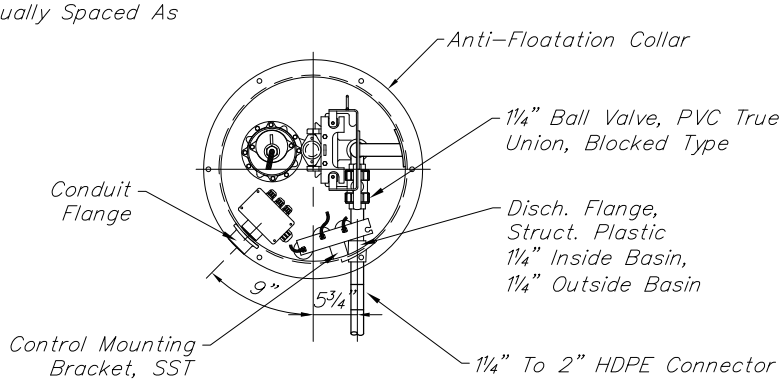
Jones & Henry Engineers, Ltd.
www.jheng.com Fluid Thinking.™

SHEET NO.
GP-2

868-6971.001



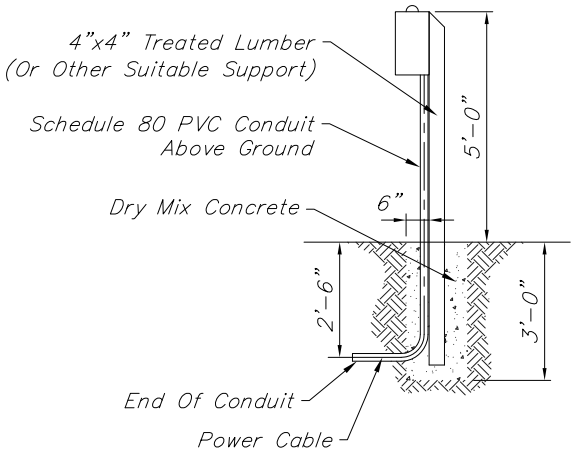
TOP PLAN



SECTIONAL PLAN

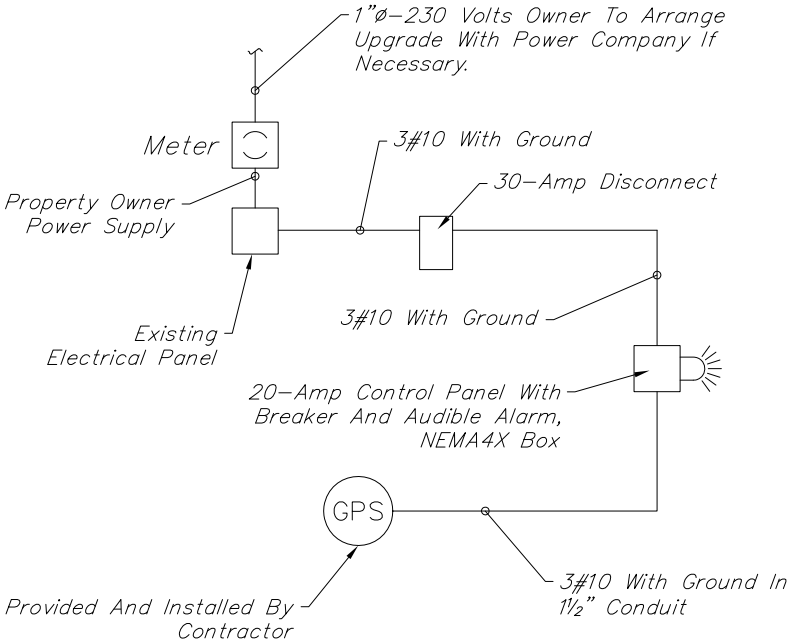
SIMPLEX GRINDER STATION DETAIL

By: Homeowner 1"=1'–0"



CONTROL PANEL PEDESTAL POST DETAIL

By: Homeowner ½"=1'–0"



TYPICAL ELECTRICAL SERVICE DETAIL

By: Homeowner NTS

Note:
Grinder Pump Station Locations And Service Laterals Shown On The Drawings Are Approximate.

SIMPLEX GRINDER STATION DETAILS (CENTRIFUGAL)

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SHEET NO.
GP–3

868–6971.001