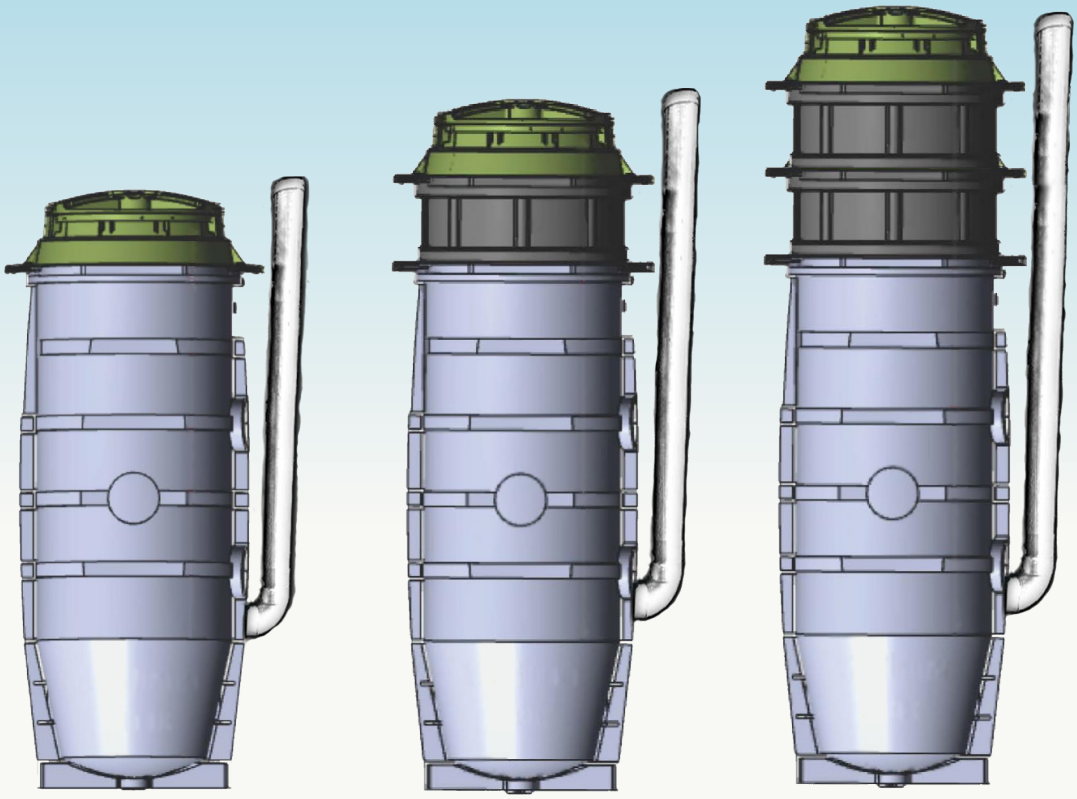
Enviro One
Services & Installations



2010IW x 800 x 2100 2010IW x 800 x 2400 2010W x 850 x 2700

2010 TANK

Your 1st Port of Call for:

- Pressure Sewer Systems
- Design & Support
- Serviceability & Training

INSTALLATION

TANK UNIT COMMISSION REPORT

COLLECTION TANK DIAGRAM

INFRASTRUCTURE DIAGRAM

CABLE GLAND INSTALLATION

INSTALLTION MANUAL

Enviro One
Services & Installations

Pressure Sewer System Tank & Pump Unit Installation Checklist

Client:		**Asset Owner:**	
		PCP Number:	N/A
Installation Address:			
Manufacturer:	E/One	**Model/Description:**	
Tank I.D. number:		**Pump I.D. number:**	Pump 1
Panel I.D. number:			Pump 2
Panel Type:			

	YES	NO	DATE
Burial			
Is the pallet removed from the station?			
Is there a minimum of 150mm of gravel bedding under the tank?			
Is the station level?			
Is the station properly ballasted?			
Is final grade as per detailed design drawing?			
Inlet			
There will be a 127mm hole saw required - A sharpened fit for purpose hole saw will be required			
Is the grommet secure and water tight?			
If the inlet is stubbed out, is it at least 1.5m long and sealed with a water tight, glued PVC cap?			
Is the inlet line bedded?			
Is the inlet riser installed correctly with riser stabiliser straps installed			
Discharge			
Is the discharge line secured and water tight?			
Is the boundary kit installed properly (directional)?			
Is the discharge line bedded?			
Vent (Flood Plain)			
Is the pipe entering the station perpendicular?			
If the inlet is stubbed out, is it at least 1.5m long and sealed with a water tight, glued PVC cap?			
Is the vent line bedded?			
Electrical			
Is the liquid tight cord grip tightened in the station?			
Backfill			
Is the backfill material free of clay, rocks, roots, etc.?			
Was the backfill material compacted in 300mm lifts?			
Comments & Actions			

