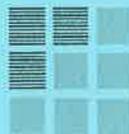


**DARK HORSE SUBDIVISION
Homeowner's Information Package
for
Connection to Sanitary Sewer System
&
Construction of On-lot Sewer Pump Assembly**

December 5, 2003

Prepared By:



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**Dark Horse Subdivision
Application Package for
Connection to Sanitary Sewer System
&
Connection of On-Lot Sewer Pump Assembly**

Introduction

The Dark Horse Subdivision lots are within Nevada County Sanitation District Number 1. The sanitary sewer system consists of a low-pressure collection system, treatment plant, and onsite soil absorption field within the subdivision. Each lot owner is required to install and privately maintain an on-lot sewer pump assembly that is connected to the pressure sewer service pipe at the street. The on-lot sewer pump assembly will be a grinder pump with holding tank except for the lots listed in Appendix C that will need high head effluent pump with septic tank.

Application and Installation Procedure

- A. Fill out application and submit it to the Department of Sanitation with the application, right-of-entry document, and connection fee. The amount of the connection fee is shown in Appendix D.
- B. Each lot owner will be required to obtain a sewer connection permit from the County Sanitation District as a condition of the building permit. Each septic tank and grinder pump tank will be required to be accessible by maintenance vehicles over an all-weather gravel or paved road constructed and maintained by the homeowner.
- C. Homeowner's contractor installs on-lot facilities consisting of:
 - (1) Gravity sewer service line to grinder holding tank or septic tank.
 - (2) Grinder pump tank assembly or septic tank with head effluent pump
 - (3) Pressure discharge line from pump to connection at service lateral at street.
 - (4) Pump level controls, electrical panel, alarm and electrical conduit.

Contractor shall be licensed and bonded and must obtain an encroachment permit from the Nevada County Department of Transportation when work is to be done in a County road right-of-way.

D. District/Building Department inspections required:

- 1. Arrange for inspection by calling (530) 265-1411 and schedule between 8:00 AM and 5:00 PM, Monday-Friday.
- 2. Witness pressure test of tanks and pipelines
- 3. Pump test, level control and alarm sequencing
- 4. Final

Submittals Required

- A. Submit with the sewer and building permit applications, a site plan showing location of pump assembly, tank, sewer lines, septic tank, etc., and setbacks.
- B. Include house and pump elevations proposed. Pump models and sizes are pre-determined for each lot and should not change due to elevations.

Maintenance, Right-of-Entry and User Fee

The homeowner pays the connection fee at the time of submittal of the permit application. The amount of the connection fee is shown in Appendix D.

The homeowner pays the user fees after final occupancy (as a part of their tax bill). This fee covers the operation and maintenance of the sewer mains and treatment plant. The homeowner shall privately maintain all on-lot sewer facilities up to the point of connection to the sewer service at the street.

The homeowner shall contract with a sewer pump/septic tank maintenance company to provide the maintenance described in Appendix E:

As a part of the building permit process, the lot owner will be required to execute a right-of-entry document, giving the Nevada County Sanitation District a right-of-entry to enter upon the subject lot for the purpose of inspecting the on-lot sewer facilities and, if required, correcting a problem such as a sewer spill.

Drawings

- Exhibit 1 Typical On-lot Sewer Facilities Plan
- Exhibit 2 On-lot Grinder Pump Assembly Requirements
- Exhibit 3 On-lot Septic Tank With High Head Effluent Pump Requirements
- Exhibit 4 Additional Construction Details, On-Lot
- Exhibit 5 Cleanout to Grade – Gravity Sewer Line
- Exhibit 6 Pedestal Mounted Control Panel

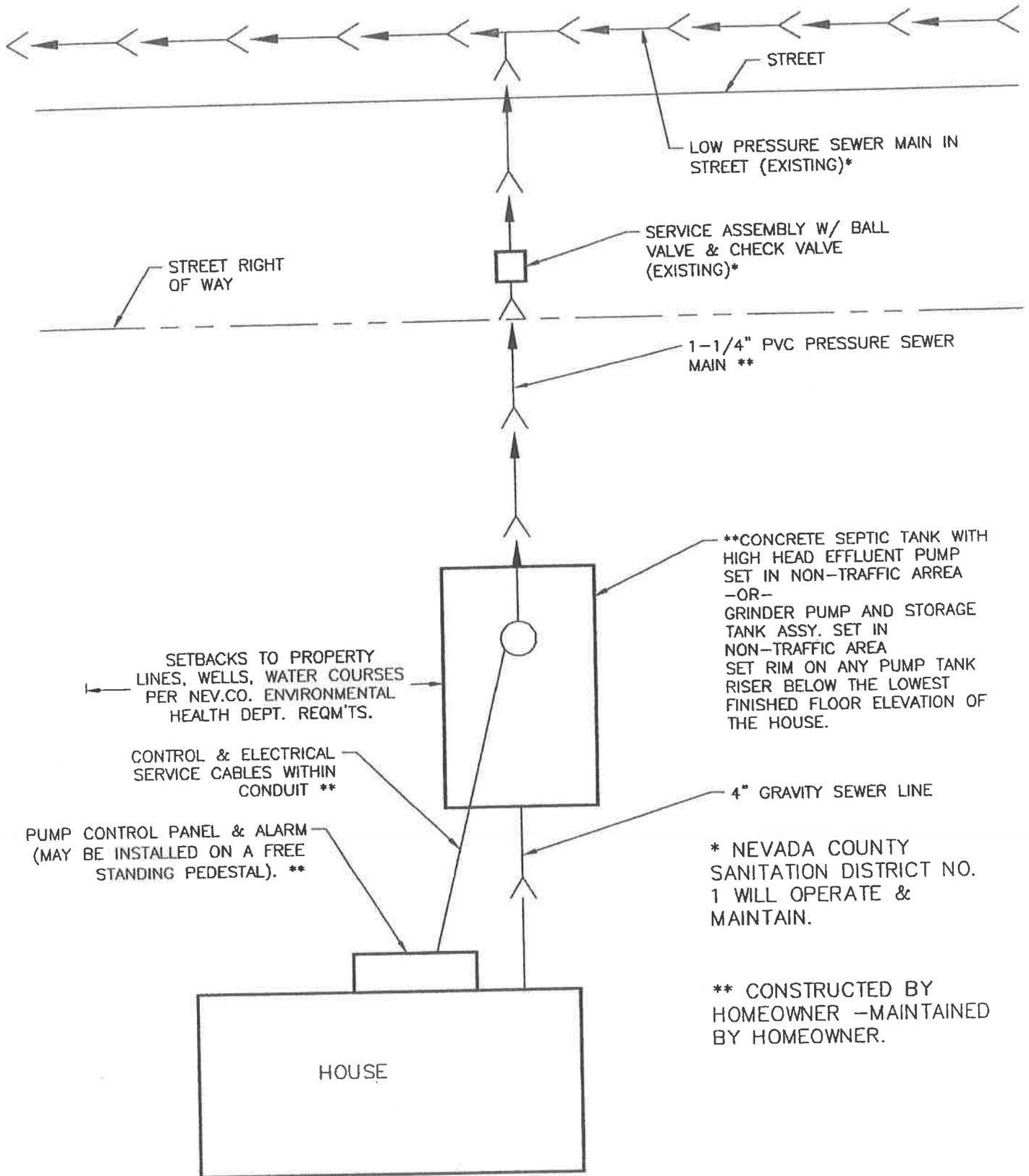
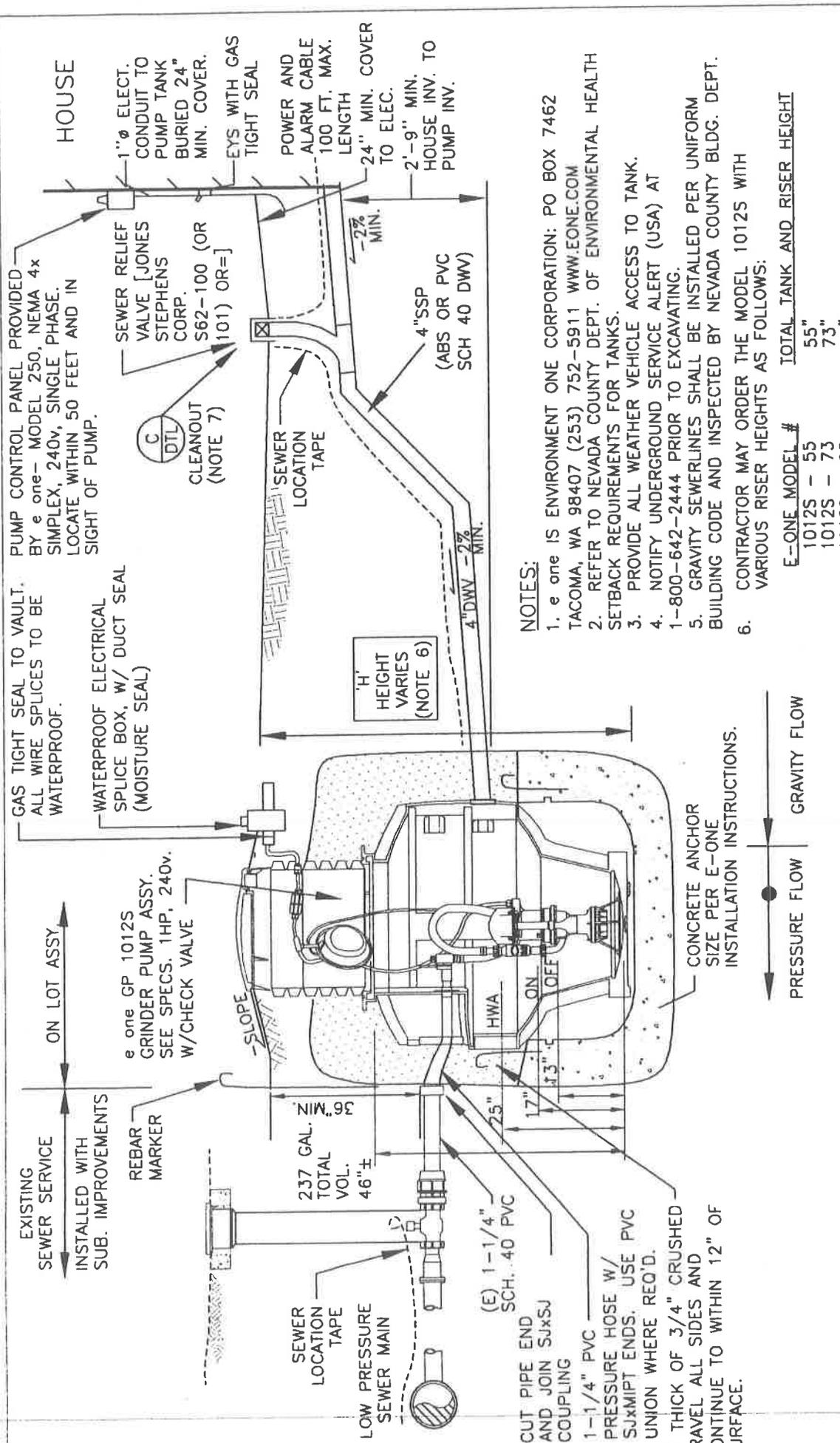


EXHIBIT 1

TYPICAL ON-LOT SEWER FACILITIES PLAN

NTS



NOTES:

1. e one IS ENVIRONMENT ONE CORPORATION: PO BOX 7462 TACOMA, WA 98407 (253) 752-5911 WWW.EONE.COM
2. REFER TO NEVADA COUNTY DEPT. OF ENVIRONMENTAL HEALTH SETBACK REQUIREMENTS FOR TANKS.
3. PROVIDE ALL WEATHER VEHICLE ACCESS TO TANK.
4. NOTIFY UNDERGROUND SERVICE ALERT (USA) AT 1-800-642-2444 PRIOR TO EXCAVATING.
5. GRAVITY SEWERLINES SHALL BE INSTALLED PER UNIFORM BUILDING CODE AND INSPECTED BY NEVADA COUNTY BLDG. DEPT.
6. CONTRACTOR MAY ORDER THE MODEL 1012S WITH VARIOUS RISER HEIGHTS AS FOLLOWS:

E-ONE MODEL #	TOTAL TANK AND RISER HEIGHT
1012S - 55	55"
1012S - 73	73"
1012S - 92	92"

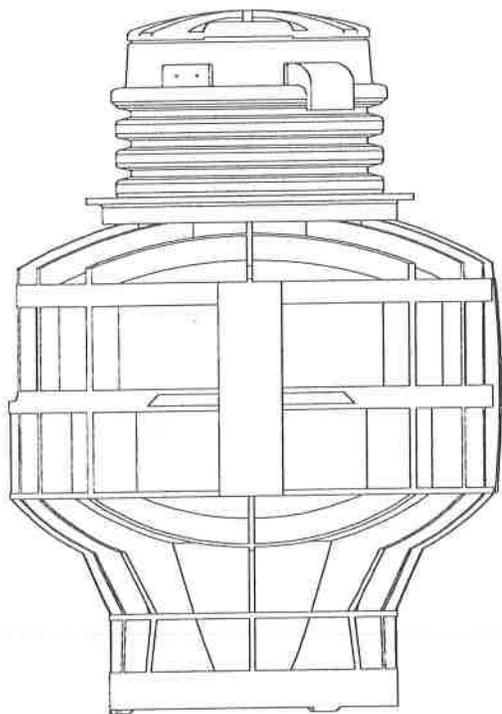
7. SET THE TOP OF THE SEWER RELIEF VALVE (TOP OF CLEANOUT) LOWER THAN THE TOP OF THE E-ONE RISER LID AND AT LEAST ONE FOOT LOWER THAN HOUSE FINISHED FLOOR.
8. ELECTRICIAN SHALL NOT TURN ON PUMPS UNTIL SERVICE VALVE AT STREET IS OPENED AS APPROVED BY INSPECTOR.

3	NEW E-ONE 1012S	6/27/06
2	NEW M.H. STORAGE	9/9/04
1	REVISED STORAGE TANK	7/28/04

EXHIBIT 2 (ALT. A)

NEVADA COUNTY SANITARY DISTRICT ON LOT SEWER SERVICE WITH GRINDER PUMP ASSEMBLY

GP 1012s



General Applications

The size, efficiency and operating economy of the GP 1012s make it your best choice for single dwellings, waterfront property, subdivision developments and marinas. The GP 1012s is ideally suited for both new and existing communities.

Features

The GP 1012s is a complete unit that includes: the grinder pump, check valve, polyethylene tank and controls.

All solids are ground into fine particles, allowing them to pass easily through the pump, check valve, and small diameter pipe lines. Even objects that are not normally found in sewage, such as plastic, rubber, fiber, wood, etc. are ground into fine particles.

The 1-1/4" inch discharge connection is adaptable to any piping materials, thereby allowing us to meet your local code requirements.

The tank is made of tough corrosion-resistant polyethylene. Designed specifically for low pressure sewer applications, the 1012s has an optimum tank capacity of 237 gallons, providing ample user storage. The lower portion of the tank has a smaller diameter tapered down to a dish shaped bottom. These design features reduce the retained volume and promote scouring which will minimize odor and corrosiveness. This model can handle flows of 850 GPD.

The internal check valve assembly, located in the grinder pump, is custom designed for non-clog, trouble-free operation.

The grinder pump is automatically activated. It runs infrequently for very short periods. The annual energy consumption is typically that of a 40 watt light bulb.

Operational Information

Motor

1 HP, 1,725 RPM, high torque, capacitor start, thermally protected, 120/240 V / 60 Hz, one phase

Inlet Connections

4-inch inlet grommet standard for DWV pipe. Other inlet configurations available from the factory.

Discharge Connections

Pump discharge terminates in 1-1/4" female NPT. Can easily be adapted to 1-1/4" PVC pipe or any other material required by local codes.

Discharge*

15 gpm at 0 psig
11 gpm at 40 psig
9 gpm at 60 psig

Overload Capacity

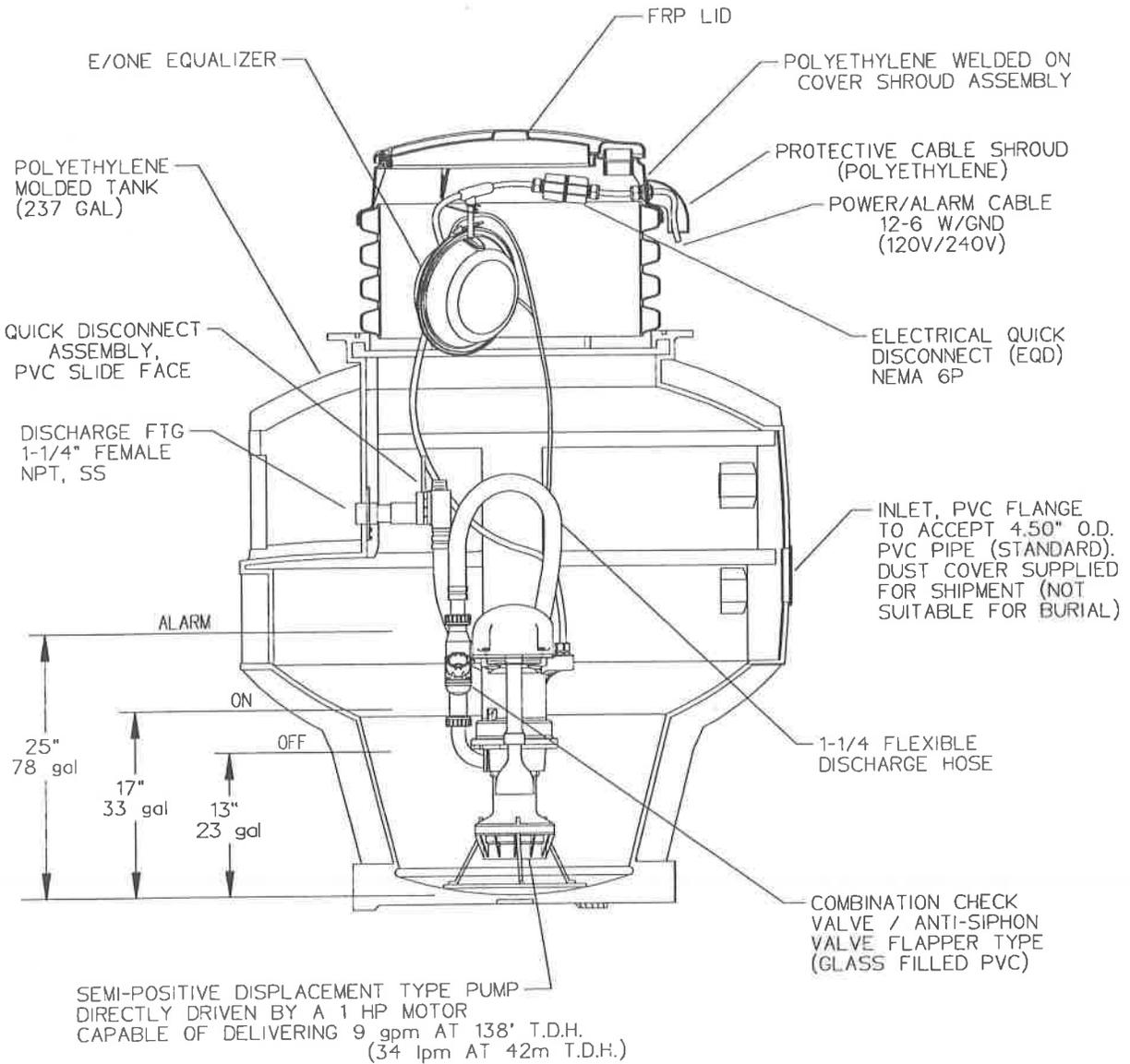
The maximum pressure that the pump can generate is limited by the motor characteristics. The motor generates a pressure well below the rating of the piping and appurtenances. The automatic reset feature does not require manual operation following overload.

Patent Numbers: 5,439,180
Patents Pending

* Discharge data includes loss through check valve, which is minimal.