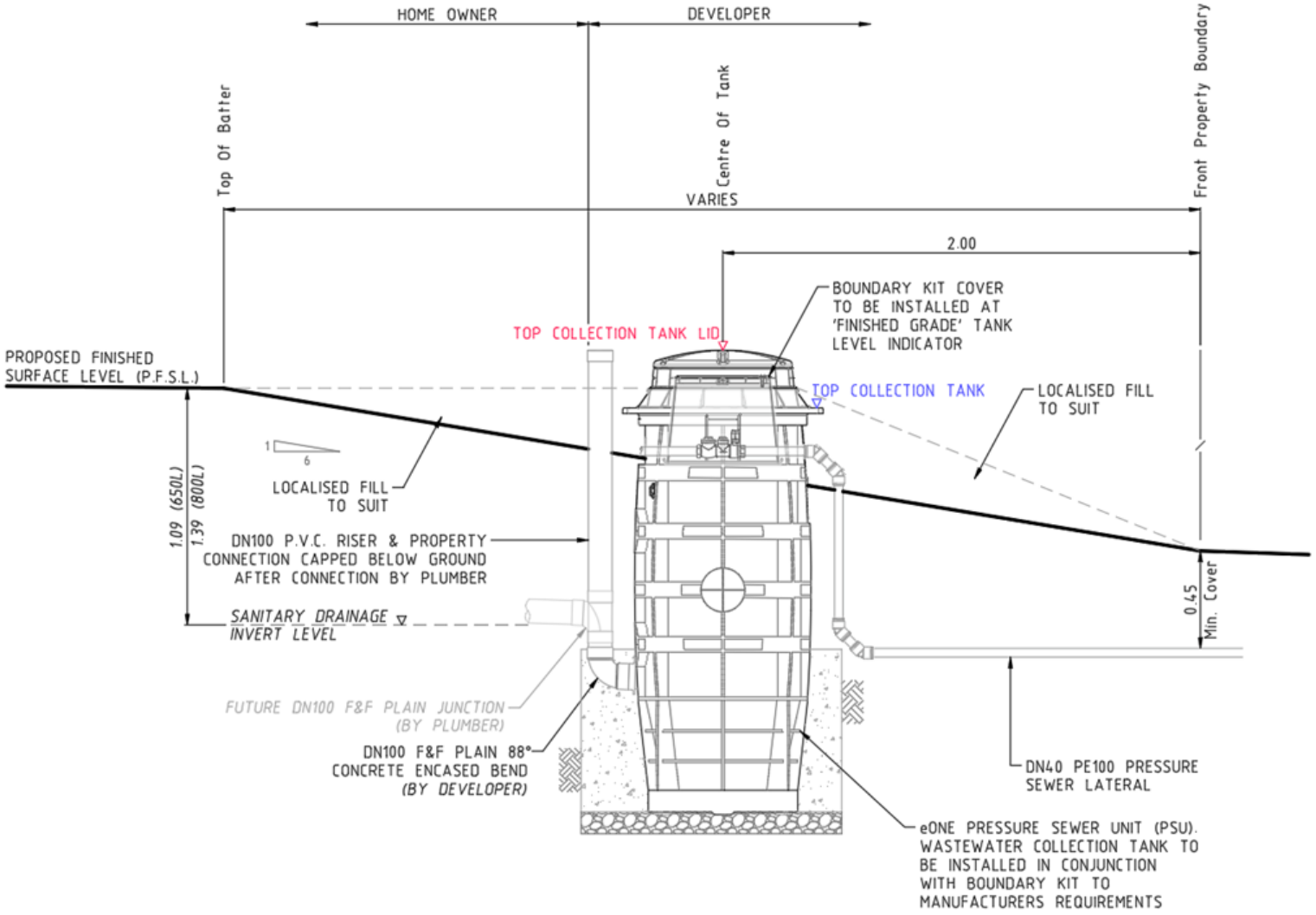
Technician:		**Date:**		**Time:**		

NOTE: If any item is not a compliant positive answer, the problem must be rectified before commissioning continues.