PA2111P01 Rev. - 5/06

1012s



NOTE:
1012s-55 WITH A FLAT FIBERGASS LID IS ALSO AVAILABLE

BALLAST REQUIREMENTS

A CONCRETE ANCHOR IS REQUIRED
ON ALL 1012s STATIONS

SPECIFIC CONCRETE DIMENSIONS ARE REQUIRED
TO ACHIEVE NECESSARY BALLAST EFFECT

SEE INSTALLATION INSTRUCTIONS FOR FURTHER DETAILS

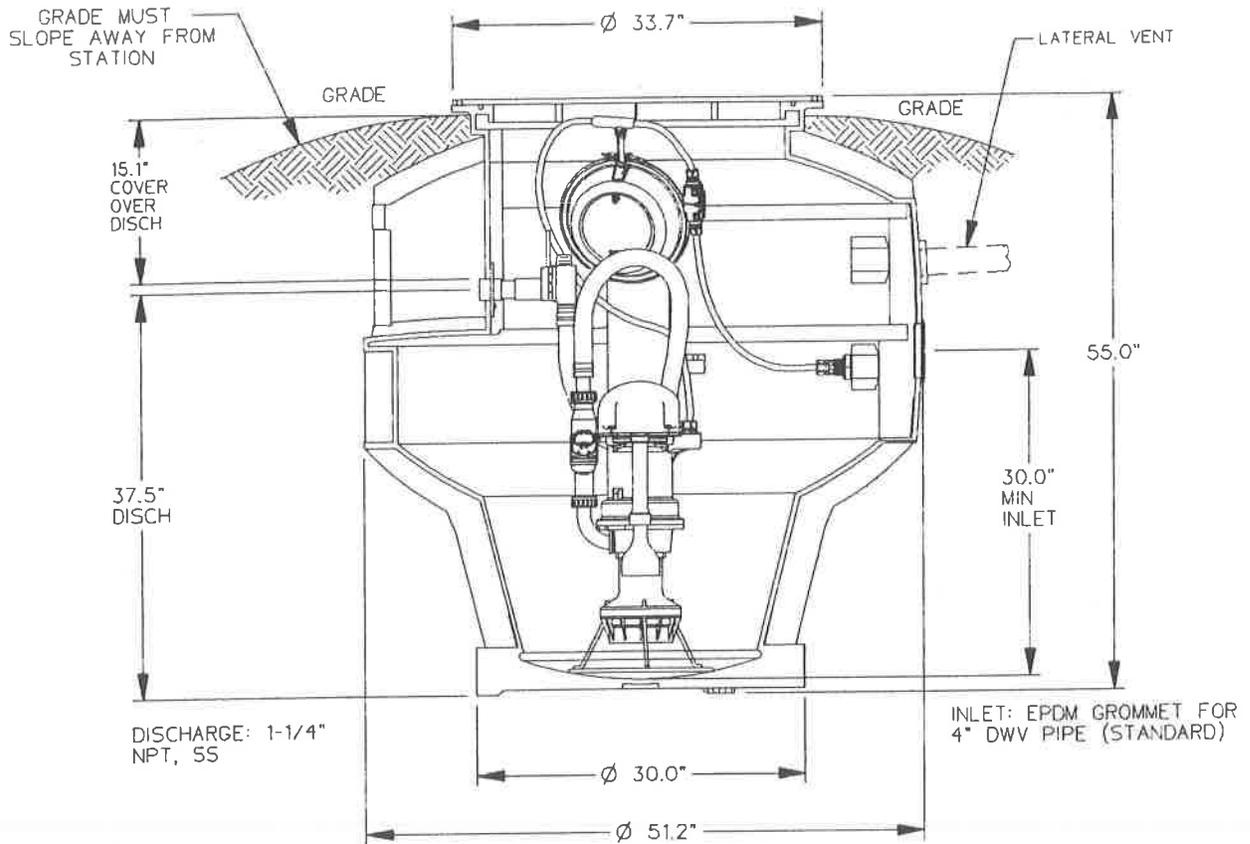
AD	CAH	05/02/06	-	1/16
DR BY	CHK'D	DATE	ISSUE	SCALE



DETAIL SHEET 1012s

PA2109P01

1012s-55



- NOTE:
1. LATERAL VENT GROMMET INCLUDED, VENT PIPE BY OTHERS
 2. ALSO AVAILABLE WITH MUSHROOM VENT IN LID

BALLAST REQUIREMENTS

A CONCRETE ANCHOR IS REQUIRED ON ALL 1012s-55 STATIONS

SPECIFIC CONCRETE DIMENSIONS ARE REQUIRED TO ACHIEVE NECESSARY BALLAST EFFECT

SEE INSTALLATION INSTRUCTIONS FOR FURTHER DETAILS

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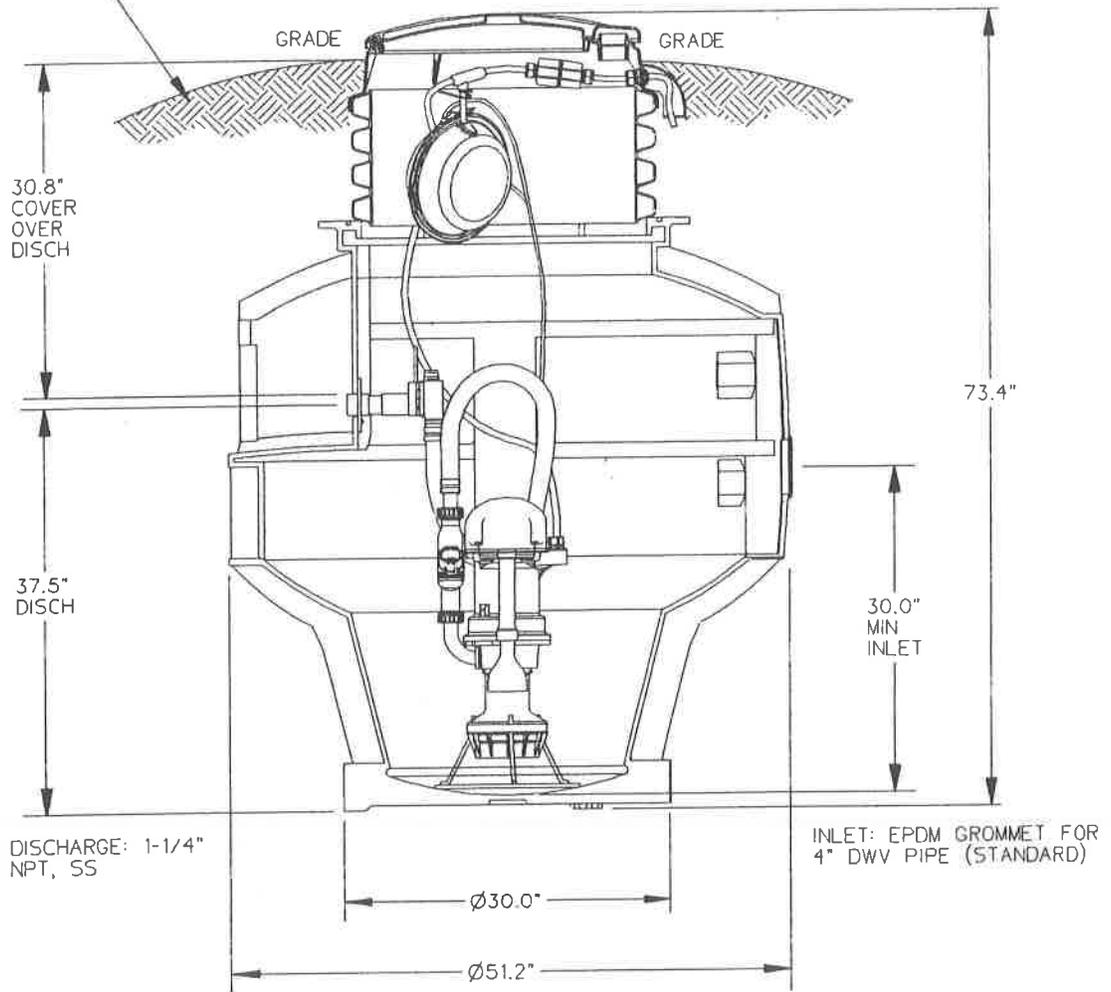
e one
SEWER SYSTEMS

MODEL 1012s-55

PA2110P01

1012s-73

GRADE MUST SLOPE AWAY FROM STATION



BALLAST REQUIREMENTS

A CONCRETE ANCHOR IS REQUIRED ON ALL 1012s-73 STATIONS

SPECIFIC CONCRETE DIMENSIONS ARE REQUIRED TO ACHIEVE NECESSARY BALLAST EFFECT

SEE INSTALLATION INSTRUCTIONS FOR FURTHER DETAILS

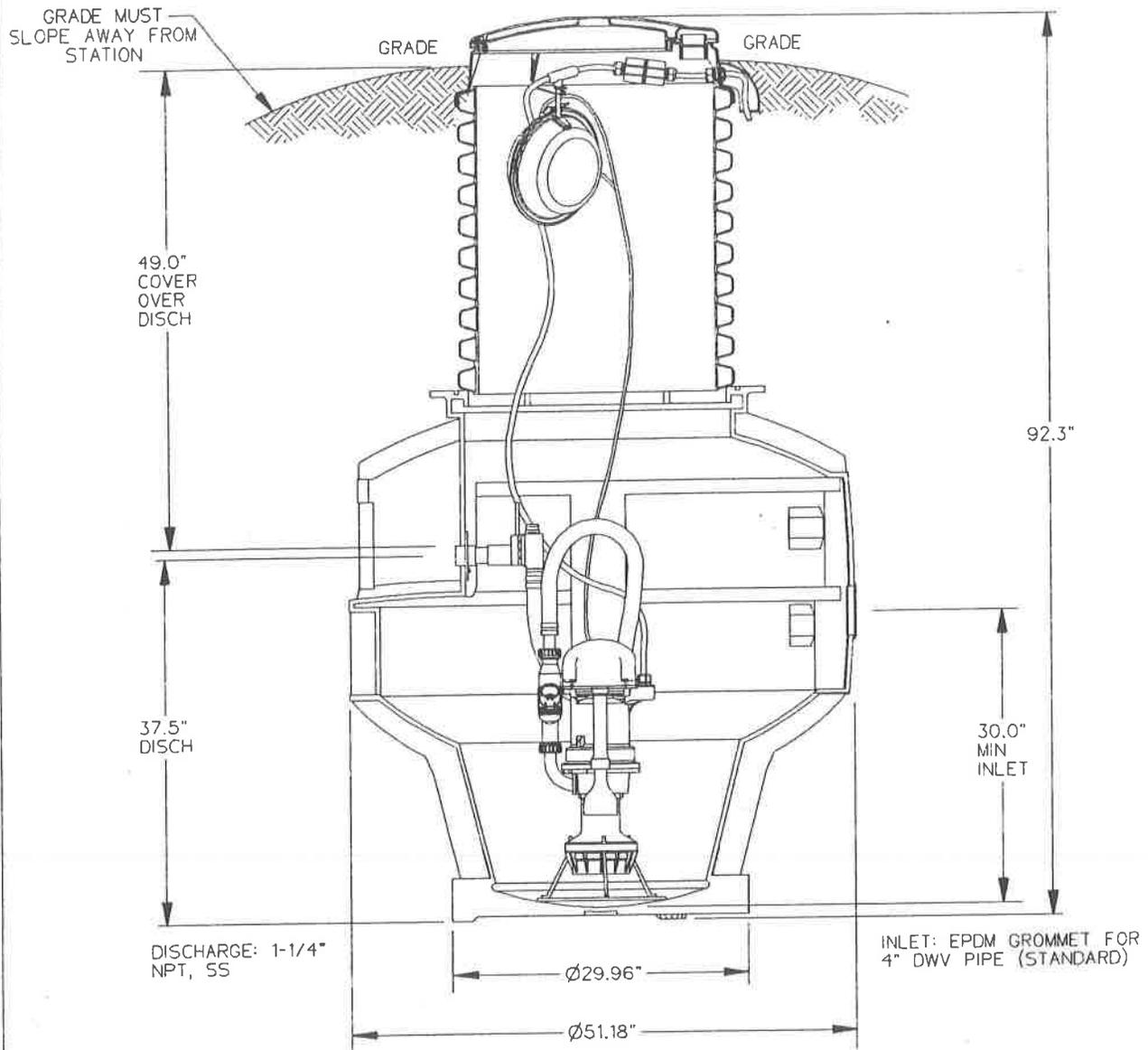
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MODEL 1012s-73

PA2107P01

1012s -92



BALLAST REQUIREMENTS

A CONCRETE ANCHOR IS REQUIRED ON ALL 1012s-92 STATIONS

SPECIFIC CONCRETE DIMENSIONS ARE REQUIRED TO ACHIEVE NECESSARY BALLAST EFFECT

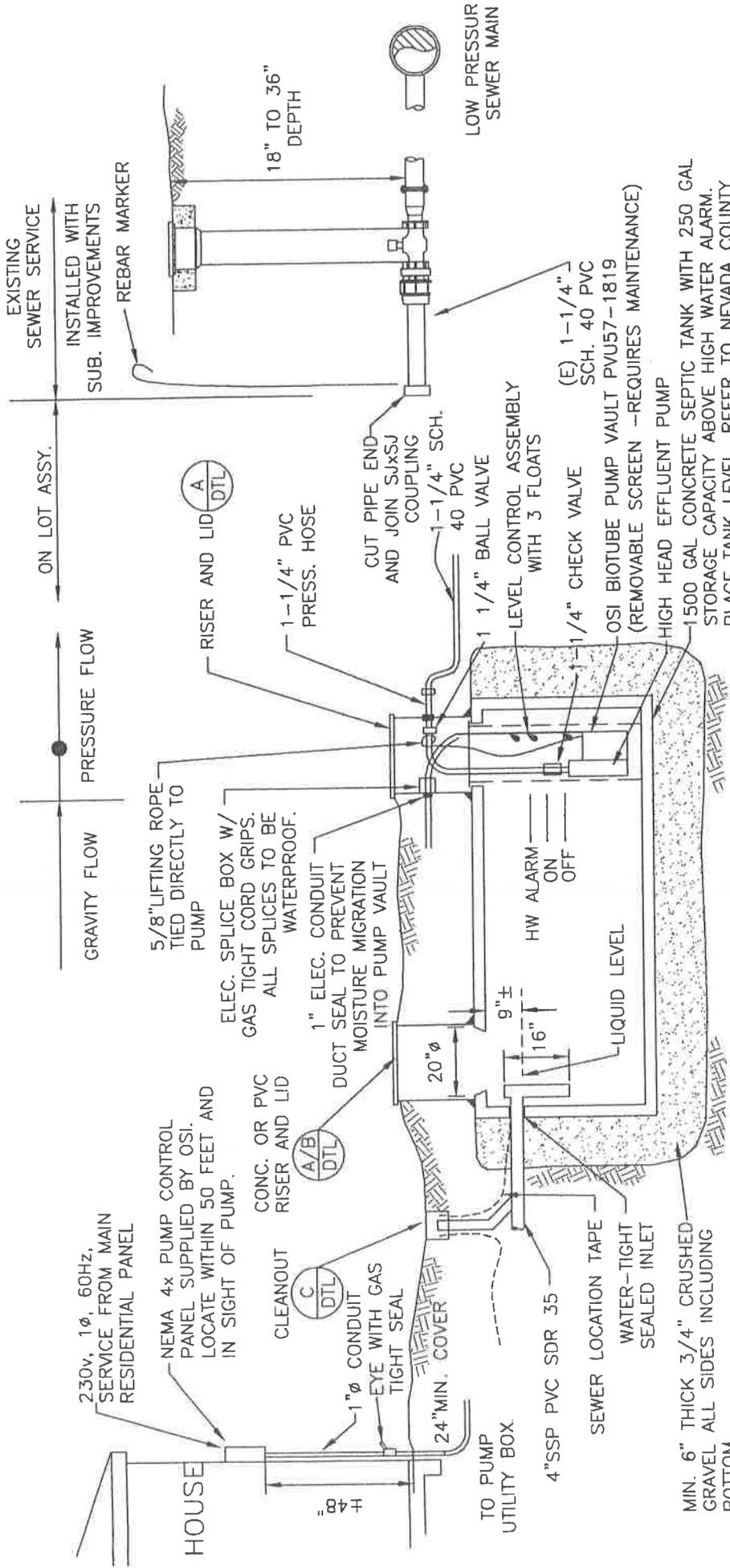
SEE INSTALLATION INSTRUCTIONS FOR FURTHER DETAILS

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MODEL 1012s-92

PA2108P01



NOTES:

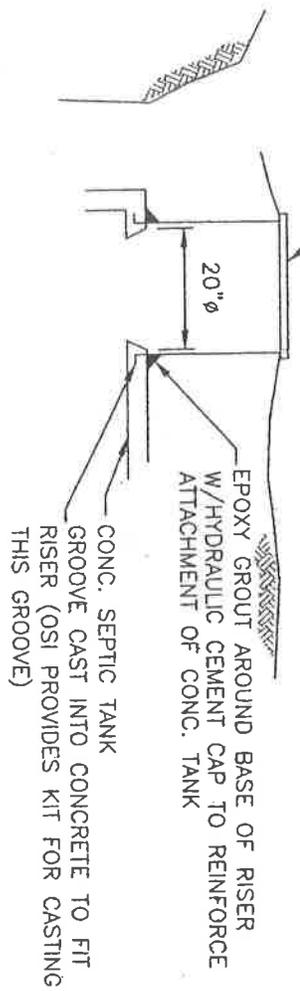
1. SEPTIC TANK SHALL PASS A VACUUM OR HYDROSTATIC LEAKAGE TEST - SEE SPECIFICATIONS.
2. OSI IS ORENCO SYSTEMS INC. 814 AIRWAY AVE. SUTHERLIN, OREGON 97479-9012 1-800-348-9843 WWW.ORENCO.COM
3. OSI SUPPLIES THE PUMP, BIOFILTER, PUMP DISCHARGE ASSEMBLY, FLOAT CONTROLS, PUMP PANEL AND RIBBED PVC RISERS.
4. PROVIDE ALL WEATHER VEHICLE ACCESS TO TANK.
5. NOTIFY UNDERGROUND SERVICES ALERT (USA) AT 1-800-642-2444 PRIOR TO EXCAVATING.
6. GRAVITY SEWERLINE SHALL BE INSTALLED PER UNIFORM PLUMBING CODE AND INSPECTED BY NEVADA COUNTY BUILDING DEPT.

EXHIBIT 3

NTS

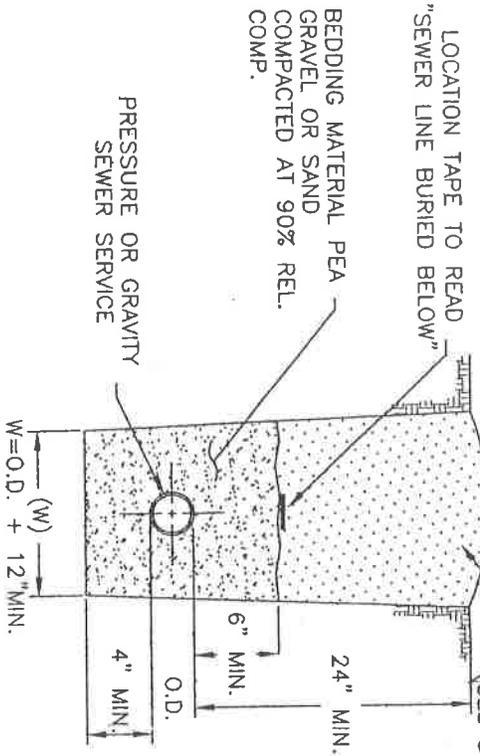
NEVADA COUNTY SANITARY DISTRICT ON LOT SEWER SERVICE WITH SEPTIC TANK AND HIGH HEAD EFFLUENT PUMP ASSEMBLY

RIBBED PVC RISER 24"Ø WITH FIBERGLASS LID WITH GASKET AND SS BOLTS. SET LID 2" ABOVE GRADE



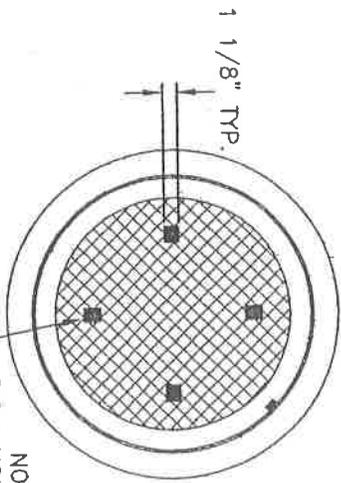
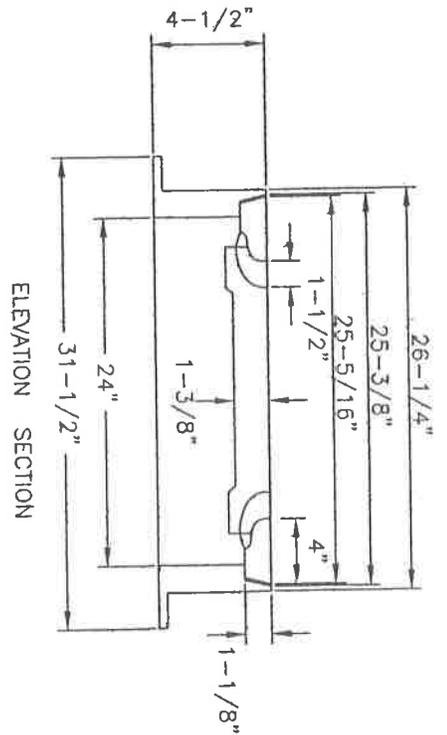
A RIBBED PVC RISER DETAIL
(NOT TRAFFIC RATED)

NOTES:
1. OSI IS ORENCO SYSTEMS INC., 814 AIRWAY AVE. SUTHERLIN, OREGON 97479-9012, (541)459-4449 MANUFACTURES RIBBED PVC RISERS WITH FIBERGLASS LIDS AND GROOVEMAKERS TO SET IN CAST CONCRETE THAT MEET THESE REQUIREMENTS.