Riser and Strapping

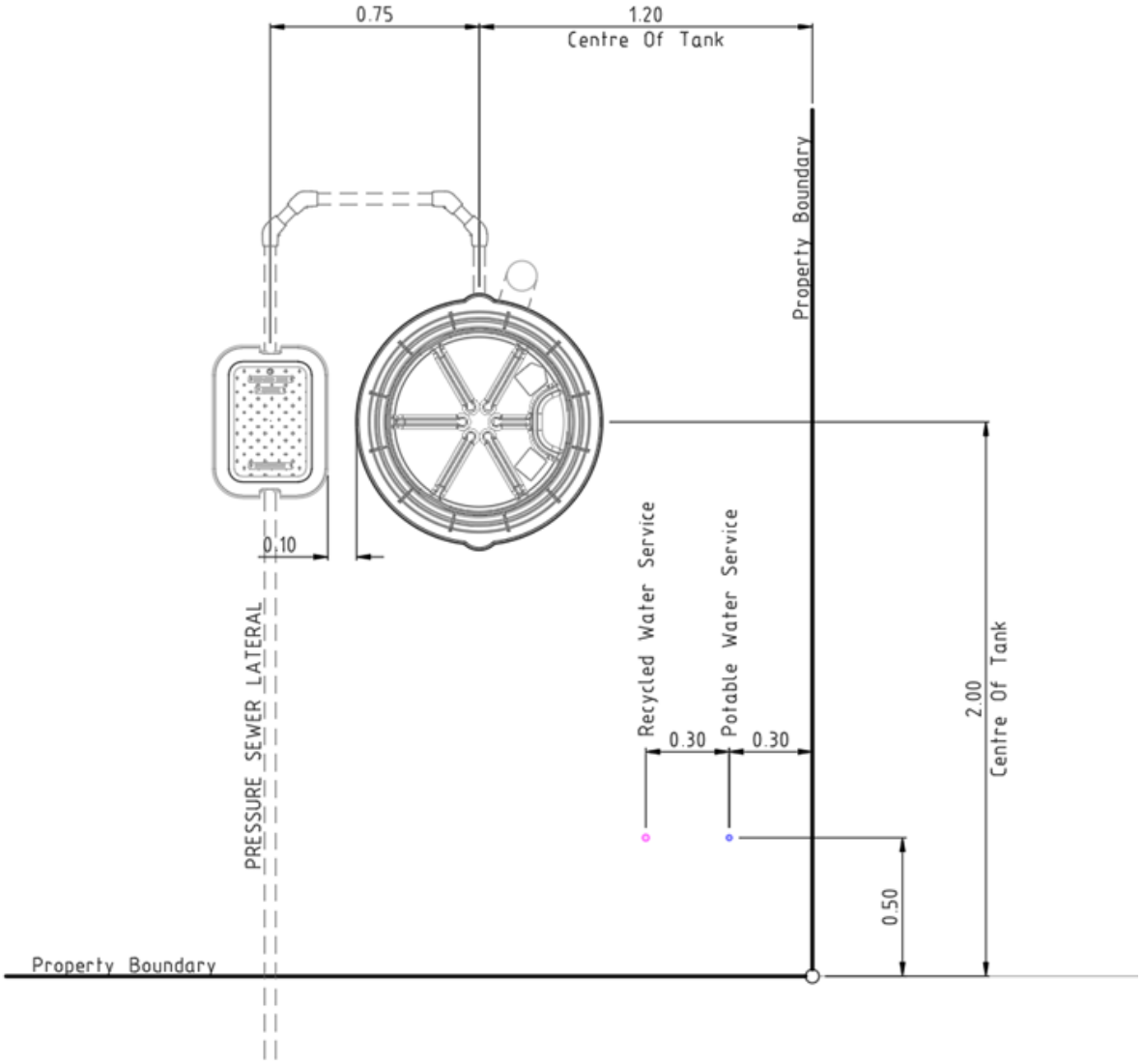
Tank

Finished Product



COLLECTION TANK SECTIONAL ELEVATION

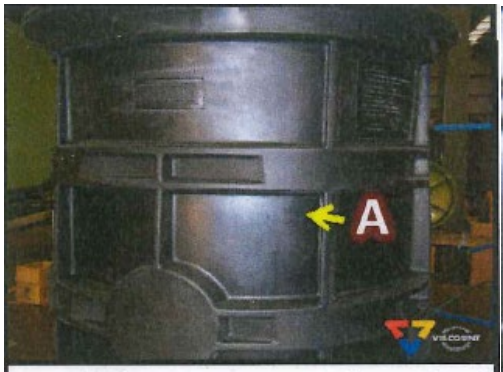
SCALE 1:25



TYPICAL INFRASTRUCTURE SETOUT DIMENSIONS

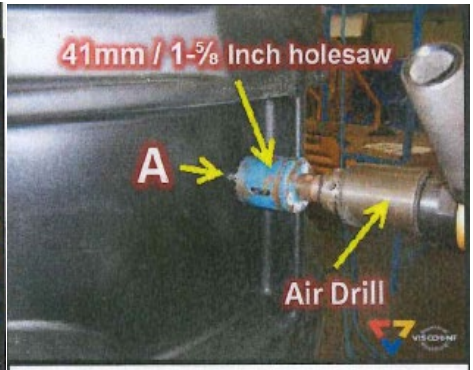
SCALE 1:25

Flow Systems - Installation of cable gland



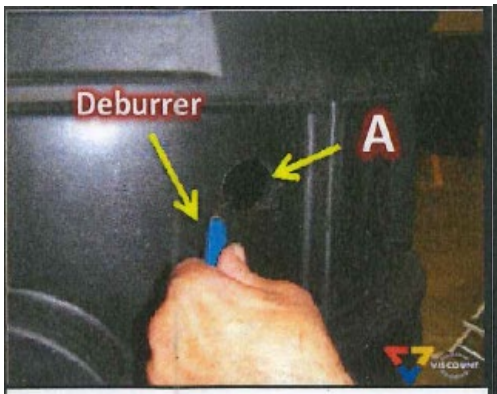
locate drill location marked **A** on back of tank as shown

Step 1



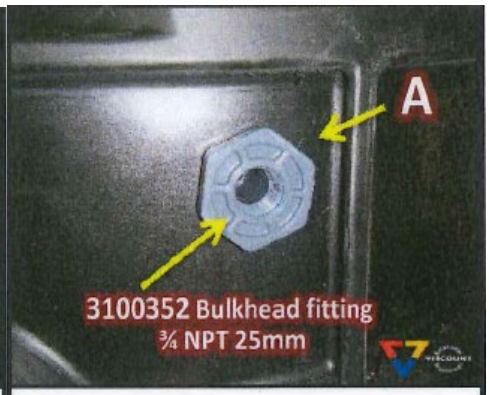
using a holesaw 41mm / 1-⅝ inches drill out hole marked **A** for bulk head fitting

Step 2



once **A** hole is drilled out use a deburrer to clean up the cut edges

Step 3



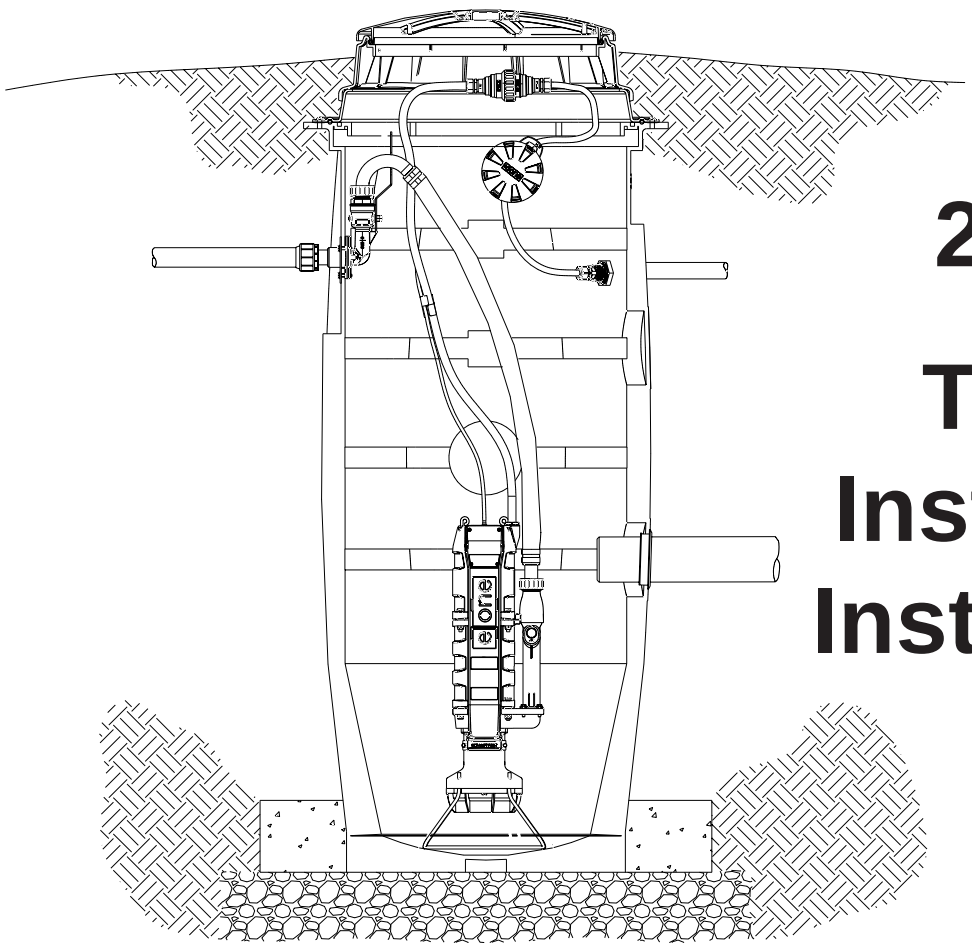
insert thread of the bulkhead fitting into the hole as shown