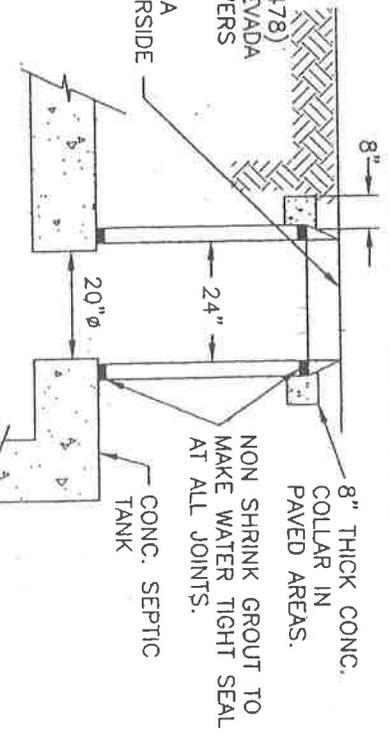


UNDER PAVING: CLASS A BACKFILL
OFF ROADWAY: CLASS C @ 85% REL/ COMP.
(SEE SPECS.)

24"Ø CNC. GRADE RINGS (ASTM C-478) AND C.I. FRAME AND COVER PER NEVADA SANITARY DISTRICT DETAILS. ALL COVERS SHALL BE GASKETED (FOR ODOR CONTROL). TYPICALLY GASKETS ARE A NEOPRENE RING FT INTO THE UNDERSIDE OF THE C.I. LID.



C.I. MH FRAME & COVER
PLAN AT 90 DEGREE INTERVALS



B CONCRETE GRADE RING ACCESS

MANHOLE DETAIL
EXHIBIT 4 (ALTERNATE TO RIBBED PVC RISER - TRAFFIC RATED)

TYPICAL TRENCH DETAIL
NTS

ADDITIONAL CONSTRUCTION DETAILS - ON LOT SEWER SERVICE FACILITIES
NEVADA COUNTY SANITATION DISTRICT

DTL-S-LOT-SWR

PEDESTAL MOUNTED CONTROL PANEL

(05-02-90)

NOTE : PLACE THE PANEL FACING TO THE NORTH TO PROTECT IT FROM THE SUN.

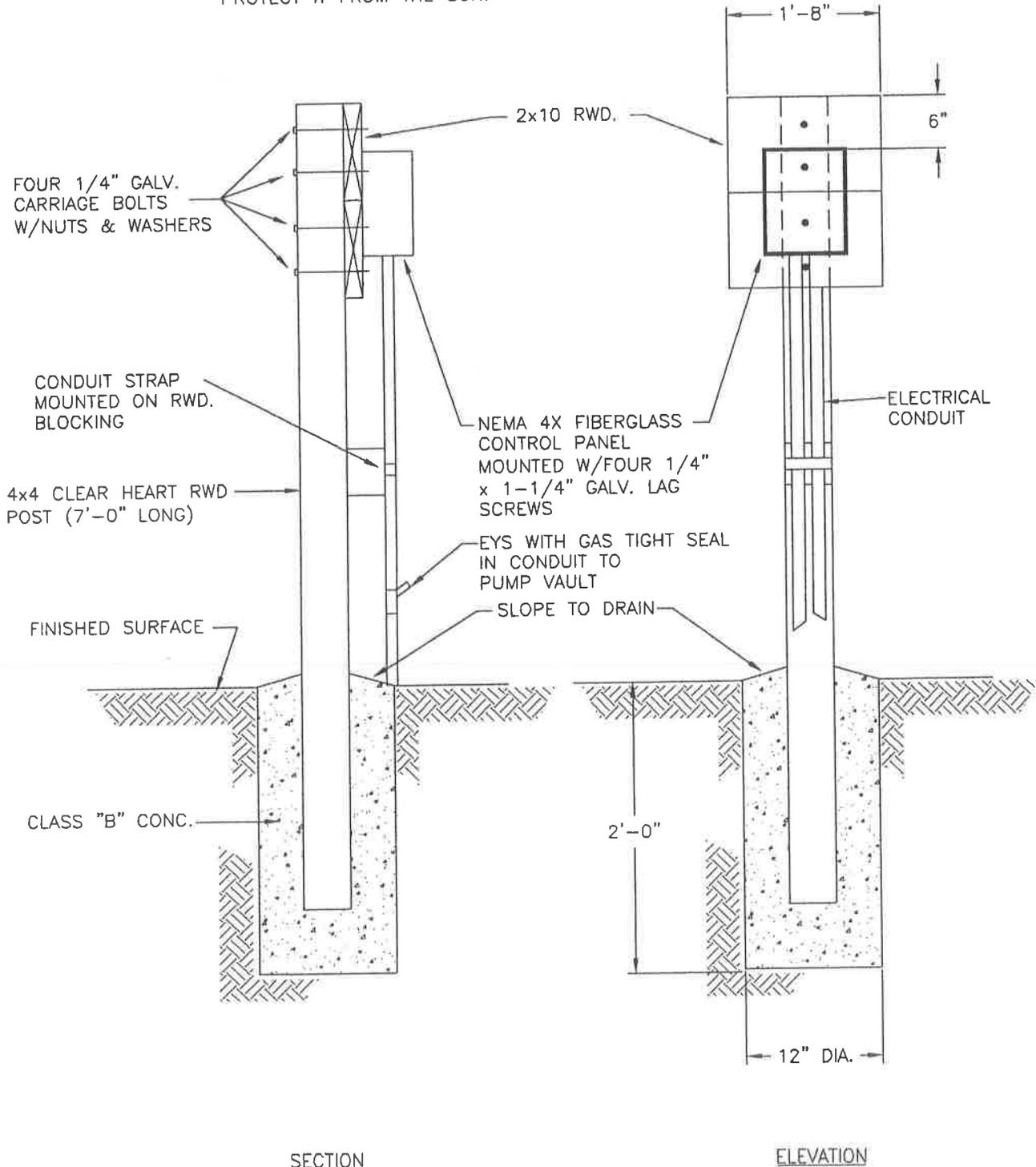


EXHIBIT 6

**Specifications
For
On-Lot Sewer Pump Assembly**

SECTION 1

Grinder Pump Service Assembly

- A. Grinder pump service assemblies shall be installed in conformance with the details shown on Exhibit 1 and the manufacturer's recommendations.
- B. Gravity sewer pipe from the house to the pump tank shall also be installed in conformance with the latest Uniform Plumbing Code and Nevada County Building Department requirements.
- C. Gravity sewer lines and cleanouts shall be pressure-tested hydrostatically or with low pressure air in accordance with Uniform Plumbing Code Section 712.2 and 712.3 and Installation Standard IAPMO IS 16-84.
- D. The grinder pump tank, assembly and electrical panel shall be supplied by:

Environment One Corp.
P. O. Box 7462
Tacoma, WA 98406
(253) 752-5911

The Environment One specifications are attached in Appendix A.
Some modifications may be required to the standard e-one electric panel to meet other requirements listed herein

- E. The height of the dry well will vary depending on the site conditions and placement of pump tank.
- F. A single phase, 240 V, 60 HZ service shall be provided for the pump circuit. All electrical equipment shall be listed and all installation shall meet NEC and local code requirements.
- G. The alarms shall be on an electrical circuit that is separate from the pump circuit. Panels shall have a fused disconnect.
- H. An elapsed time meter (hours) and event counter shall be supplied for each pump and located in the electric panel.
- I. Each pump shall have a hand/off/automatic switch or feature that controls operation mode located in the electric panel.
- J. There shall be a time delay between liquid level control and pump operation (on or off).
- K. Pumps shall have an automatic reset feature that does not require manual operation following overload.
- L. Audio/visual alarm shall have a push-to-silence button feature.
- M. Hydrostatic Leakage Test: prior to backfill with joints exposed, HDPE wet well and tanks shall be filled with water to 1" above the manhole riser connection to the tank lid or to the top of the wet well. All inlet pipes shall be plugged. The tank shall be filled to this level prior to inspection request. There shall be no visible leaks and the water level shall not drop within a 24-hour period. A second leakage test is required after backfilling is complete. The water level shall be to the top of the risers and the maximum allowable leakage shall be 0.13 gallon per hour. Both leakage tests shall be witnessed by the District inspector.
- N. The e-one GP 2012 assembly installation instructions are attached in Appendix B.
- O. Completed pump assembly shall successfully complete a test cycle by automatically turning on and shutting off at the proper liquid levels. Alarms shall also automatically signal at the proper liquid levels.

SECTION 3

Sewerline Trench Backfill

Class "A" Backfill

Within paved areas, pavement removal shall be made to neat, cut edges. Backfill shall be ¾" Class 2 AB mechanically compacted to 90% relative maximum density excepting the top 6 inches which shall be compacted to 95% relative maximum density in layers not exceeding 12 inches in depth. Pavement replacement shall be a minimum compacted thickness of 3 inches or the thickness of the removed pavement, whichever is greater.

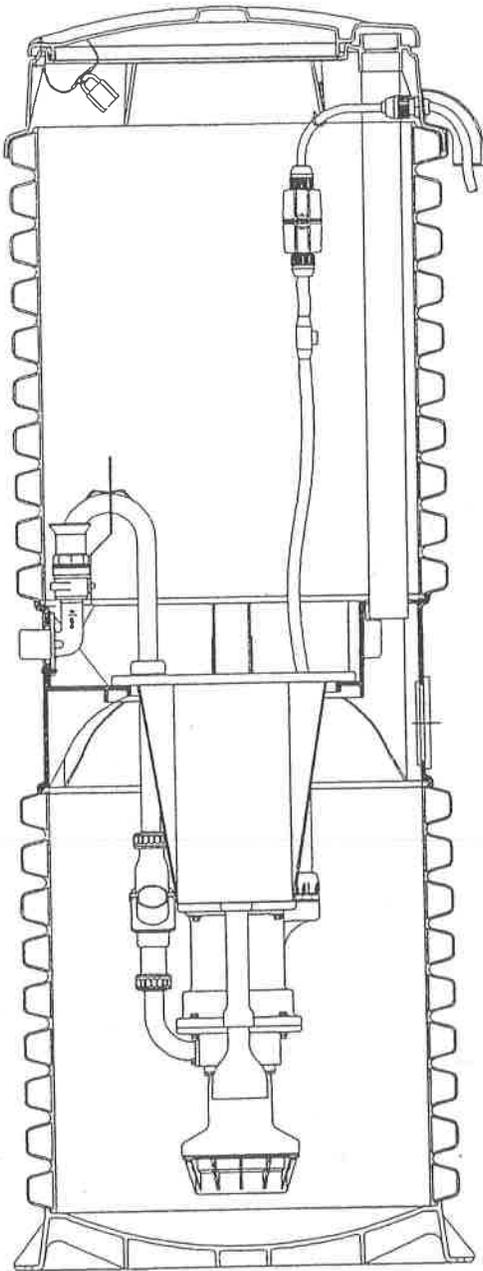
Class "C" Backfill

Backfill shall be suitable native material with 4" maximum rock size, or shall be imported select backfill and shall be compacted by wheel rolling to 85% relative maximum density.

APPENDIX A

Grinder Pump Assembly Specifications

Appendix A



GP2000

**Typical
Specifications**

**Semi-positive
Displacement Type
Grinder Pump
Stations**

SECTION: GRINDER PUMP STATIONS

1.0 GENERAL

- 1.01 **GENERAL DESCRIPTION:** The **MANUFACTURER** shall furnish complete factory-built and tested Grinder Pump Station(s), each consisting of grinder pump(s) suitably mounted in a basin constructed of fiberglass or high density polyethylene (HDPE), electrical quick disconnect (NEMA 6P), pump removal system, shut-off valve, anti-siphon valve, and check valve assembled within the basin, electrical alarm/disconnect panel, and all necessary internal wiring and controls. For ease of serviceability, all pump, motor/grinder units shall be of like type and horsepower throughout the system.
- 1.02 **SHOP DRAWINGS:** After receipt of notice to proceed, the **MANUFACTURER** shall furnish a minimum of six (6) sets of shop drawings detailing the equipment to be furnished including dimensional data and materials of construction. The **ENGINEER** shall promptly review this data, and return two (2) copies as accepted, or with requested modifications. Upon receipt of accepted shop drawings, the **MANUFACTURER** shall proceed immediately with fabrication of the equipment.
- 1.03 **MANUFACTURER:** The equipment specified shall be a product of a company experienced in the design and manufacture of grinder pumps for specific use in low pressure sewage systems. The company shall submit detailed installation and user instructions for its product; submit evidence of an established service program including complete parts and service manuals, and be responsible for maintaining a continuing inventory of grinder pump replacement parts. The **MANUFACTURER** shall provide a reference and contact list from three of its largest contiguous grinder pump installations.
- 1.04 **OPERATING CONDITIONS:** The pumps shall be capable of delivering 15 GPM against a rated total dynamic head of 0 feet (0 PSIG) and 9 GPM against a rated total dynamic head of 138 feet (60 PSIG). The pump(s) must also be capable of operating at negative total dynamic head without overloading the motor(s). Under no conditions shall in-line piping or valving be allowed to create a false apparent head.

- 1.05 **WARRANTY:** The grinder pump **MANUFACTURER** shall provide a part(s) and labor warranty on the complete station and accessories, including, but not limited to, panel and redundant check valve, for a period of twenty-four (24) months after notice of **OWNER'S** acceptance, but no greater than twenty-seven (27) months after receipt of shipment. Any defects found during the warranty period will be reported to the **MANUFACTURER** by the **OWNER**.

2.0 PRODUCT

- 2.01 **PUMP:** The pump shall be a custom designed, integral, vertical rotor, motor driven, solids handling pump of the progressing cavity type with a single 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 suited for domestic wastewater service. Its physical properties shall include high tear and abrasion resistance, grease resistance, water and detergent resistance, temperature stability, good aging properties, and outstanding wear resistance.
- 2.02 **GRINDER:** The grinder shall be placed immediately below the pumping elements and shall be direct-driven by a single, one-piece stainless steel 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 stainless steel shredding ring spaced in accurate close annular alignment with the driven impeller assembly, which shall carry two hardened type 400 series stainless steel cutter bars.

This assembly shall be dynamically balanced and operate without objectionable noise or vibration over the entire range of recommended operating pressures. The grinder shall be constructed so as to eliminate clogging and jamming under all normal operating conditions including starting. Sufficient vortex action shall be created to scour tank free of deposits or sludge banks which would impair the operation of the pump. These requirements shall be accomplished by the following, in conjunction with the pump:

1. *The grinder shall be positioned in such a way that solids are fed in an upward flow direction.*
2. *The inlet shroud shall have a diameter no less than 5 inches.*
3. *At maximum flow rate through the cutting mechanism must not exceed 4 feet per second.*
4. *The impeller mechanism must rotate at a nominal speed of no greater than 1800 rpm.*

The grinder shall be capable of reducing all components in normal domestic sewage, including a reasonable amount of "foreign objects", such as paper, wood, plastic, glass, rubber and the like, to finely-divided particles which will pass freely through the passages of the pump and the 1-1/4" diameter s/s discharge piping.

2.03 ELECTRIC MOTOR: As a maximum, 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 into the motor. This motor protector combination shall have been specifically investigated and listed by Underwriters Laboratories, Inc., for the application.

2.04 MECHANICAL SEAL: The core shall be provided with a mechanical shaft seal to prevent leakage between the motor and pump. The seal shall have a stationary ceramic seat and carbon rotating surface with faces precision lapped and held in position by a stainless steel spring.

2.05 TANK AND INTEGRAL ACCESSWAY: (Model 2010) High Density Polyethylene Construction. The tank shall be made of high density polyethylene, with a melt index of 2.0 grams/10 minutes or lower to assure high environmental stress cracking resistance. Corrugated sections are to be made of a double wall construction with the internal wall being generally smooth to promote scouring. Corrugations of outside wall are to be of a minimum amplitude of 1 1/2" to provide

necessary transverse stiffness. Any incidental sections of a single wall construction are to be a minimum .250 inch thick. All seams created during tank construction are to be thermally welded and factory tested for leak tightness. Tank wall and bottom must withstand the pressure exerted by saturated soil loading at maximum burial depth. All station components must function normally when exposed to maximum external soil and hydrostatic pressure.

The tank shall be furnished with one EPDM grommet (4" DWV or SCH 40) fitting to accept a 4.50" OD DWV pipe. Tank capacities shall be as shown on the contract drawings.

The accessway shall be an integral extension of the wet well assembly and include a tamper-proof cover assembly providing low profile mounting and water-tight capability. Accessway design and construction shall enable field adjustment of station height in increments of 4" or less.

The station shall have all necessary penetrations molded in and factory sealed. No field penetrations shall be acceptable.

All discharge piping shall be constructed of 304 Series Stainless Steel and terminate outside the accessway bulkhead with a stainless steel, 1 1/4 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 single NEMA 6P electrical quick disconnect for all power and control functions, factory installed with accessway penetrations warranted by the manufacturer to be watertight. The accessway shall also include a 2 inch PVC vent to prevent sewage gases from accumulating in the tank.

2.06 TANK & INTEGRAL ACCESSWAY: (Models 2012 & 2014) High Density Polyethylene Construction. The tank shall be made of rotationally molded high density polyethylene, with a melt index of 2.0 grams/10 minutes or lower to assure high environmental stress cracking resistance. The tank shall have a nominal thickness of 1/2". All seams created during tank construction are to be thermally welded and

factory tested for leak tightness. Tank wall and bottom must withstand the pressure exerted by saturated soil loading at maximum burial depth. All station components must function normally when exposed to maximum external soil and hydrostatic pressure. The tank shall be furnished with one EPDM grommet (SDR 35 or SDR 40) fitting to accept a 4.50" OD DWV pipe. Tank capacities shall be as shown on the contract drawings.

The accessway shall be an integral extension of the wet well assembly and include a lockable cover assembly providing low profile mounting and water-tight capability. Accessway design and construction shall facilitate field adjustment of station height in increments of 4" or less without the use of any adhesives or sealants requiring cure time before installation can be completed. The station shall have all necessary penetrations molded in and factory sealed. No field penetrations shall be acceptable.

All discharge piping shall be constructed of 304 Series Stainless Steel and terminate outside the accessway bulkhead with a stainless steel, 1 1/4 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 single NEMA 6P electrical quick disconnect for all power and control functions, factory installed with accessway penetrations warranted by the manufacturer to be watertight. The accessway shall also include a 2 inch PVC vent to prevent sewage gases from accumulating in the tank.

2.07 TANK & INTEGRAL ACCESSWAY: (Models 2015 & 2016) **Fiberglass reinforced polyester resin.** The tank shall be custom molded of fiberglass reinforced polyester resin and shall be furnished with one inlet grommet to accept a 4.50" OD DWV 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 made of high density polyethylene of a grade selected for environmental stress cracking resistance. It shall have an access opening at the top to accept a lockable fiberglass cover.

2.08 CHECK VALVE: The pump discharge shall be equipped with a factory installed, gravity operated, flapper-type integral check valve built into the stainless steel discharge piping. 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 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 backpressure. The valve body shall be an injection molded part made of glass filled PVC.

Each grinder pump station shall also include one separate check valve for installation in the 1 1/4" service lateral between the grinder pump station and the sewer main, preferably next to the curb stop.

2.09 CORE UNIT: The Grinder Pump Station shall have cartridge type easily removable core assemblies containing pump, motor, grinder, all motor controls, check valve, anti-siphon valve, electrical quick disconnect and wiring. The watertight integrity of each core unit, shall be established by 100% factory test at a minimum of 5 PSIG.

2.10 CONTROLS: All necessary controls shall be located in the top housing of the core unit. The top housing will be attached with stainless steel fasteners.

Non-fouling waste water level detection for controlling pump operation shall be accomplished by monitoring the pressure changes in an integral air-bell level 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.

To assure reliable operation of the pressure sensitive switches, each core shall be equipped with a breather assembly, complete with a suitable means to prevent accidental entry of water into the motor compartment. The grinder pump will be furnished with a length of 6 conductor 14 gauge, type SJOW

cable, pre-wired and watertight to meet UL requirements.

- 2.11 ALARM/DISCONNECT PANEL:** Each grinder pump station shall include a NEMA 4X, UL listed ALARM/DISCONNECT PANEL suitable for wall or pole mounting. The NEMA 4X enclosure shall be manufactured of thermoplastic to assure corrosion resistance. The enclosure shall include a hinged, pad lockable cover, secured dead front and component knockouts. The enclosure shall not exceed 9.38"W x 11.5"H x 5.63"D.