Step 4

ensure black connector strain relief is in bulkhead fitting end as shown

Step 5

E/ONE EXTREME SERIES



2010iP

Typical Installation Instructions

2010iP Installation Instructions

The 2010iP station is a well-engineered system designed to provide low-pressure sewer service to individual residences or buildings. Correct installation and start-up of this equipment will ensure proper operation.

This is a sewage handling pump and must be vented in accordance with national and local plumbing codes. This pump is not to be installed in locations classified as hazardous. All piping and electrical systems must be in compliance with applicable standards, local and national codes and to the satisfaction of relevant authorities.

PRODUCT DESCRIPTION

The 2010iP station consists of a grinder pump, tank, pump alarm panel and connecting power (supply) cable. The tank is a polyethylene basin complete with a gasket-sealed lid. Three lid styles are available for the 2010iP station (Figure 4). Sewage enters the tank through the 100 mm DWV uPVC (110.2 mm OD) (standard) inlet pipe where it is ground into fine particles by the grinder pump. The in-line pumping mechanism discharges the macerated sewage to a pressure or gravity main, then to a remote treatment site. The pump is a semi-positive displacement type capable of operating at discharge pressures up to 56 m TDH. Ample tank storage capacity in conjunction with integral level sensing controls provides for economic, on-demand, operation of the grinder pump.

ITEMS REQUIRED FOR INSTALLATION

Prior to beginning installation of the 2010iP station, a thorough review of these installation instructions is recommended. This will likely eliminate problems with inconvenient piping and cable locations or due to the unavailability of materials or equipment. In addition to the components furnished with each station, the following items will be needed to support installation:

- Electrical supply in accordance with the specification on the pump nameplate.
- Bedding material (Section 2)
- Concrete ballast (Section 5)
- 100 mm DWV uPVC (110.2 mm OD) inlet pipe (from residence or building sewer) (Sections 4 & 7)
- PE100, 40mm OD, PN16, SDR11 polyethylene discharge pipe to force or gravity main (recommended – Section 8)
- Compactable backfill material (Section 11)

The following tools:

- 127mm (5”) dia. hole saw
- Pipe thread sealant (suitable for materials being joined)
- Pipe wrenches
- Electric drill
- Common hand tools