For each core, the panel shall contain one (1) - 15 amp, double pole circuit breaker for the power circuit and one (1) 15 amp single pole circuit breaker for the alarm circuit. The panel shall contain terminal blocks, integral power bus, push to run feature and a complete alarm circuit.

The Alarm/Disconnect Panel shall include the following features: audio & visual alarm, push to run switch, and high level (redundant) pump starting control. The alarm sequence is to be as follows:

1. *When liquid level in the sewage wet-well rises above the alarm level, visual and audio alarms will be activated. The contacts on the alarm pressure switch will close. The redundant pump starting system will be energized.*
2. *The audio alarm may be silenced by means of the externally mounted, push-to-silence button.*
3. *Visual alarm remains illuminated until the sewage level in the wet-well drops below the "off" setting of the alarm pressure switch.*

The visual alarm lamp shall be inside 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 NEMA 4X rating. 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 core requires servicing. The audio alarm shall be a printed circuit board in conjunction with an 86 dB buzzer with quick

mounting terminal strip mounted in the interior of the enclosure. The audio alarm shall be capable of being de-activated by depressing a push-type 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.

- 2.12 SERVICEABILITY:** The grinder pump core unit shall have two lifting hooks complete with nylon lift-out harness connected to its top housing to facilitate easy core removal when necessary. All mechanical and electrical connections must provide easy disconnect accessibility for core unit removal and installation. A push to run feature will be provided for field trouble shooting. All motor control components shall be mounted on a readily replaceable bracket for ease of field service.

- 2.12.5 OSHA CONFINED SPACE:** All maintenance tasks for the grinder pump station must be possible without entry of the grinder pump station (as per **OSHA 1910.146** Permit-required confined spaces). *"Entry means the action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space."*

- 2.13 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 Station shall be listed by Underwriters Laboratories, Inc., to be safe and appropriate for the intended use.*

The grinder pump shall meet accepted standards for plumbing equipment for use in or near residences, shall be free from noise, odor, or health hazards, and shall have been tested by an independent laboratory to certify its capability to perform as specified in either individual or low pressure sewer system applications. As evidence of compliance with this requirement, the grinder pump shall bear the seal of NSF International

3.0 EXECUTION

- 3.01 **FACTORY TEST:** Each grinder pump shall be submerged and operated for 5 minutes (minimum). Included in this procedure will be the testing of all ancillary components such as, the anti-siphon valve, check valve, discharge line, level sensors and each unit's dedicated controls. All factory tests shall incorporate each of the above listed items. Actual appurtenances and controls which will be installed in the field, shall be particular to the tested pump only. A common set of appurtenances and controls for all pumps will not be acceptable. Certified test results shall be available upon request showing the operation of each grinder pump at two (2) different points on its curve, with the maximum pressure no less than 60 psi. The **ENGINEER** reserves the right to inspect such testing procedures with representatives of the **OWNER**, at the **GRINDER PUMP MANUFACTURER'S** facility.

All completed stations shall be factory leak tested to assure the integrity of all joints, seams and penetrations. All necessary penetrations such as inlets, discharge fittings and cable connectors shall be included in this test along with their respective sealing means (grommets, gaskets etc.).

- 3.02 **DELIVERY:** All Grinder Pump units will be delivered to the job site, 100% completely assembled, including testing, ready for installation. Grinder pump units will be individually mounted on wooden pallets.
- 3.03 **INSTALLATION:** Earth excavation and backfill are specified under **SITE WORK**, but are also to be done as a part of the work under this section, including any necessary sheeting and bracing.

The **CONTRACTOR** shall be responsible for handling ground water to provide a firm, dry subgrade for the structure, and shall guard against flotation or other damage resulting from general water or flooding.

The Grinder Pump Stations shall not be set into the excavation until the installation procedures and excavation have been approved by the **ENGINEER**.

Remove packing material. Users instructions **MUST** be given to the **OWNER**. Hardware supplied with the unit, if required, will be used

at installation. The basin will be supplied with a standard 4" inlet grommet (4.50" OD) for connecting the incoming sewer line. Appropriate inlet piping must be used. The basin may not be dropped, rolled or laid on its side for any reason.

Installation shall be accomplished so that 1" to 4" of accessway, below the bottom of the lid, extends above the finished grade line. The finished grade shall slope away from the unit. The diameter of the hole must be large enough to allow for the concrete anchor.

A 6" inch (minimum) layer of naturally rounded aggregate, clean and free flowing, with particle size of not less than 1/8" or more than 3/4" shall be used as bedding material under each unit.

A concrete anti-flotation collar, as detailed on the drawings, and sized according to the manufacturer's instructions, shall be required and shall be pre-cast to the grinder pump or poured in place. Each Grinder Pump Station with its precast anti-flotation collar shall have a minimum of three (3) lifting eyes for loading and unloading purposes.

The unit shall be leveled, and filled with water, to the bottom of the inlet, to help prevent the unit from shifting while the concrete is being poured. The concrete must be manually vibrated to ensure there are no voids. If it is necessary to pour the concrete to a level higher than the inlet piping, an 8" sleeve is required over the inlet prior to the concrete being poured.

The **CONTRACTOR** will provide and install a four (4) foot piece of four inch SCH. 40 PVC pipe with water tight cap, to stub-out the inlet for the property owners' installation contractor, as depicted on the contract drawings. The electrical enclosure shall be furnished, installed and wired to the Grinder Pump Station by the **CONTRACTOR**. An alarm device is required on every installation, there shall be **NO EXCEPTIONS**. It will be the responsibility of the **CONTRACTOR** and the **ENGINEER** to coordinate with the individual property owner(s) to determine the optimum location for the "Alarm/disconnect Panel."

The **CONTRACTOR** shall mount the alarm device in a conspicuous location, as per national and local codes. The Alarm/disconnect Panel will be connected to

the Grinder Pump Station by a length of six (6) conductor 12 gauge TC type cable as shown on the contract drawings. The power and alarm circuits must be on separate power circuits.

3.04 START-UP AND FIELD TESTING: The **MANUFACTURER** shall provide the services of qualified factory trained technician(s) who shall inspect the placement and wiring of each station, perform field tests as specified herein, and instruct the **OWNER'S** personnel in the operation and maintenance of the equipment before the stations are accepted by the **OWNER**.

All equipment and materials necessary to perform testing shall be the responsibility of the **INSTALLING CONTRACTOR**. This will include, as a minimum, a portable generator (if temporary power is required) and water in each basin.

The services of a trained factory-authorized technician shall be provided at a rate of one (1) - four (4) day week for each 100 grinder pump stations supplied. Each day shall be ten (10) person hours in duration.

Upon completion of the installation, the authorized factory technicians will perform the following test on each station:

1. *Make certain the discharge shut-off valve is fully open. This valve must not be closed when the pump is operating. In some installations, there may be a*

valve(s) at the street main that must also be open.

2. *Turn ON the alarm power circuit.*
3. *Fill the wet well with water to a depth sufficient to verify the high level alarm is operating. Shut off water.*
4. *Turn ON pump power circuit. Initiate pump operation to verify automatic "on/off" controls are operative. Pump should immediately turn ON. Within one (1) minute alarm light will turn OFF. Within three (3) minutes the pump will turn OFF.*

Upon completion of the start-up and testing, the **MANUFACTURER** shall submit to the **ENGINEER** the start-up authorization form describing the results of the tests performed for each Grinder Pump Station. Final acceptance of the system will not occur until authorization forms have been received for each pump station installed.

4.0 OPERATION AND MAINTENANCE

4.01 SPARE CORE: The **MANUFACTURER** will supply one (1) spare grinder pump core for every 25 grinder pump stations installed, complete with all operation controls level sensors, check valve, anti-siphon valve, pump/motor unit, and grinder.

4.02 MANUALS: The **MANUFACTURER** shall supply four (4) copies of Operation and Maintenance Manuals to the **OWNER**, and one (1) copy of the same to the **ENGINEER**.

END OF SECTION

**environment|one Corporation
2773 Balltown Road
Niskayuna, New York 12309**

LM000110 Rev. C 9/00

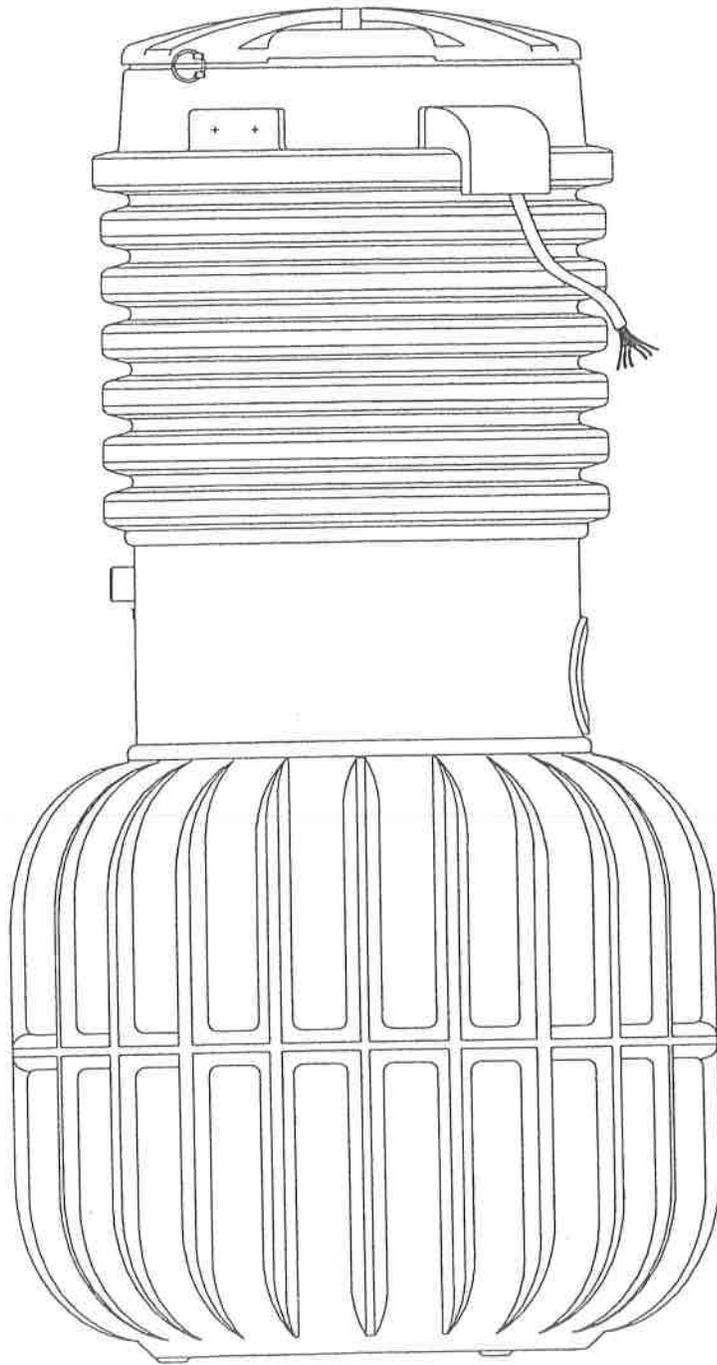
APPENDIX B

Grinder Pump Assembly Installation Instructions

NOTES:

1. Add a waterproof electrical splice box outside the pump vault assembly per Exhibit 2 for the electrical cables.

Appendix B



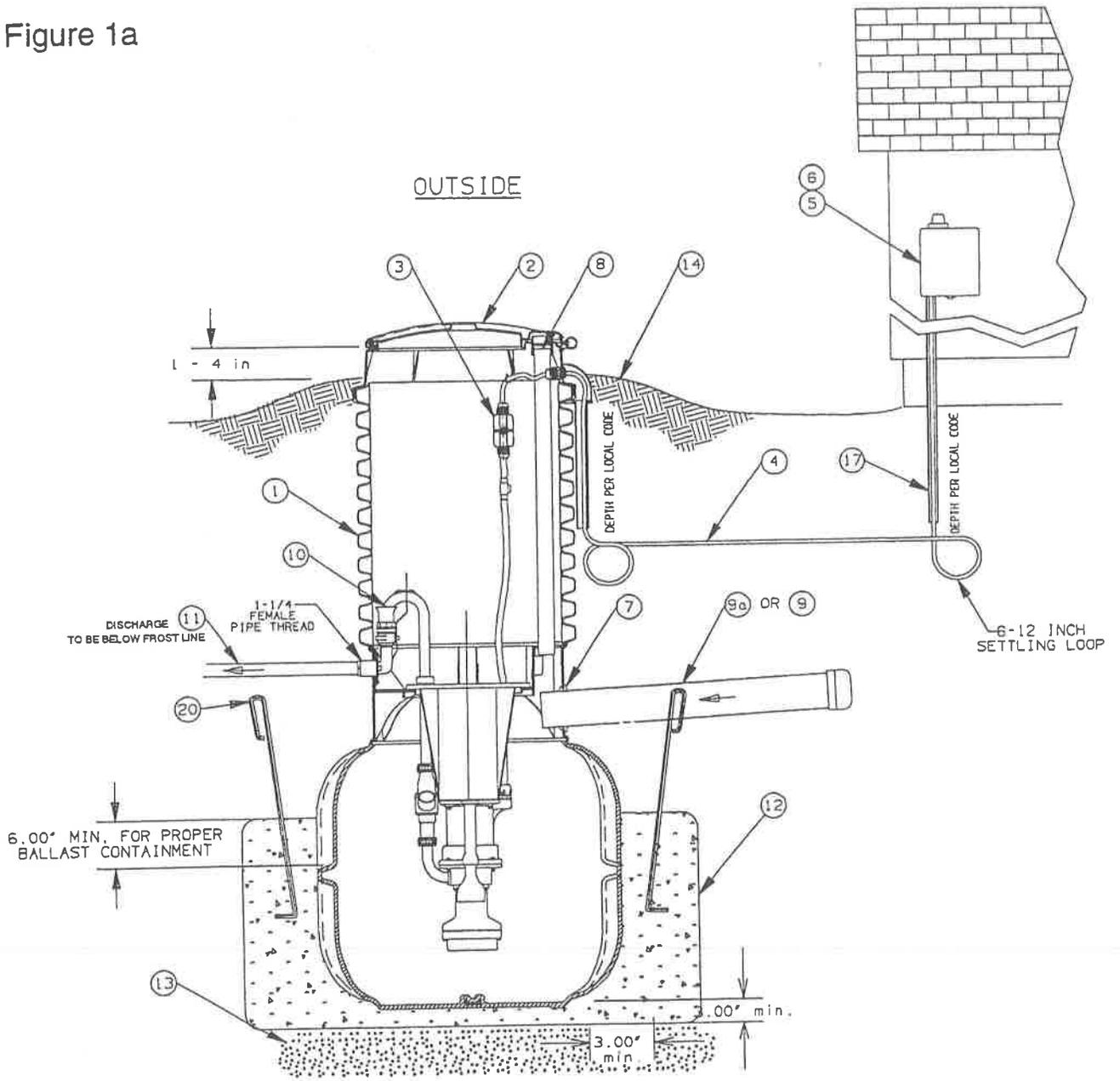
GP 2012

TYPICAL INSTALLATION INSTRUCTIONS

ENVIRONMENT ONE GRINDER PUMP FEATURE IDENTIFICATION

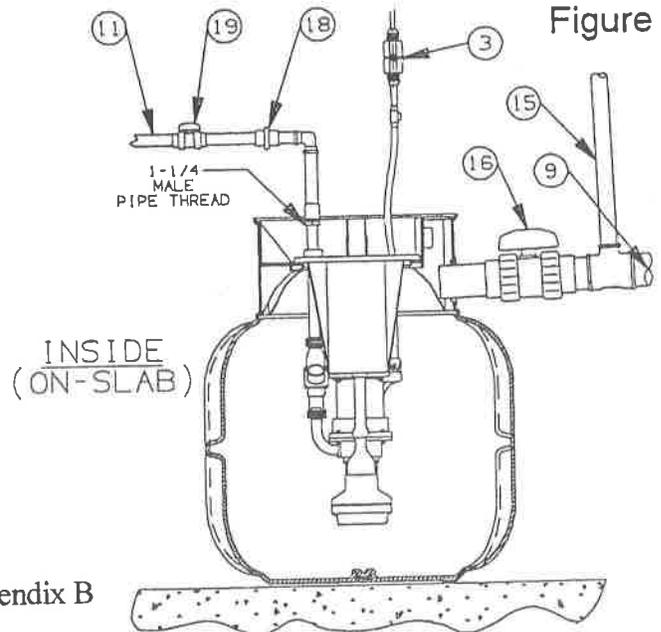
1. **GRINDER PUMP BASIN** - High density polyethylene (HDPE).
2. **ACCESSWAY COVER** - FRP.
3. **ELECTRICAL QUICK DISCONNECT (EQD)** - Cable from pump core terminates here.
4. **POWER AND ALARM CABLE** - Circuits to be installed in accordance with local codes. (100 feet maximum length)
5. **DISCONNECT PANEL** - Rain proof (NEMA 4X) enclosure. Equipped with circuit breakers or disconnect switch. Locate according to local codes.
6. **ALARM DEVICE** - Every installation is to have an alarm device to alert the homeowner of a potential malfunction. Visual devices should be placed in very conspicuous locations.
7. **INLET** - EPDM grommet (4.5" ID). For 4.5" OD DWV pipe.
8. **WET WELL VENT** - 2.0" tank vent, supplied by factory in units with accessways.
9. **GRAVITY SERVICE LINE** - 4" DWV, (4.5 OD). Supplied by others.
- 9a. **STUB-OUT** - 4" X 5' Long watertight stub-out, to be installed at time of burial unless the gravity service line is connected during installation. Supplied by others.
10. **DISCHARGE VALVE** - 1-1/4" Female pipe thread.
11. **DISCHARGE LINE** - 1-1/4" Nominal pipe size. Supplied by others.
12. **CONCRETE ANCHOR** - See Chart 1 for specific weight for your station height. Supplied by others.
13. **BEDDING MATERIAL** - 6" minimum depth, round aggregate, (gravel). Supplied by others.
14. **FINISHED GRADE** - Grade line to be 1 to 4 inches below removable lid and slope away from the station.
15. **VENT** - Indoor installation. See section 6, Venting, on page 4.
16. **VALVE** - Full ported ball valve. Recommended option, for use during service operations. Supplied by others.
17. **CONDUIT** - 1" or 1-1/4", material and burial depth as required by local code. Supplied by others.
18. **UNION** - 1-1/4" or compression type coupling. Supplied by others.
(Do not use rubber sleeve and hose clamp type coupling.)
19. **VALVE** - Ball valve, must provide a full-ported 1-1/4" round passage when open. Supplied by others.
20. **REBAR** - Required to lift tank after ballast (concrete anchor) has been attached, 4 places, evenly spaced around tank.

Figure 1a



**FAILURE TO COMPLY WITH
INSTALLATION INSTRUCTIONS WILL
VOID WARRANTY**

Figure 1b



Installation Instructions for Model 2012 Grinder Pump

The Environment One Grinder Pump is a well engineered, reliable and proven product: proper installation will assure years of trouble-free service. The following instructions define the recommended procedure for installing the Model 2012 Grinder Pump. These instructions cover the installation of units with and without accessways.

This is a sewage handling pump and must be vented in accordance with local plumbing codes. This pump is not to be installed in locations classified as hazardous in accordance with National Electric Code, ANSI / NFPA 70. All piping and electrical systems must be in compliance with applicable local and state codes.

1. REMOVE PACKING MATERIAL:

The User Instructions must be given to the home owner. Hardware supplied with the unit, if any, will be used at installation.

2. TANK INSTALLATION

The tank is supplied with a standard grommet for connecting the 4" DWV (4.50" outside Dia.) incoming sewer drain. Other inlet types and sizes are optional (caution 4" DR-35 pipe is of smaller diameter and won't create a water tight joint with the standard grommet). Please confirm that you have the correct inlet before continuing. If a concrete ballast is attached to the tank lift only by the lifting eyes, (rebar) embedded in the concrete. **Do not drop, roll, or lay tank on its side. This will damage the unit and void the warranty.**

◆ If the tank has no accessway (Fig. 1b): (Indoor Installation)

The pump may be installed on or in the basement floor (see fig. 1b). If the tank is to be set on the floor it must be a flat and level bearing surface. If the tank is to go into the basement floor, it must be anchored to prevent unit from

floating due to high ground water (see Chart 1, page 8 for weight).