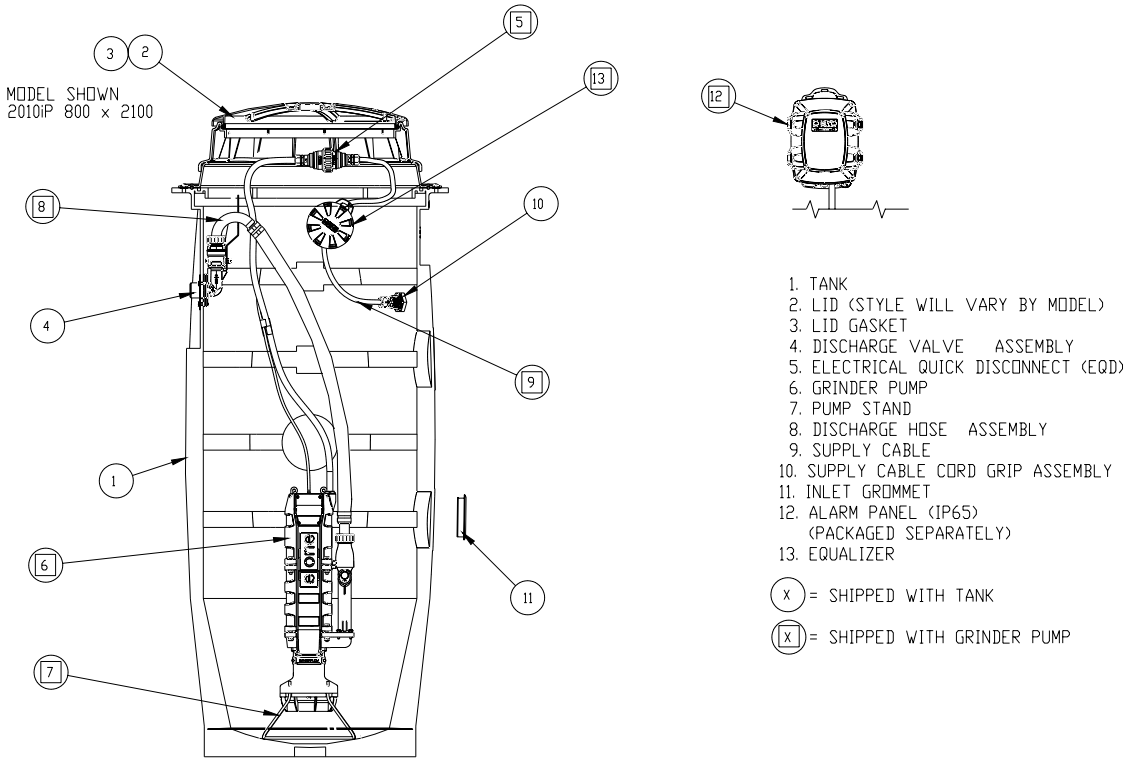


Fig. 1 - Station Components

INSTALLATION STEPS

The following instructions will provide the necessary information to properly install the 2010iP station.

1. Station Unpacking
(Figure 1)

The station alarm panel, grinder pump and tank are shipped to the job site separately. Inspect the tank (1) and ensure that it sustained no damage during shipment. Proper handling of the polyethylene tank will ensure reliable performance. Do not drop the tank or roll it on its side. Only a non-marring sling should be used to lift the tank (see Lifting Instructions). Ensure that all lifting equipment is rated for the load being lifted. Remove the tank lid (2) and verify that the supply cable cord grip (10) and the discharge valve (4) are installed in the tank. The inlet grommet (11) was shipped loose with the tank. The balance of the factory-provided components was delivered with the grinder pump unit. Inspect the shipping cartons for signs of any damage sustained during shipment. Open the pump shipping carton(s) and verify that the grinder pump (6), pump stand (7), discharge hose assembly (8), equalizer (13), and supply cable (9) are enclosed. Open the alarm panel (12) shipping carton(s) and ensure that alarm panel has sustained no shipping damage. If damage is suspected on any of the components, do not proceed with installation. Notify an Environment One representative of any damage discovered or any missing components.

2. Site Excavation
(Figure 2)

Excavate a hole of sufficient depth and width to accommodate the tank, ballast, underground piping and required backfill material as well as providing adequate working space for plumbing and electrical connections. The base of the excavated hole should be level and prepared with proper bedding material, such as gravel, in accordance with the site engineer's requirements. The depth of the excavation must be sufficient to accommodate the bedding material and tank burial. The station burial depth depends on the specific 2010iP model being installed. Figure 4 shows the appropriate burial depth by model (cover style) for each. The size, shape and shoring requirements of the excavation will be based on the soil conditions and should be in accordance with the site engineer's recommendation and safety requirements.

3. Tank Installation

Improper handling of the tank may result in damage and, ultimately, failure of the station. Care should be taken during lifting and placement to prevent

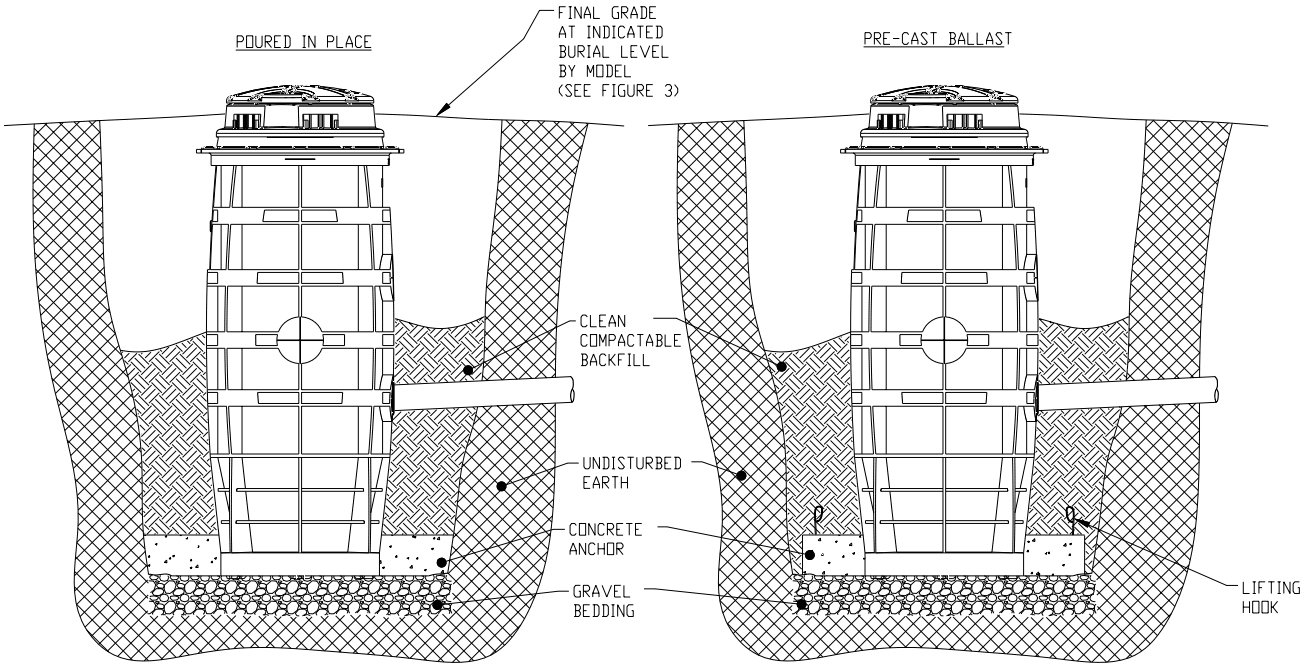


Fig. 2 - Excavation and Ballast

impacting or otherwise damaging the tank. A non-marring sling should be used when lifting the tank (see Lifting Instructions). Ensure that the lifting sling is rated for the load being lifted. Lifting chains or cables should never be placed in direct contact with the tank surfaces. Place the tank on the level bed of fill material in the excavated hole. Orient the installed discharge fitting, as required, to align it with the existing or proposed discharge piping path.

4. Inlet Pipe Location

A 100 mm uPVC inlet grommet was provided with the station for sealing the inlet pipe at the tank wall. Other inlet pipe grommet sizes are also available (Section 7). The location of the tank inlet must be determined to support final positioning of the tank prior to ballast installation. The inlet pipe location corresponds with the actual or projected point where the 100 mm 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 (Figure 6 and Section 10) should be considered when selecting the inlet location. A 127 mm diameter field penetration of the tank wall is required to support installation of the 100 mm (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 3. 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 200 mm diameter, raised panels on the tank body. The panels have been marked with a series of locating lines to support centering of the drilled penetration. The selected elevation of the inlet penetration must be in compliance with national and local code requirements. 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 152 mm diameter flange on the standard 100 mm inlet grommet (Figure 3). Do not install inlet in lower, tapered section of the tank. Once the location of the inlet penetration is selected, mark the inlet center location on the tank and position the tank to line up the inlet location with the inlet pipe path.

5. Ballast Installation

A concrete anchor is required to prevent flotation of the polyethylene tank when groundwater is present. The volume of concrete used **must** comply with the site engineer's requirements. Recommended minimum ballast volumes are presented in Chart 1 of the Ballast