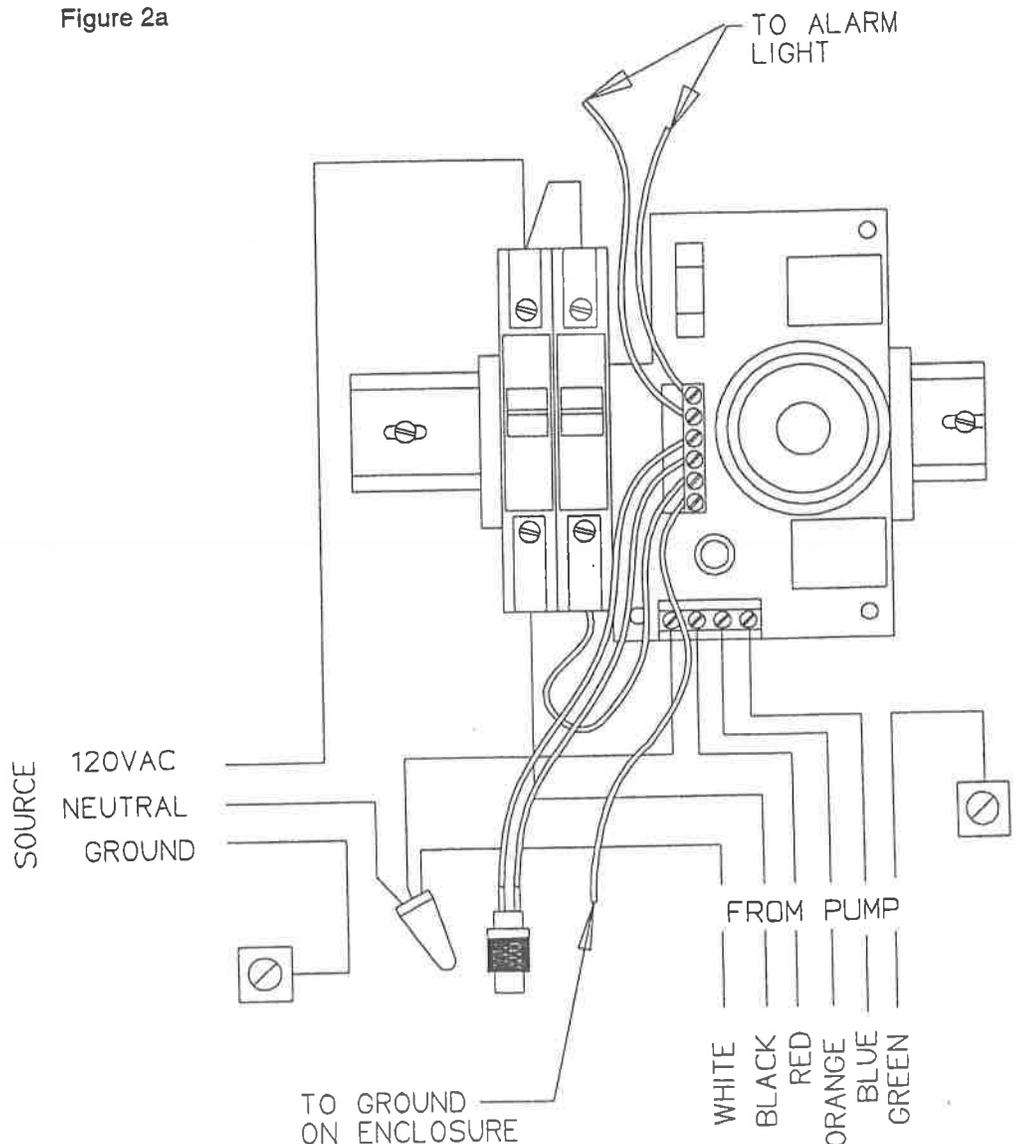
◆ If the tank is to go in the floor:

A hole of the correct width and depth should be excavated. The tank must be placed on a 6" bed of gravel made up of naturally rounded aggregate, clean and free flowing, with particle size not less than 1/8" or more than 3/4" in diameter. The wet well should be

leveled and filled with water prior to pouring the concrete to prevent the tank from shifting. If it's necessary to pour the concrete to a level above the inlet, the inlet must be sleeved with an 8" tube before pouring.

There must be a minimum clearance of three feet directly above the tank to allow for removal of the pump core.

Figure 2a



120 VOLT WIRING

◆If the tank has an accessway (Fig. 1a):

Excavate a hole to a depth, so that the removable cover extends above the finished grade line. The grade should slope away from the unit. The diameter of the hole must be large enough to allow for a concrete anchor. Place the unit on a bed of gravel, naturally rounded aggregate, clean and free flowing, with particles not less than 1/8" or more than 3/4" in

diameter. The concrete anchor is not optional. The amount of concrete required varies for each respective unit. (See Chart 1 on page 8 for specific requirements for your unit)

The unit should be leveled and the wet well filled with water to the bottom of the inlet to help prevent the unit from shifting while the concrete is being poured. The concrete must be vibrated to ensure there are no voids.

If it is necessary to pour the concrete to a higher level than the inlet, the inlet must be sleeved with an 8" tube before pouring.

If your unit is a model taller than 93" it may be shipped in two sections, requiring field assembly. See Field Joint Assembly Instructions on page 6 for additional information.

3. INLET PIPE INSTALLATION:

Mark the inlet Pipe 3 1/2" from the end to be inserted. Inlet pipe should be chamfered and lubricated with a soap solution. Lubricate the inlet grommet with soap solution as well. Insert the pipe into the grommet up to the 3 1/2" mark. Inspect to ensure the grommet has remained intact and in place.

4. DISCHARGE:

The use of 1-1/4" PVC pressure pipe Schedule 40 and polyethylene pipe SDR 11 or SDR 7 are recommended. If polyethylene is chosen use compression type fittings to provide a smooth inner passage. It is recommended that a Redundant Check Valve Assembly (E-One part no. PB0104GXX) be installed between the pump discharge and the street main on all installations. Never use a ball type valve as a check valve. We recommend the valve be installed as close to the public right-of-way as possible. Check local codes for applicable requirements.

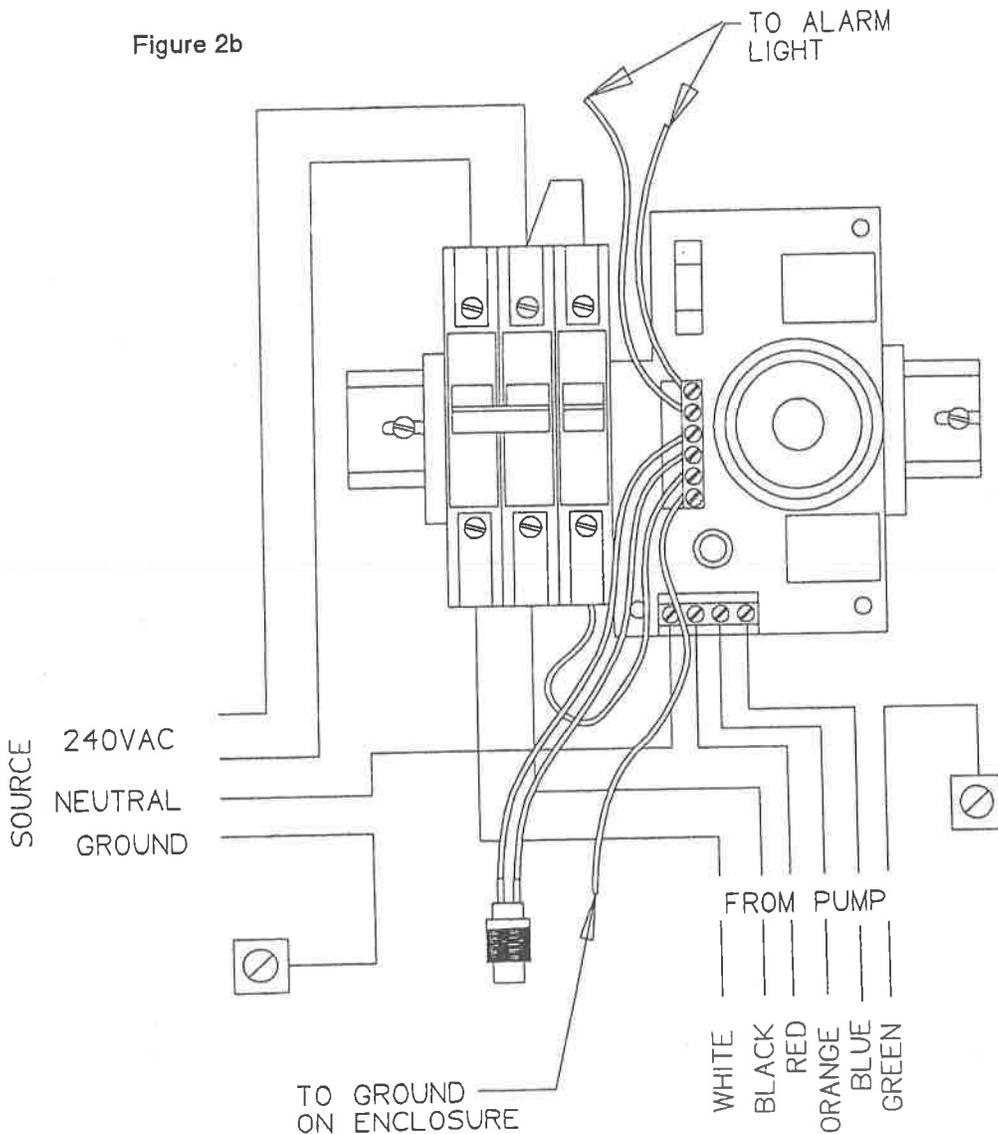
CAUTION:

Redundant check valves on station laterals and anti-siphon/check valve assemblies on grinder pump cores should not be used as system isolation valves during line tests.

◆If the tank has no accessway: (Indoor Installation)

The discharge connection is a 1-1/4" male NPT. The discharge piping must incorporate a shut-off valve and a union with a minimum pressure rating of 160 PSI, or a suitable piping disconnect to allow for removal of the pump core. The valve should be of the type that

Figure 2b



240 VOLT WIRING

provides a full-ported passage (i.e. a ball or gate valve). A standard 1-1/4" union or a compression type coupling should be used as a disconnect joint.

◆ **If the tank has an accessway:**

There is a ball valve and a quick disconnect pre-installed in the accessway. There is a 1-1/4" female NPT discharge connection on the outside of the tank 41" above the bottom of the tank.

5. BACKFILL REQUIREMENTS:

Proper backfill is essential to the long term reliability of any underground structure. Several methods of backfill are available to produce favorable results with different native soil conditions.

The most highly recommended method of backfilling is to surround the unit to grade using Class I or Class II backfill material as defined in ASTM 2321. Class 1A and Class 1B are recommended where frost heave is a concern, Class 1B is a better choice when the native soil is sand or if a high, fluctuating water table is expected. Class I, angular crushed stone offers an added benefit in that it needs minimal compaction. Class II, naturally rounded stone, may require more compactive effort, or tamping, to achieve the proper density.

If the native soil condition consist of clean compactable soil, with less than 12% fines, free of ice, rocks, roots, and organic material it may be an acceptable backfill. Such soil must be compacted in lifts not to exceed one foot to reach a final Proctor Density of between 85% and 90%. Non-compactable clays and silts are not suitable backfill for this or any under-ground structure such as inlet or discharge lines. If you are unsure of the consistency of the native soil it is recommended that a geotechnical evaluation of the material be obtained before specifying backfill.

Another option is the use of a flowable fill (i.e., low slump concrete). This is particularly attractive when installing grinder

pump stations in augured holes where tight clearances make it difficult to assure proper backfilling and compaction with dry materials. Flowable fills should not be dropped with more than four feet between the discharge nozzle and the bottom of the hole since this can cause separation of the constituent materials.

6. VENTING:

The unit must be properly vented to assure correct operation of the pump. If you have an indoor unit it can be vented through the 2" port supplied at the top of the wet well or through the incoming sewer line with a 2" pipe (the vent must be within four feet of the grinder pump, and before the first change of direction fitting).

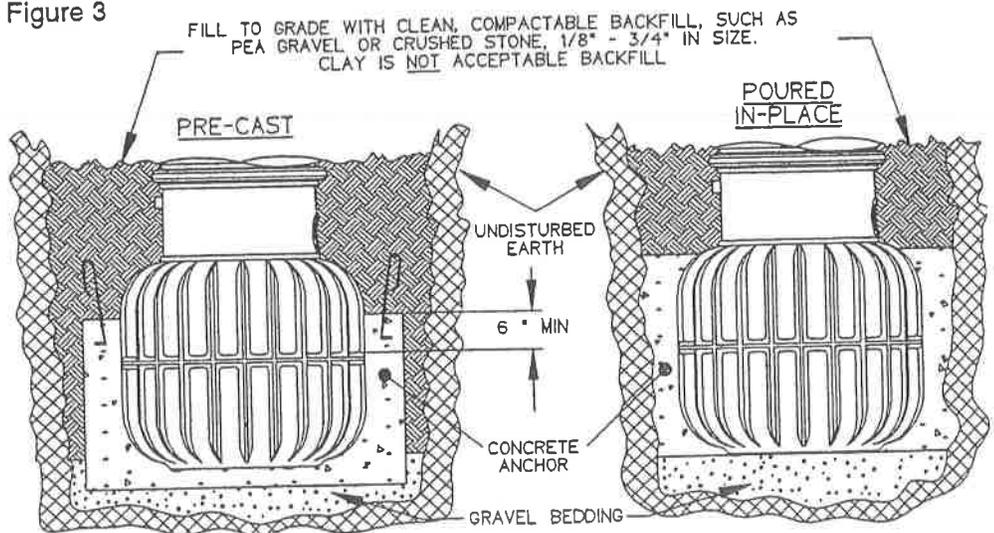
The outdoor units are supplied with a vent pipe from the wet well to the top of the accessway. Failure to *properly vent* the tank will result in faulty operation and will void the warranty.

7. ELECTRICAL CONNECTION:

(Supply panel to E-ONE control panel) Before proceeding verify that the service voltage is the same as the motor voltage shown on the name plate. An alarm device is to be installed in a conspicuous location where it can be readily seen by the home owner. An alarm device is required on every installation. There shall be no exceptions.

Wiring of supply panel and Environment One Control Panel shall be per figure 2a and 2b, control panel wiring diagrams and local codes.

Figure 3



TYPICAL IN-GROUND SECTION VIEW

8. ELECTRICAL CONNECTION: (Pump to Panel) (Fig. 4)

The Environment One GP2000 grinder pump station is provided with a cable for connection between the station and the control panel, (The Supply Cable). The supply cable is shipped inside the station with a small portion fed through the cable connector mounted on the wall of the fiberglass shroud. The supply cable, a six conductor tray cable, meets NEC requirements for direct burial as long as a minimum of 24" burial depth is maintained. Those portions of the cable which have less than 24" of cover must be contained in suitable conduit. This includes the vertical portion dropping to a 24" depth at the station and the length rising out of the ground at the control panel. *NOTE: Wiring must be installed in compliance with local codes.*

8a. Procedure for installing E-ONE supply cable:

1) Open the lid of the station, Locate the cable and the feed-thru connector on the wall of the shroud. If the station has a field joint and was delivered in two pieces be sure the 2 halves of the EQD are securely assembled together. Loosen the nut on the connector and pull the supply cable out through the connector until it hits the crimped on stop feature on the cable, approximately 24" from the EQD. ****IMPORTANT: All but 24" of the cable must be pulled out of the station, and the portion of the cable between the EQD and the molded in cable breather should be secured in the hook provided to ensure that the pump functions properly. Do not leave the excess cable in the station.**

2) Retighten the nut. *This Connection must be tight or ground water will enter the station.*

3) Feed the wire through the length of conduit (contractor provided) which will protect it until it is below the 24" burial depth.

4) Position the conduit vertically below the cable connector along side of the station reaching down into the burial depth. Attach the small fiberglass guard (Protective Shroud) provided with the station to protect the exposed cable where it enters the station. Four self tapping screws are provided.

5) Run the cable underground, in a trench or tunnel, to the location of the E-ONE panel. Leave a 6-12 inch loop of cable at each end to allow for shifting and settling. Connections made at the panel are shown in the panel wiring diagram (Fig. 2a and 2b).

9. DEBRIS REMOVAL:

Prior to start-up test procedure, the core must be removed and the incoming sewer line flushed to force all miscellaneous debris into the tank. Next, all liquid and debris must be removed. Once tank is clean, re-install the pump and proceed with the test.

10. TEST PROCEDURE:

When the system is complete and ready for use, the following steps should be taken to verify proper installation and operation:

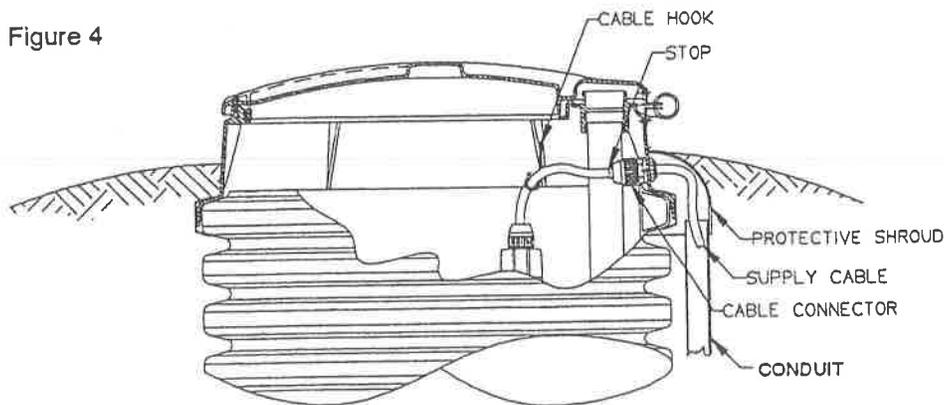
a) Make sure that the discharge shutoff valve is fully open. This valve must not be closed when the pump is operating. In some installations there may be a valve, or valves, at the street main that must also be open.

b) Turn ON the alarm power circuit breaker.

c) Fill tank with water until the alarm turns ON. Shut off water.

d) Turn ON pump power circuit breaker Pump should immediately turn on. Within one minute the alarm will turn off. Within three minutes the pump will turn off.

Figure 4



Supply Cable Voltage Drop:

120 VAC Pump = .195 Volts per Foot of Cable
240 VAC Pump = .098 Volts per Foot of Cable
(Maximum Recommended Length = 100 Feet)

TYPICAL SUPPLY CABLE CONFIGURATION

Field Joint Assembly Instructions

IT IS EXTREMELY IMPORTANT THAT THE JOINT IS SEALED PROPERLY BEFORE BACKFILLING. EXCAVATING A UNIT FOR REPAIR IS VERY EXPENSIVE AND CAN BE EASILY AVOIDED BY USING PROPER CAUTION DURING THE FOLLOWING PROCEDURE.

Parts Included In Field Joint Kit:

Identify all parts before proceeding with installation.

- (16) 3/8-16 X 1-1/2 Long screws
- (16) 3/8-16 Elastic Stop Nuts
- (32) Flat Washers
- (1) Length Sealant (Sika) Tape
- (1) Hole Punch
- (1) Vent Pipe Extension

1) Carefully clean and dry both accessway flanges with solvent. **IMPORTANT: Sealing surfaces must be dry to ensure the sealant adheres correctly.**

2) Apply Sika tape twice around the perimeter of the flange that is attached to the tank, start at one hole and go all the way around just inside the bolt circle. Remove the backing paper as you lay the adhesive on the flange. **Do not stretch Sika tape during application, it may result in a leak.** The tape should overlap at the end by approximately 1/2 inch, as shown in fig. 5a. If a section of Sika Tape is misapplied, the bad section may be cut out and replaced. Cut away the poorly laid portion cleanly with a knife and be sure to overlap the tape at each end about 1/2 inch.

3) Using the tool provided, punch a hole through the tape at each of the 16 existing bolt holes in the flange. **Be careful to keep the exposed sealant clean and dry.**

4) Insert three of the sixteen 3/8-16 x 1-1/2" long bolts, with a flat washer, into the flange attached to the upper part of the accessway. These will act as guides while aligning the bolt pattern of the two flanges.

5) Support the upper accessway section a few inches over the tank with the green stripes on each lined up. Once aligned, lower the upper section onto the mating flange using the three bolts to guide it to the proper position. See fig. 5b.

6) Insert the remaining 13 bolts with flat washers into the flanges. Place a flat washer and elastic stop nut on the end of each bolt, turning the nut on just enough to hold the washer in place.

7) Tighten up the bolts until the sealant begins to squeeze out from between the flanges. To ensure a consistent, sturdy seal tighten them in the following sequence: 1, 9; 5, 13; 3, 11; 7, 15; 2, 10; 4, 12; 6, 14; 8, 16. Always be sure to tighten one bolt and then the bolt at the position 180° from it, see figure 1 for position numbers.

8) Using the same sequence as in step 7 tighten each bolt to 60 in-lbs. Visually inspect the joint, each bolt and each nut should have a flat washer between it and the flange, and a uniform amount of sealant should be protruding from the seam along the entire perimeter.

In the event that there are any voids in the sealant, the joint may leak. Take corrective actions if necessary and be sure that the joint is leak free before continuing.

9) Install the vent pipe extension piece which was shipped inside the upper piece of the accessway. Push the extension pipe into the bell mouth fitting on the pipe installed in the wet well tank. Be sure the pipe is seated correctly. Slide the top end of the extension pipe into the receptacle on the bottom of the lid.

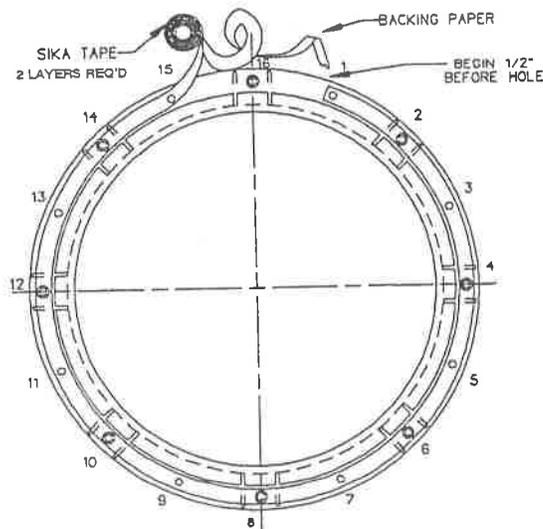


Figure 5a

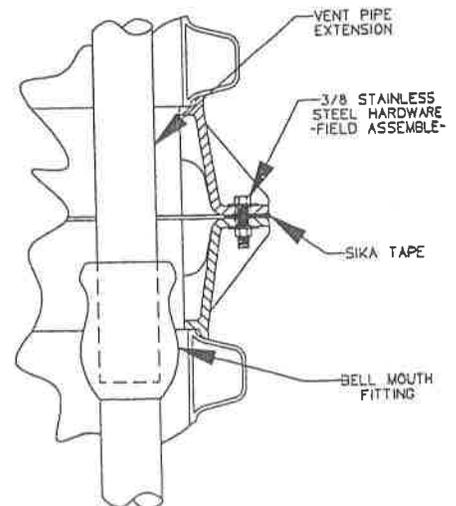


Figure 5b

Lifting Instructions

FAILURE TO FOLLOW THESE INSTRUCTION COMPLETELY WILL VOID WARRANTY.

1. Transporting unit to installation site:

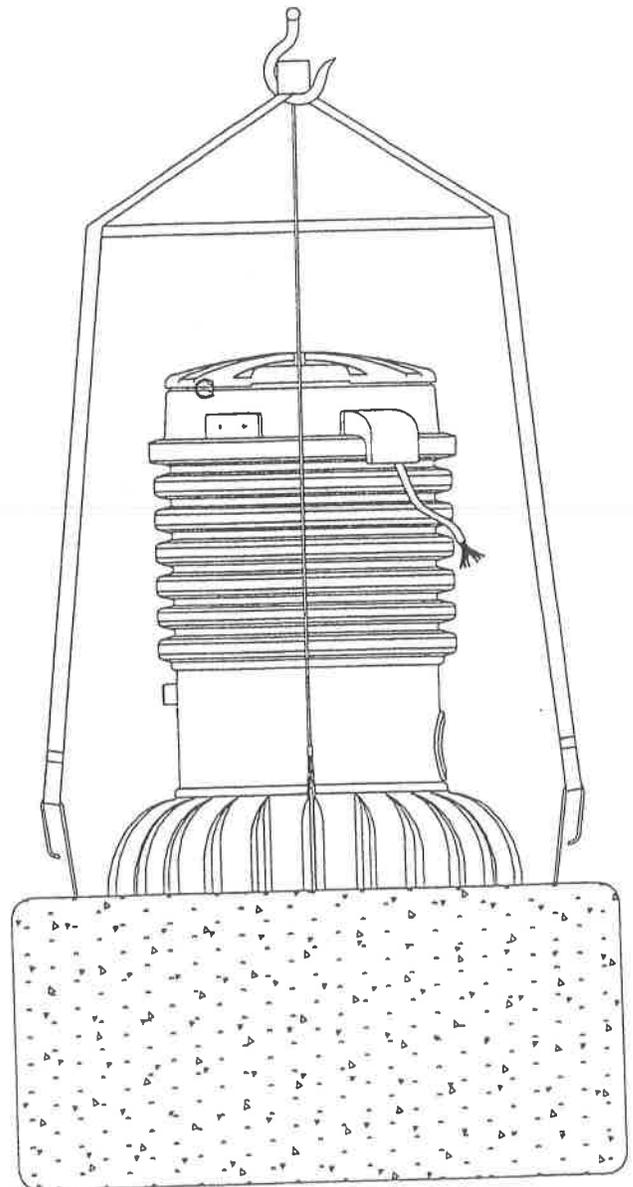
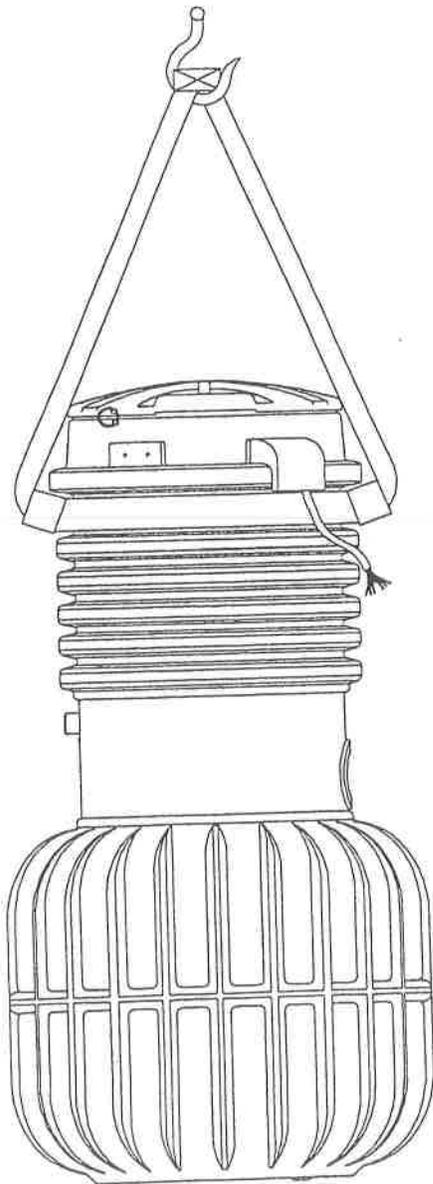
Always lift a unit from the bottom for the purpose of transportation. The station should be received attached to a pallet for this purpose. **Never roll a station or move it on its side.**

2. No Ballast: (to be poured in place):

If the concrete anchor is to be poured while the station is in place lift the unit using 2 nylon straps wrapped around the accessway making a sling, as shown below. Keep station oriented vertically to avoid any damage. Only lift from the accessway to put unit in hole, not for moving any distance.

3. Precast Ballast:

Never lift a station that has a ballast attached by any means except the rebar. The weight of the concrete will damage the station if you attempt to lift it from any part of the station.



BALLAST CALCULATIONS

A ballast, or concrete anchor, of proper volume and weight is required on all in-ground installations. The following explains how to arrive at the correct size ballast:

The amount of ballast needed is equal to the weight it would take to counterbalance the buoyant forces that would be present if the station were being installed in water. Therefore:

$$\text{STATION VOLUME} \times \text{THE WEIGHT OF WATER PER CUBIC FOOT (62.4 LBS/CU FT)} = \text{BUOYANT FORCES}$$

$$F_{\text{BUOYANT}}$$

$$\text{BUOYANT FORCES} - \text{STATION WEIGHT} =$$

$$\text{FORCE REQUIRED FROM BALLAST}$$

$$F_{\text{BALLAST}}$$

$$\text{BALLAST FORCE} \div \text{WEIGHT OF CONCRETE PER CUBIC FOOT IN WATER (87.6 LBS/CU FT)} =$$

$$\text{VOLUME OF CONCRETE REQUIRED}$$

$$V_{\text{CONCRETE}}$$

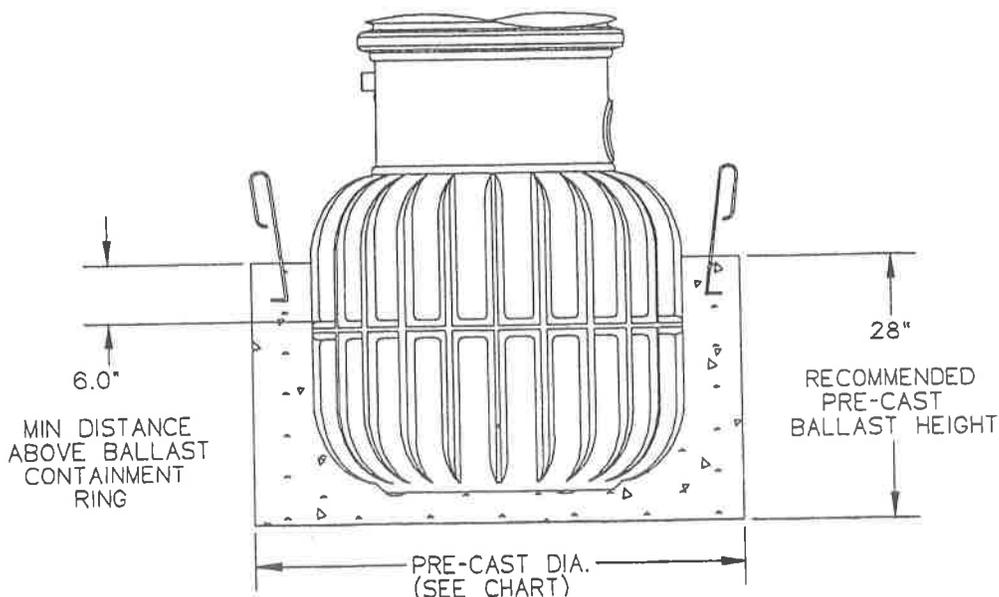
$$\text{VOLUME OF CONCRETE} \times \text{WEIGHT OF CONCRETE PER CUBIC FOOT IN AIR} =$$

$$\text{WEIGHT OF CONCRETE REQUIRED}$$

$$W_{\text{CONCRETE}}$$

Chart 1.

	STATION VOLUME	F _{BUOYANT}	STATION WEIGHT	F _{BALLAST}	V _{CONCRETE}	BALLAST WEIGHT	PRE-CAST DIA. @ 28 in min h
2012-60	25.2 ft ³	1573 lbs	276 lbs	1297 lbs	14.8 ft ³ (.54 yd ³)	2300 lbs (2220 lbs)	Ø47-1/4 in
2012-74	29.2 ft ³	1822 lbs	288 lbs	1534 lbs	17.5 ft ³ (.67 yd ³)	2700 lbs (2627 lbs)	Ø49-3/8 in
2012-93	35.2 ft ³	2197 lbs	306 lbs	1897 lbs	21.7 ft ³ (.80 yd ³)	3300 lbs (3247 lbs)	Ø52-5/8 in
2012-129	46.7 ft ³	2912 lbs	345 lbs	2567 lbs	29.3 ft ³ (1.1 yd ³)	4400 lbs (4395 lbs)	Ø58 in
2012-160	56.7 ft ³	3537 lbs	375 lbs	3162 lbs	36.1 ft ³ (1.3 yd ³)	5500 lbs (5414 lbs)	Ø62-1/2 in



FAILURE TO FOLLOW THESE INSTRUCTION COMPLETELY WILL VOID WARRANTY.
Appendix B

APPENDIX C

Dark Horse Phase 2 High-Head Sewer Effluent Pump Models Required

Lot #	Lowest Pump Elev. Used for Design	Design Pump TDH (ft)	Orengo Systems, Inc Effluent Pump Model	HP	Design Flow GPM
172	1,610	1776.4+10-1610=177'	P20 OSI 10 HHF- 7 stage	1	15.5
173	1,612	1784.1+10-1612=182'	P20 OSI 10 HHF- 7 stage	1	15
174	1,610	1784.1+10-1610=184'	P20 OSI 10 HHF- 7 stage	1	14.5
175	1,610	1784.1+10-1610=184'	P20 OSI 10 HHF- 7 stage	1	14.5
176	1,610	1784.1+10-1610=184'	P20 OSI 10 HHF- 7 stage	1	14.5
177	1,612	1784.1+10-1612=182'	P20 OSI 10 HHF- 7 stage	1	15
178	1,612	1784.6+10-1612=183'	P20 OSI 10 HHF- 7 stage	1	15
181	1,625	1789.6+10-1625=175'	P20 OSI 10 HHF- 7 stage	1	16.5
182	1,627	1789.7+10-1627=173'	P20 OSI 10 HHF- 7 stage	1	16.5
183	1,635	1790.7+10-1635=166'	P20 OSI 10 HHF- 7 stage	1	17.5
190	1,625	1785.6+10-1625=171'	P20 OSI 10 HHF- 7 stage	1	16.5
191	1,625	1782.0+10-1625=167'	P20 OSI 10 HHF- 7 stage	1	17.5

Dark Horse Phase 3 High-Head Sewer Effluent Pump Models Required

Lot #	Lowest Pump Elev. Used for Design	Design Pump TDH (ft)	Orengo Systems, Inc Effluent Pump Model	HP	Design Flow GPM
143	1,615	1783.0+10-1615=178'	P20 OSI 10 HHF- 7 stage	1	15.5
144	1,605	1785.1+10-1605=190'	P20 OSI 10 HHF- 7 stage	1	13.5
145	1,600	1791.0+10-1600=201'	P20 OSI 10 HHF- 7 stage	1	11
146	1,590	1791.8+10-1590=212'	P20 OSI 15 HHF- 9 stage	1.5	17
147	1,580	1794.1+10-1580=224'	P20 OSI 15 HHF- 9 stage	1.5	15.5
148	1,575	1796.2+10-1575=231'	P20 OSI 15 HHF- 9 stage	1.5	14.5
149	1,575	1796.7+10-1575=232'	P20 OSI 15 HHF- 9 stage	1.5	14.5
150	1,588	1796.7+10-1588=219'	P20 OSI 15 HHF- 9 stage	1.5	16
151	1,606	1795.2+10-1606=199'	P20 OSI 10 HHF- 7 stage	1	11.5
152	1,620	1793.2+10-1620=183'	P20 OSI 10 HHF- 7 stage	1	15

1. Pump curve is shown on the next sheets.
2. There are no high head effluent pumps required in Phase 4.

Appendix C



Oreco Systems
Incorporated

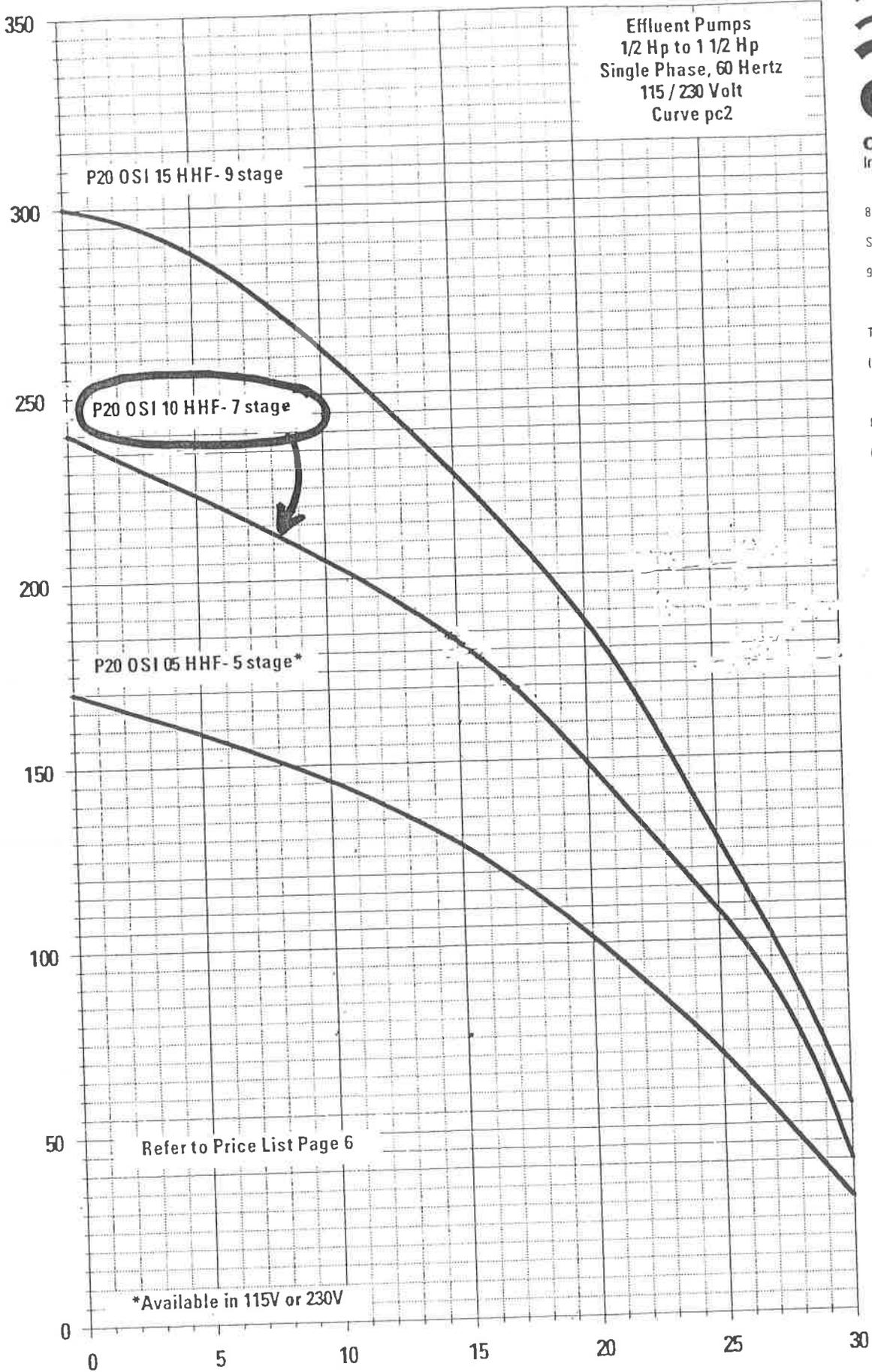
814 AIRWAY AVENUE
SUTHERLIN, OREGON
97479-9012

TELEPHONE
(541) 459-4449

FACSIMILE
(541) 459-2884

Total Dynamic Head, TDH

Effluent Pumps
1/2 Hp to 1 1/2 Hp
Single Phase, 60 Hertz
115 / 230 Volt
Curve pc2



Refer to Price List Page 6

*Available in 115V or 230V

APPENDIX D

Fee Schedule

	TYPE OF FEE	FEE
1.	Connection Fee	\$14,700

APPENDIX E

Homeowner's Operation and Maintenance Manual for On-Lot Sewer Facilities

Table of Contents

General Information:	General Procedure for Responding to Any Alarm or Emergency
	Safety
Table 1:	Maintenance Schedules
Table 2:	Hazardous gases
Table 3:	Troubleshooting – Problems, Symptoms, Diagnosis
Table 4:	Possible Pump Hour Meter reading Combinations
Table 5:	Electrical Tests and Troubleshooting
Table 6:	Electrical Data
Table 7:	Insulation Resistance
	Manufacturer's Data
	Maintenance Forms

Homeowner's Operation and Maintenance Manual for On-Lot Sewer Facilities

General Information

The homeowner shall privately maintain all on-lot sewer facilities up to the point of connection to the sewer service at the street.

The homeowner shall contract with a sewer pump/septic tank maintenance company to provide the following general services in addition to the maintenance described herein.

- A. Respond to e-one grinder pump alarms and diagnose the cause. Replace e-one grinder pump unit if/when required. Check the pump event counter and/or hour meters. Check for tank infiltration.
- B. Pump septic tank every 5th year.
- C. Remove and hose down/clean bio-filter screens into septic tank once every year or more frequently, if required.
- D. Respond to high head effluent pump alarms and diagnose the cause. Check the pump event counter and hour meter. Check for tank infiltration. Replace effluent pump if/when required.

General Procedure for Responding to Any Alarm or Emergency

- 1. Reduce water use and toilet flushing to a minimum.
- 2. Look for wastewater overflow at the pump or in the house.
- 3. Call the sewer maintenance company and describe visible problem(s).
- 4. If the sewer maintenance company determines the cause to be in the mainline sewer system in the street they should contact the Sewer District at the emergency telephone number (530) 265-1555.

SAFETY

It is imperative to develop safe working procedures especially with work in roadway and traffic areas, driving vehicles, operating heavy equipment, work involving electrical components, lifting of pumps, exposure to hazardous gases, and exposure to domestic wastewater. Part of the safety program includes holding periodic safety meetings and practicing safe working procedures.

EQUIPMENT OPERATION

1. Practice safe driving. Make it a habit. Wear seat belts as required by law.
2. Keep vehicles and equipment in good operating condition.
3. Maintain back up horns for heavy equipment.
4. Wear hard hats around heavy equipment operation.

LIFTING

1. Use hoists and dollies when needed for lifting pumps.
2. Practice correct lifting procedures.
3. Use your legs to lift and avoid lifting from an improper position.

ELECTRICAL

1. Disconnect power before working on electrical components.
2. Avoid contact with any live terminal.
3. Avoid testing live electrical components in wet conditions.
4. Use grounding insulation i.e. rubber boots, rubber floor mats when testing live wires.
5. Use properly insulated tools

WORK IN CONFINED SPACES

1. Use tripod lifts and harnesses when required by OSHA rules.
2. Use lighting and ventilation when required by OSHA rules.
3. Wastewater atmosphere may contain toxic, asphyxiating and flammable gases. Deaths in septic tank pumping practice are uncommon, but deaths from breathing this type of atmosphere, especially in confined spaces, is not uncommon.
4. Reliable gas analyzer equipment should be used in this work. Hydrogen sulfide, carbon dioxide and carbon monoxide are all lethal in the right concentrations.
5. Do not use open flame in possible gas areas.
6. Table 3 lists the various gases present in wastewater environment and their effects.

HEALTH

1. Wear protective clothing appropriate for the work function.
2. Keep first aid kits well supplied and provide them on the job site.
3. Keep tetanus and hepatitis immunizations current.
4. Clean with antiseptic soap or chlorine water.
5. Disinfect work areas where sewage was present.

TABLE 1
MAINTENANCE SCHEDULES
 Refer to the maintenance forms

Function	Work Description
Level Controls Inspection	Observation and cleaning as needed, usually in response to a problem.
Pump hour meter readings	Read the pump run time meters at regular intervals. These readings can help track down pump problems, blockages, service check valve failures or infiltration.
Septic tank (if applicable)	Monitor sludge and scum levels. Use a clear plastic, graduated tube with a float ball/bottom orifice to measure sludge and scum levels. Record these levels prior to tank pump out to verify reasonable tank pump out frequency. Pump tank out at least every 5 years.
Pumps Inspection	Measure current amperage usually in response to a problem. Check pump run time meters. Check discharge head against the pump curve by pumping against a closed valve and measure shut off head. Normal wear of a pump should cause the head to be within about 5% of the curve.
Infiltration Inspection	Locate observed leakage, usually in tanks. Make tank inspections during wet weather, especially where pump run time readings are high.
Water Meter Readings	Read water meter at regular intervals to determine water usage. If water usage is high, check for water leaks such as leaking toilets.

**TABLE 2
HAZARDOUS GASES**

Gas	Chemical Formula	Vapor Density (Air=1)	Class	TVL ⁽¹⁾ PPM	Color	Odor	Physiological Effect	Explosive Limits ⁽²⁾ (LEL, UEL)
Methane	CH ₄	0.55	Asphyxiant		N ⁽³⁾	N	Mechanically deprives tissue of oxygen	5-15
Carbon Dioxide	CO ₂	1.33	Asphyxiant	5000	N	N	Effects respiratory nerves	
Nitrogen	N ₂	0.97	Asphyxiant		N	N	Inert	
Hydrogen Sulfide	H ₂ S	1.19	Toxic	10	N	"Rotten egg"	Impairs sense of smell, causes acute poisoning, paralyzes resp. center	4-46
Oxygen	O ₂	1.11	Aids combustion		N	N	Lack of oxygen causes CO ₂ poisoning	
Carbon Monoxide	CO	1.0	Asphyxiant	50	N	N	Prevents oxygenation of the blood	12.5-14.2
Hydrogen	H ₂	.07	Asphyxiant		N	N		4-74.2
Gasoline Vapors	C ₅ H ₁₂ to C ₉ H ₂₀	3.0 - 4.0	Slightly Toxic Asphyxiant		N	"Gasoline"	Can cause intoxication, difficult breathing, convulsions and others	1.3-7.0
Ozone	O ₃		Oxidizing Agent	0.1	N	Sulfur-like	Irritates eyes and respiratory system	
Ethane	C ₂ H ₆	1.04	Asphyxiant		N	N	Mechanically deprives tissue of oxygen	3.1-15
Chlorine	Cl ₂	2.49	Toxic	1.0	Greenish yellow	Chlorine	Irritates eyes & respiratory system	

(1) TLV = Threshold limit value (concentration of exposure that generally will not produce harm.)

(2) LEL = Lower explosive limit. UEL= Upper explosive limit.

(3) N= None

**TABLE 3
TROUBLE SHOOTING ON LOT FACILITIES
PROBLEMS, SYMPTOMS, AND DIAGNOSIS**

PROBLEM	SYMPTOM	CAUSE	REMEDY	POSSIBLE DAMAGE
(1) Pump Level Controls				
<u>Sticking pump runs in manual mode.</u>	(1) Pump continually running	(a) Control stuck in one position due to rags or grease buildup	(a) Free and then clean. Hose down and remove rags.	(1) Motor over heats and fails.
	(2) Alarm with no apparent pump or electrical problem	(b) Oriented too close to wall, pump or other control	(b) Reposition level controls	(2) Tank overflows or backs up into residence.
				(3) Discharge nipple overheat and melt
				(4) Pump could become air bound.
Failure	(1) Displacer malfunction	(a) Open circuit		
Pump runs in manual mode.		(1) Internal	(a) Replace	
		(2) Cam-loc connector	(b) Clean, replace if necessary	
	(2) Mercury malfunction	(b) Tube plugging	Clean	
	(3) Bubbler malfunction	(c) Compressor failure	Replace	
		(d) Leaking lube		
(2) Pumps				
Effluent, well, and grinder				
(a) Impeller Binding	(1) Motor running but not pumping. High amperage demand. (If current is within +20% of locked rotor amps.)	(a) Clogged impeller. Rags or large solids	Replace and clean	Current Overload

Table 3 – Troubleshooting cont.

	(2) Pump runs, then stops, locked impeller causing overloads.	(b) Iron buildup between impeller and pump wall. (Might expect when pump is inactive for an extended period of time.)		(1)Electrical equip. could fail
		(c)Tight or frozen bearings.	Replace and clean	(2)Motor could be damaged or destroyed
		(d) Bent shaft.		
(b)Motor failure	(1)Pump will not perform in manual mode, when power is on the panel or meter overload not tripped.	(a)Excessive cycling	Replace and repair	
		(b) Electrical overload		
		(c)Excessive run time		
(c) Capacitor (Single phase only)	(1)Pump runs, then stops (if impeller is free then capacitor is defective.)	(a) Electrical overload or physical defection.	Replace	
(d)Reduced performance	(1) Discharge capacity drops. Impeller not clogged.	(a) Worn or damaged impeller	Replace	Overworks pump and reduces life cycle.
			Check elec. Wiring and rewire if incorrect. Contact electrician.	
(e)Running at shut off head	(1) Pump running at amperage below locked rotor amps, but not pumping.	(a) G.V. shut	Open valve	
		(b) C.V. defective	Replace	

Table 3 – Troubleshooting cont.

		(c) Inflow greater than or equal to pumping rate. (I/I problem) or pump under designed.	Change pump and/or isolate I/I.	
(f) Excessive cycling	(1) High counts and hours recorded from hour and count meters.	(a) Level control differential too small.	(a) Reposition	Reduces life cycle of equip. and increases energy demand.
	(2) Owner complains of excessive elec. Bill, or pumping frequencies.	(b) Excessive I/I building sewer failure tank defective. Cover riser leaks.	(b) Isolate I/I point and repair.	
		(c) Check valve failure. Allows flow back to tank from main.	(c) Disconnect discharge hose and open G.V. in vault. If backflow obvious, replace C.V.	
(g) Air binding	(1) Motor running but not pumping with normal amperage demand. (Below LRA)	(a) Level controls set too low or sticking	(a) Reposition higher 3" ± above impeller	Overwork motor, increase energy demand. Cause damage to motor by overheating.
		(b) Siphoning	(b) Provide atmospheric break at a high point in the vault.	
		(c) Gas accumulation	(c) Provide hole in discharge nipple 3" above impeller.	
		(d) Grinder pumps located too close to bottom of vault.	(d) Raise pump	
(3) Electrical				
(a) Pump inactive	(1) Alarm	(a) No power	(a) Regenerate	Backflow into home. Inconvenient and damage to floor covering, etc. Unsafe health condition.

Table 3 – Troubleshooting cont.

	(2)Overflow	(b)Blown fuse	(b)Replace	
		(c)Cam-loc connection defective	(c)Clean and repair	
(b)False alarm	(1) Alarm. No other apparent problems	(a) Electrical feedback	(a)Isolate and repair	
(c)Multiple units pumps not alternating		(a) Relay switch defective	(a) Replace	Early replacement on pump
		(b) One pump failing	(b) Repair or replace	
(4) Discharge Line				
(a) Discharge hose disconnects	(1) Alarm, visual observation of vault	(a) Excessive pressure	Replace securely	Pump running continuously. Reduced life.
		(b)Connection worked loose		
(b) Breaks	(1)Alarm, visual observation of vault	(a) Pressure surge		
		(b)Excavation damage		
		(c) Shear due to earth settlement		
5. Building Sewer				
(a)Sewage backup	(1)Visual	(a)Plugged	(a) Clean	Property damage. Health
(b)Break	(2)Odor	(b)Excavation	(b)Repair	
		(c)Shear due to settlement	(c)Repair	
5. Miscellaneous				
(a) Odor	(1)H ₂ S Aroma	(a) Break in lines	(a)Repair	Health. Unpleasant irritation.
		(b)Cover not properly sealed	(b)Repair	
		(c)Sources not related to P.S.	(c)Isolate	

**TABLE 4
POSSIBLE PUMP HOUR METER READING COMBINATIONS**

Combinations	Cycles	Pumping Time (pump hour meter readings)		Probable ⁽²⁾ Causes
		C/Day	Min/Cycle	
1	N*	N	N	Acceptable
2	N	N	H	1,4,5,8,9
3	N	H	N	4,6,8
4	N	H	N	4,5,6,8
5	N	L	N	3,7,12
6	N	L	L	2,3,12
7	H	N	N	1,5,7,9
8	H	N	H	1,5,9
9	H	H	H	5,9
10	H	L	N	3,7
11	H	L	H	7
12	H	L	L	7
13	L	N	N	2,10,11
14	L	N	L	2,10,11
15	L	H	N	4,6,8
16	L	H	H	4,8
17	L	H	L	2,11
18	L	L	L	11

*N = Normal ⁽¹⁾, H = High, L = Low

(1) Range

Normal Counts: 1 to 8 times per day.
Normal pumping time;
Normal pumping time;
Highs and lows

(2) Probable Causes

1. High water usage, or occupancy
2. Low water usage, or vacancy
3. Pump oversized
4. Pump undersized,
5. Infiltration
6. Level
7. Level
8. Level
9. Check
10. Siphoning
11. Exfiltration
12. Service
13. Faulty meter, incorrect reading, incorrect recording, or miscalculation

Probable cause 13 is common to any meter reading combination. There are also mixtures of the general causes that may produce a certain meter reading combination. The operator will have to rely on his best judgment at this time to isolate the problem or problems.

**TABLE 5
ELECTRICAL TESTS AND TROUBLE SHOOTING**

TEST	HOW TO MEASURE	INTERPRETATION AND COMMENTS
Supply Voltage	With a voltmeter, set to the proper scale, measure voltage at the panel between line and neutral.	When motor is operating, voltage should be within +10% of the nameplate voltage (115 or 230 VAC). Excess voltage variation may cause winding damage, especially low voltage.
Current Measurement	With an ammeter, set on proper scale, measure amperage on each power lead at the panel. See Table 4 for motor amp draw information. Pump should be running at constant pressure when testing.	The full load amperage (FLA) should not be exceeded. If the amp draw exceeds the service factor amps (SFA) in Table 4, check the following:
		1. Burnt contacts on motor starter.
		2. Loose terminals in panel or cable defects. Check winding and insulation resistance.
		3. Incorrect voltage.
		4. Motor windings shorted.
		5. Pump damaged.
Winding Resistance	Turn off power and disconnect pump leads in panel. Use ohmmeter; set scale selectors to Rx1 for values under 10 ohms and Rx10 for values over 10 ohms. Zero adjust meter and measure resistance between T1 and T2 or T1 and N. Refer to Table 4 for motor resistance values.	Zero ohms signifies a short. If any ohm value is less than normal, the motor may be shorted. Infinite ohms indicates an open circuit. If any one ohm value is greater than normal, there is a poor connection or the windings are open. Cable resistance is about 2.7 ohms or 1.7 ohms per 1000 feet for #14 or #12 AWG respectively. The length is two times the distance from panel to motor.
Insulation Resistance	Turn off power and disconnect pump leads in panel. Use ohmmeter set for Rx100k and zero adjust the meter. Measure resistance between lead and ground.	Refer to Table 6

**TABLE 6
ELECTRICAL DATA**

Parameter	115 Volts ½ Horsepower	230 Volts		
		½ HP	¾ HP	1 HP
Amps				
FLA ⁽¹⁾	9.8	4.9	6.9	8.0
SFA ⁽²⁾	11.9	5.9	8.0	9.6
LRA ⁽²⁾⁽³⁾	62.4	31.2	40.2	42.0
Winding	1.0-	4.2-	2.7-	2.2-
Resistance ⁽²⁾	1.3	5.2	3.4	2.8
Fuse Size ⁽⁴⁾				
Standard	30	15	20	25
Dual Element	15 or 20	9	12	15
Inverse Time				
Breaker	25	15	20	20
Cable Selection ⁽⁵⁾				
#14 AWG	109	438	311	268
#12 AWG	175	698	496	428
(1)	From NEC 1981, Table 430-148.			
(2)	For more detailed information, ref. Franklin Electric Data 4" SP Pump Motors, Installation and Operating Instructions (Manufacturer's Data).			
(3)	Approximately equal to starting current if motor is under load			
(4)	NEC 1981, Table 430-152			
(5)	Maximum length of copper cable in feet from load center to motor. To assure adequate starting torque the lengths are calculated to maintain 95% of the service entrance voltage at motor when the motor is running at FLA. NEC 1981, Table 8 and Section 210.19. Compute length from			
	$L = \frac{V(10.05)}{FLA (2) (R, 52/ft.)} , \text{ ft}$			

TABLE 7
INSULATION RESISTANCE (1) (2)

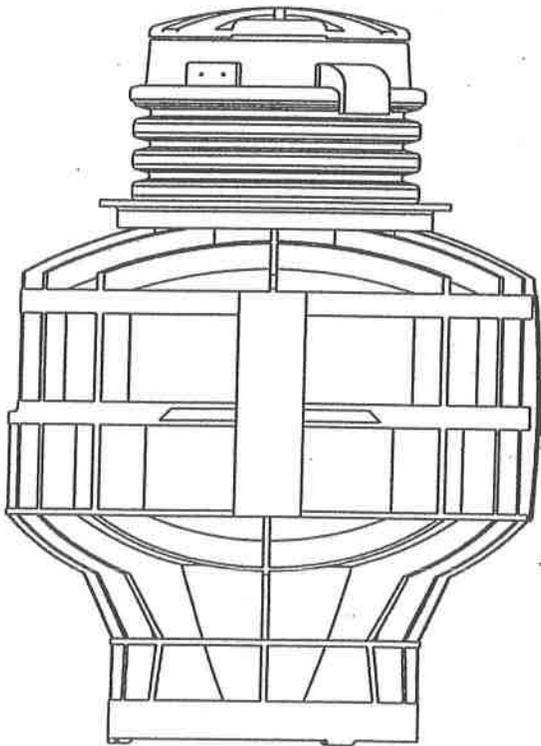
Ohm Value	Condition of Motor and Leads
2,000,000 (or more)	New motor.
1,000,000 (or more)	Used motor, which can still be used.
500,000-1,000,000	Used motor in wet well still in reasonably good condition.
10,000-20,000	Motor damaged or with damaged cable. Probably will not operate for long.
Less than 10,000	Motor failed or destroyed cable insulation. Motor will not run in this condition.
(1)	Motors of all HP, voltage, phase and cycles have the same values.
(2)	For more detailed information, ref. Franklin Electric Data 4" SP Pump Motors, Installation and Operating Instructions (Manufacturer's Data).

Manufacturer's Data

Insert the Manufacturer's Data supplied by your contractor.

CONTENTS:

1. Pump
2. Level Controls
3. Tank and Manholes
4. Electrical Panel
5. Valves, Piping
6. Bio-Filter Screen



WH231 & WR231
SQUAT™
Typical Installation
Instructions
& Warranty
Information

Simplex Station
230-Gal. Capacity

Environment One Grinder Pump Feature Identification

1. **GRINDER PUMP BASIN** – Polyethylene
2. **ACCESSWAY COVER** – High density polyethylene (HDPE)
3. **ELECTRICAL QUICK DISCONNECT (EQD)** – Cable from pump core terminates here.
4. **POWER AND ALARM CABLE** – Circuits to be installed in accordance with local codes.
5. **ALARM PANEL** – NEMA 4X enclosure and equipped with circuit breakers. Locate according to local codes.
6. **ALARM DEVICE** – Every installation is to have an alarm device to alert the homeowner of a potential malfunction. Visual devices should be placed in very conspicuous locations.
7. **INLET** – EPDM grommet (4.5" ID). For 4.5" OD DWV pipe (standard).
8. **WET WELL VENT** – 2.0" tank vent.
9. **GRAVITY SERVICE LINE** – 4" DWV, (4.5 OD). Supplied by others.
- 9a. **STUB-OUT** – 4" X 5' long **watertight** stub-out, to be installed at time of burial unless the gravity serviceline is connected during installation. Supplied by others.
10. **DISCHARGE FTG** – 1-1/4" Female NPT, stainless steel.
11. **DISCHARGE LINE** – 1-1/4" Nominal pipe size. Supplied by others.
12. **CONCRETE ANCHOR** – See Ballast Calculations for specific weight for your station height. Supplied by others.
13. **BEDDING MATERIAL** – 6" minimum depth, round aggregate, (gravel). Supplied by others.
14. **FINISHED GRADE** – Grade line to be 1" to 2" below removable lid and slope away from the station.
15. **CONDUIT** – 1" or 1-1/4", material and burial depth as required per national and local codes. Conduit must enter panel from bottom and be sealed per NEC section 300.5 & 300.7. Supplied by others.
16. **REBAR** – For use with precast concrete ballast. Required to lift tank after ballast (concrete anchor) has been attached, 4 places, evenly spaced around tank.

The following instructions define the recommended procedure for installing the Model WH/WR231 grinder pump station.

This is a sewage handling pump and must be vented in accordance with local plumbing codes. This pump is not to be installed in locations classified as hazardous in accordance with National Electric Code, ANSI / NFPA 70. All piping and electrical systems must be in compliance with applicable local and state codes.

1. REMOVE PACKING MATERIAL: The User Instructions must be given to the homeowner. Hardware supplied with the unit, if any, will be used at installation.

2. TANK INSTALLATION: The tank is typically supplied with a standard grommet for connecting the 4" DWV (4.50" outside dia.) incoming sewer drain. Other inlet types and sizes are optional. **CAUTION:** 4" DR-35 pipe has a smaller diameter and won't create a watertight joint with the standard grommet. Confirm that you have the correct inlet before continuing. If a concrete ballast is attached to the tank, lift only by the lifting eyes (rebar) embedded in the concrete. **Do not drop, roll, or lay tank on its side. This will damage the unit and void the warranty.**

Excavate a hole to a depth so that the station cover extends 1" to 2" above the finished grade line. The finished grade must slope away from the station cover to prevent surface water from entering the station. The diameter of the hole shall be large enough to allow for the concrete ballast

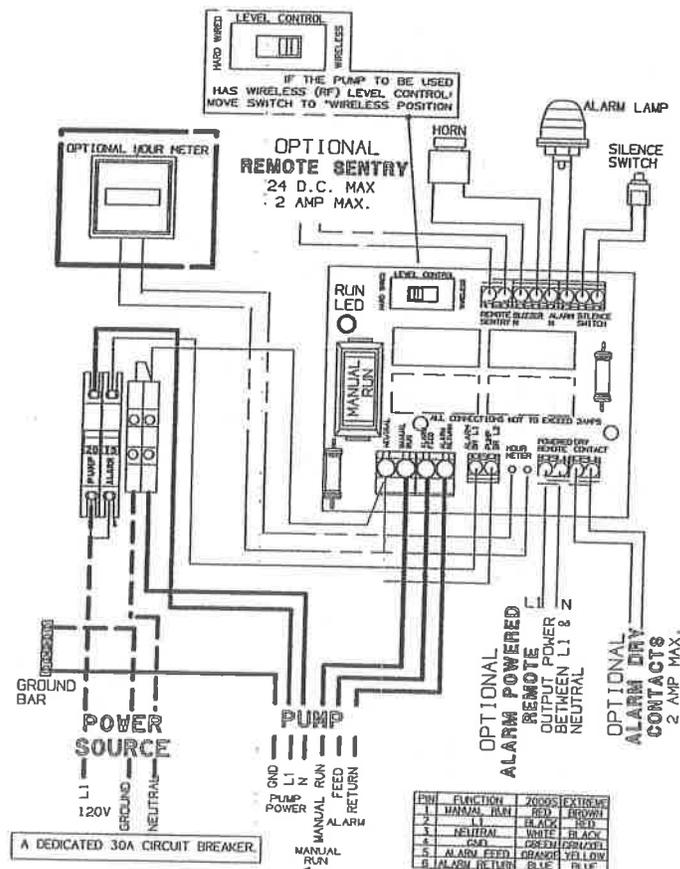
anchor. The size, shape and shoring requirements of the excavation will be based on the soil conditions and must be in accordance with the site engineer's recommendation and safety requirements. Care must be taken during lifting and placement to prevent impacting or otherwise damaging the tank (see Lifting Instructions). Only a non-marring sling, rated for the load being lifted, should be used in contact with the tank surfaces. Lifting chains or cables should not be placed in direct contact with the tank surfaces.

Place the station on a bed of gravel, naturally rounded aggregate, clean and free

flowing, with particles not less than 1/8" or more than 3/4" in size.

A concrete ballast anchor is required to prevent flotation of the tank when groundwater is present. The concrete anchor is not optional. The MINIMUM concrete anchor requirements for the WH/WR231 station are shown in Chart 1 of the Ballast Calculation section. Ensure the tank is properly positioned in the excavation to support inlet pipe (Section 3) and discharge pipe (Section 5) connections before pouring the concrete ballast. The unit should be leveled and filled with water to approximately the bottom of the inlet pipe to prevent shifting

Figure 2a



while the ballast is being poured. The concrete should be vibrated, as necessary, to eliminate voids. If it is necessary to pour the concrete above the inlet level (Section 3), the inlet must be sleeved with an 8" tube before pouring.

Concrete ballast should be cast in-place around the tank in the excavation (Figure 3). Alternatively, pre-cast ballast around the base of the tank may be used. If the concrete is pre-cast, lifting hooks must be anchored in the ballast to support subsequent handling of the tank (see Lifting Instructions). The lifting hooks used must be adequate to support the combined weight of

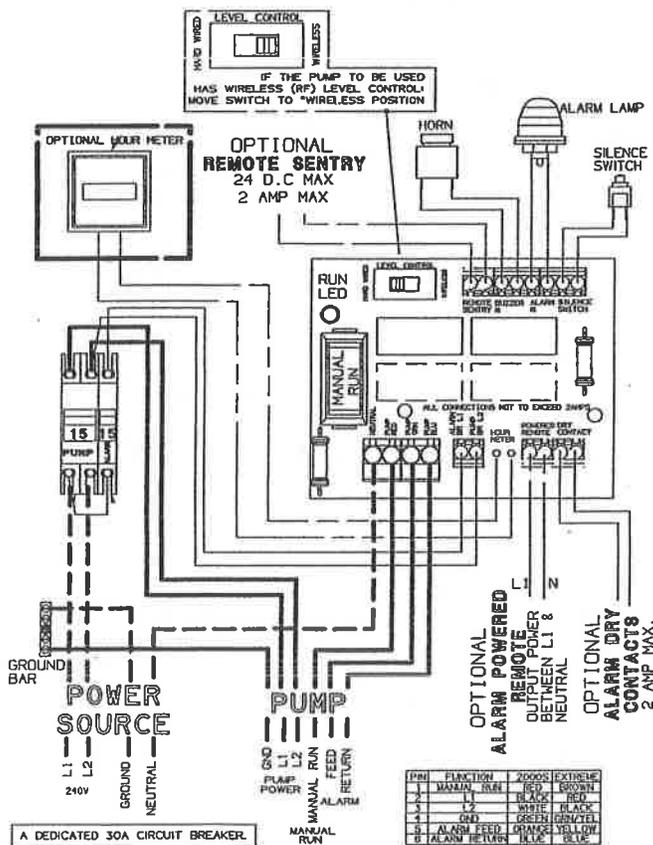
the tank and concrete ballast and shall be sized and installed in accordance with the site engineer's recommendation. Place the ballasted tank on the gravel bedding in the excavated hole using the lifting hooks. Do not lift by any of the tank surfaces if pre-cast ballast is utilized.

3. INLET LOCATIONS:

A 4" (standard) DWW inlet grommet was provided with the station for sealing the inlet pipe at the tank wall. If the inlet grommet penetration was not factory installed, the location of the tank inlet must be determined to support final positioning of the tank prior to ballast installation (see Section

2). The inlet pipe location corresponds with the actual or projected point where the 4" building sewer line intersects the tank wall. The grade of the inlet pipe and required burial depth (per national and local code requirements) must be accounted for when determining the inlet location. The supply cable path should be considered when selecting the inlet location (see Section 8). A 5" diameter field penetration of the tank wall is required to support installation of the (standard) inlet grommet. This penetration must not remove or interfere with any of the structural ribbing on the polyethylene tank. The inlet grommet may be installed in any of the allowable locations shown in Figure 6. The inlet penetration must be centered in the location selected to prevent interference with the tank ribbing. Typical inlet installation will be on one of the three, 6.5" wide, raised panels on the tank body. The panels have been marked with a series of locating lines to support centering of the 5" (standard) drilled penetration. The center of the 4" inlet location must not be located below the recommended minimum inlet center line on the raised panels (Figure 6). Any inlet installed in the depressed panels between the horizontal and vertical ribbing must be centered within the panel to provide adequate clearance for the 6" diameter flange on the standard 4" inlet grommet (Figure 6). Once the location of the inlet penetration is selected, mark the inlet center location on the tank and position the tank. Using

Figure 2b



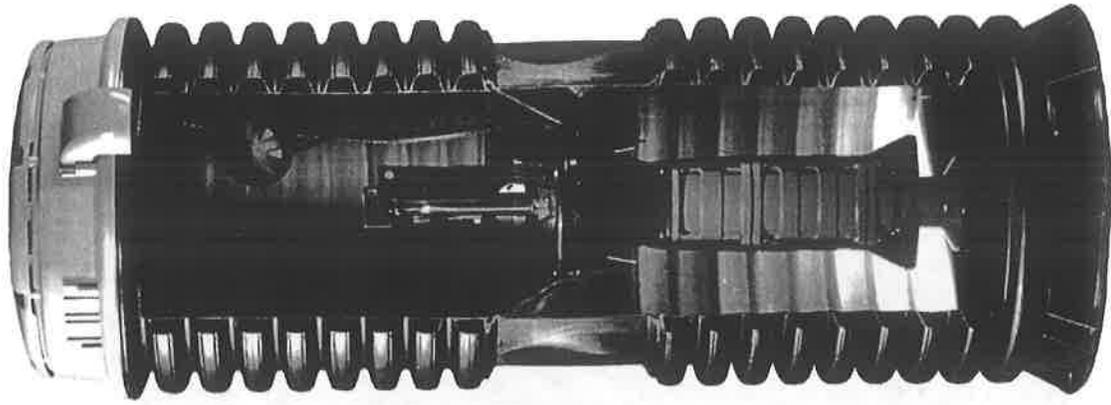
240 VOLT WIRING

The Pressure Sewer System

Owners Guide

e one

Environment One Corporation
A Precision Castparts Company



The Pressure Sewer System

A pressure sewer system is used in certain areas because of the unsuitability and/or cost of a conventional sewer system.

The pressure sewer system consists of a pumping unit installed on your property which is connected to a network of pipes from other pumping units in your area.

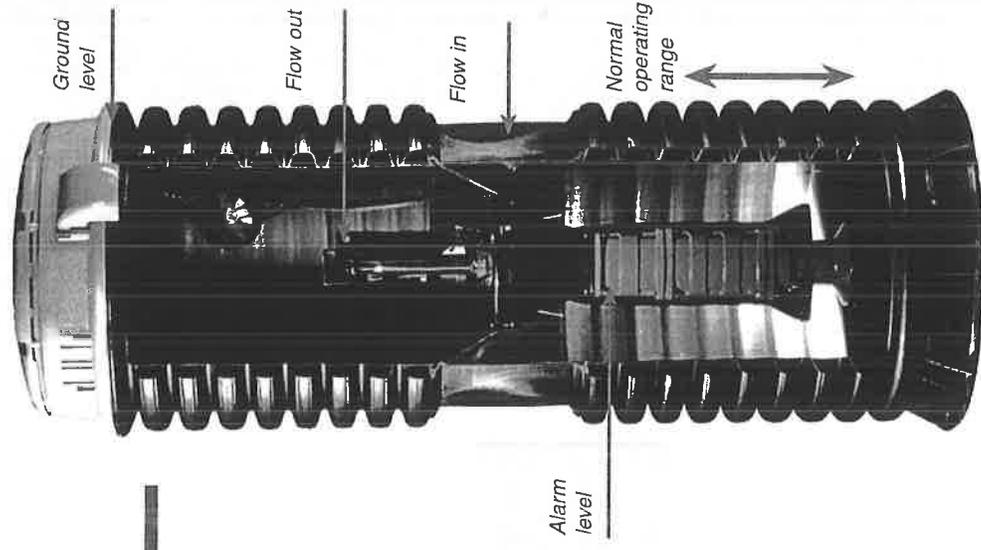
These pipes transfer wastewater to the sewer system or treatment plant that processes the wastewater into reclaimed water suitable for re-use or recycling.

The systems installed are E/One grinder pump stations and are very reliable and robust.

There is not much you need to do and very little that can go wrong. The diagram opposite shows how it works.

You have approximately 24 hours of storage depending on water usage.

** Your grinder pump station may be different than model shown.*



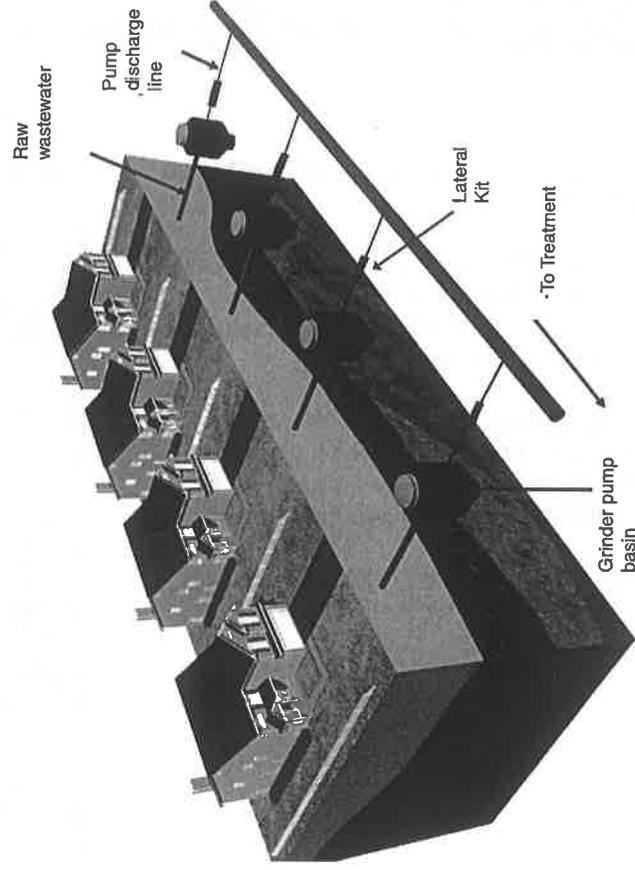
Using the System

There are a few things you need to know to ensure the system runs smoothly.

The system operates like a normal sewer system, taking waste liquids from your toilet, sink, shower, bath, dishwasher and washing machine and transferring it to the sewer system or treatment plant.

To avoid blockages and damage to the pump, the following items should NOT be placed into the system:

- **Glass**
- **Metal**
- **Gravel, sand (including aquarium stone), and coffee grinds**
- **Seafood shells**
- **Socks, rags or cloths**
- **Plastic**
- **Sanitary napkins or tampons**
- **Disposable diapers**
- **Kitty litter**
- **Explosives**
- **Flammable materials**
- **Lubricating oil, grease, cooking oil, paint**
- **Strong chemicals**
- **Gasoline or diesel**
- **Stormwater runoff**



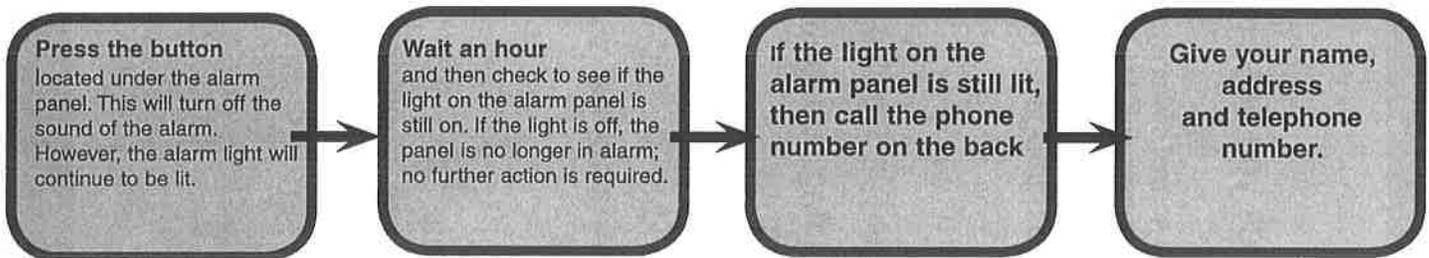
What to do if the alarm sounds

Turn off the sound of the alarm by pressing the silence button underneath the alarm panel.

If the alarm light is still active after an hour, then call the phone number located on the back of this pamphlet. If the alarm sounded and the system subsequently cleared itself, you should consider what caused this to happen.

The system has a 24-hour emergency storage capacity, depending on water usage, so any repairs will be carried out within the 24-hour period. At these times, you should try to minimize the amount of wastewater going into the system.

If you notice any irregularity with the unit, such as the alarm sounding frequently, then contact the phone number located on the back of this pamphlet.



DO NOT ATTEMPT TO REPAIR THE UNIT YOURSELF

Troubleshooting

The system is damaged and needs repair

(example: a pipeline breaks)

- If the alarm sounds, follow the alarm procedure on the previous page.
- If there is a break in the discharge pipe, turn off the power to the pump and **report the damage by calling the phone number located on the back of this pamphlet** and minimize water usage until it is repaired. **Make sure the service person has easy and safe access to the pump for repair.**
- If it is a water supply pipe, **turn off your water supply and contact a plumber for repair.**

The unit becomes smelly?

- When operating normally there should be no noticeable odors coming from the unit. If it gets smelly, the unit may need flushing. Just run clean water down your kitchen, laundry or bathroom sink for about 10 minutes. **If the unit remains smelly, call the phone number located on the back of this pamphlet.**

You notice wet spots around the pumping unit or the discharge pipe?

- The pumping unit and discharge pipe are totally sealed. If you notice wet spots around the unit or pipe and there has not been any recent rain, **call the phone number located on the back of this pamphlet.**

The alarm keeps going off when it rains?

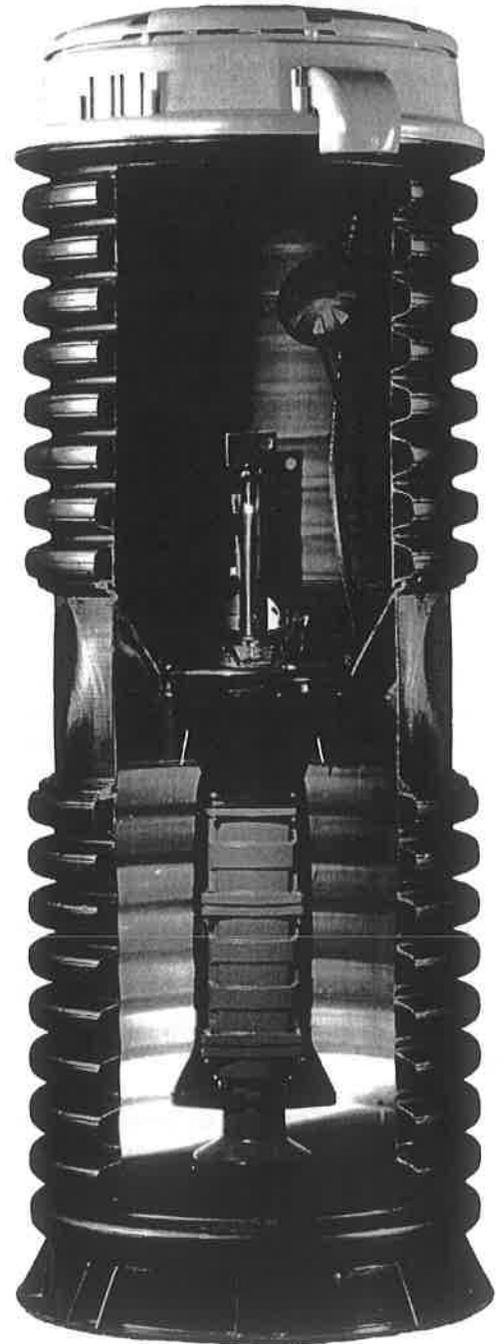
- It means rainwater may be getting into your system and overloading it. **Contact your plumber to investigate.**

The neighbor's alarm goes off and they are away?

- **Call the phone number located on the back of this pamphlet immediately and report the problem.** Do not investigate the problem yourself.

There is a power failure?

- If there is a power failure, reduce water use where possible. The alarm may activate until the unit clears itself. If the alarm remains on for over an hour after the power has been restored, **call the phone number located on the back of this pamphlet.**



Be aware ...

- *Do not touch the valves*
- *Do not turn off the power to the pump unless in response to a broken discharge pipe*
- *Do not block the vent on the pump station*
- *Do not cover the pump station lid*

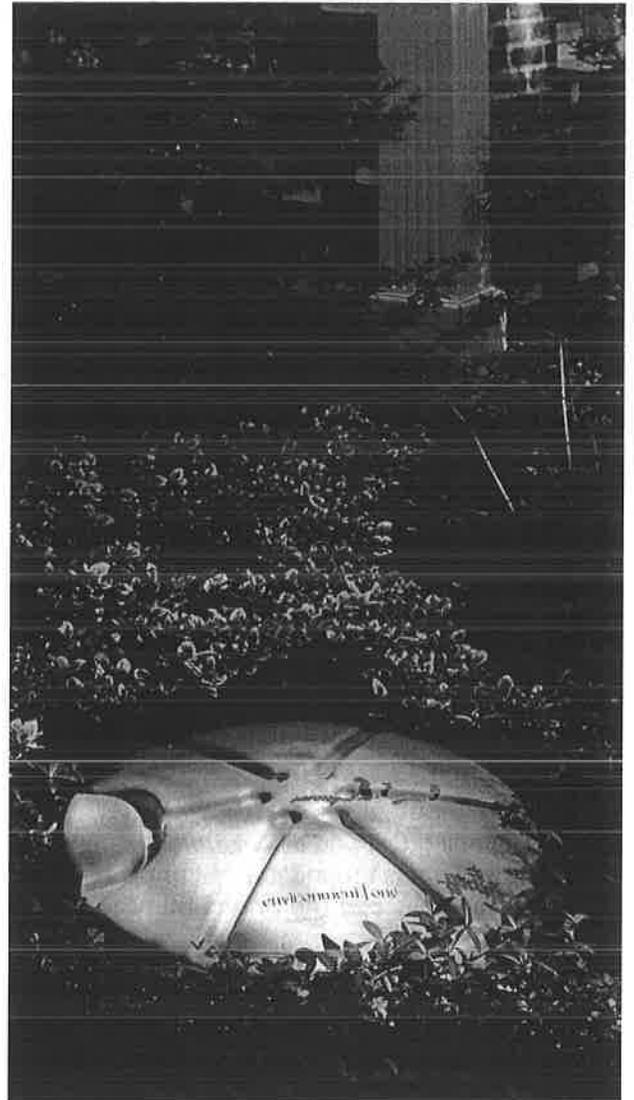
Contact E/One or your local distributor if you are making modifications to your home which may affect the system, such as installing a spa or swimming pool or extending the house over or near the unit or discharge pipe.

Ensure access is available to the pump station at all times. Keep plant growth and other debris away from the unit.

If you go on vacation for a length of time, flush the system before you go away. Run clean water into the unit until the pump activates. Turn off the water and allow the grinder pump to run until it shuts off automatically. If you have a duplex unit (two pumps), special attention must be taken to ensure that both pumps turn on when water is added to the tank.

Take care when **digging in the yard near the pump station** or the discharge pipe. If you do accidentally break any pipeline, call the phone number located on the back of this pamphlet immediately and minimize use of water in the house. Do not attempt to repair the system yourself. You will be responsible for the cost of these repairs.

If you have a pool or want to install a pool or spa, **contact your local distributor for further information.**



If you require further information about the pressure sewer system ...



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