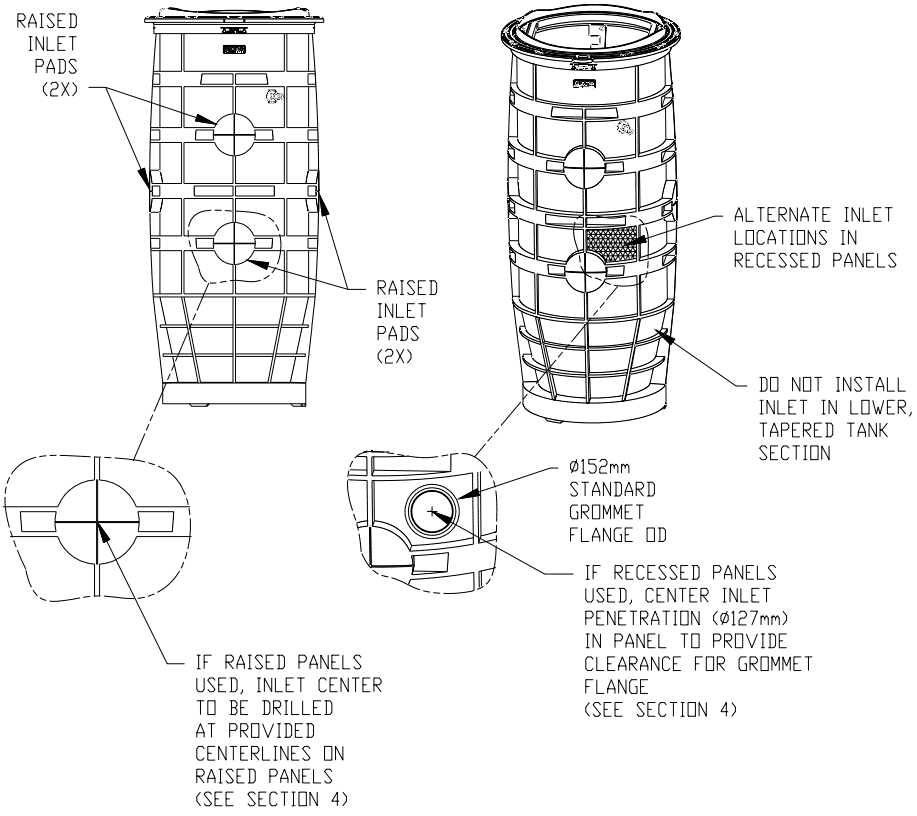


Fig. 3 - Allowable Inlet Locations

Calculation page. Ensure that the tank is properly positioned in the excavation to accomodate the marked inlet location (Section 4) before pouring the concrete ballast. Concrete ballast should be cast in place around the tank in the excavation. **Do not pour the concrete ballast above the marked inlet pipe location.** If the ballast must be poured above this level, proceed with installation of the inlet piping (Section 7) before pouring the concrete. The inlet pipe must be sleeved with a 200 mm tube prior to pouring. The tank should be filled with water, to a level above the specified ballast height to prevent shifting during the concrete pour.

Alternatively, precast concrete, around the tank bottom, may be used for ballast (Figure 2). Do not pour ballast above the intended inlet location. If this ballast method is used, lifting hooks must be anchored in the concrete to support subsequent handling of the tank. The lifting hooks must be adequate to support the combined weight of the tank and concrete ballast, and should be sized and installed in accordance with the site engineer's recommendation. Place the ballasted tank in the excavated hole using the lifting hooks. **Do not lift by any of the tank surfaces if precast ballast is utilized.**

6. Venting

(Figure 4)

The 2010iP station is a sewage handling pump and requires ventilation for proper and safe operation. The method of station ventilation will vary depending on the specific model ordered. The vent location for each model is shown in Figure 4. Do not bury the station above the appropriate burial line (by model) indicated in Figure 4. Burial above this level will result in blockage of the integral cover vent system provided on most 2010iP models.

If the water level outside of the station is expected to rise above the surrounding grade (flooding), a cover vent system cannot be used. If flood conditions are expected, an underground (lateral) vent system and solid cover, as shown on the Model 2010iP 800 mm x 1900 mm station, must be used. Refer to the E/One 2000i Lateral Vent Installation Instructions (PA2114P01) for information about underground station venting. **Consult the factory if flood conditions are possible where the station is to be installed.**

7. Inlet Installation

(Figure 5)

The station is supplied with a standard grommet to accept a 100 mm DWV uPVC (110.2 mm OD) sewer inlet pipe. The grommet is self-sealing and does not require the use of additional sealant or adhesives. Verify that the grommet supplied with the 2010iP station will accommodate the selected inlet piping. Using a 127.0 mm (5") hole saw, drill

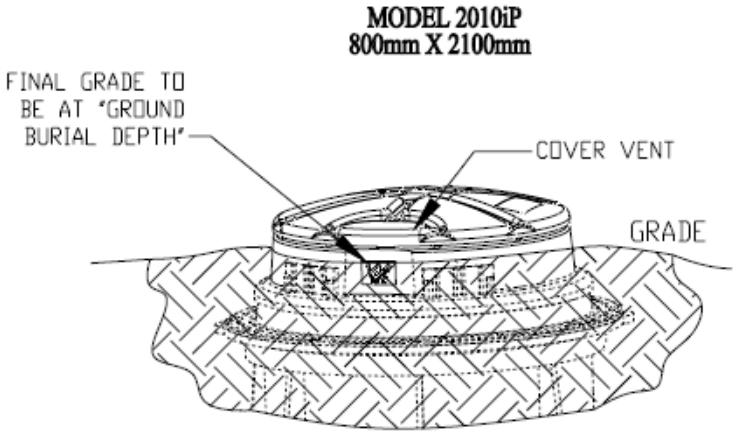


Fig. 4 - Tank Installation

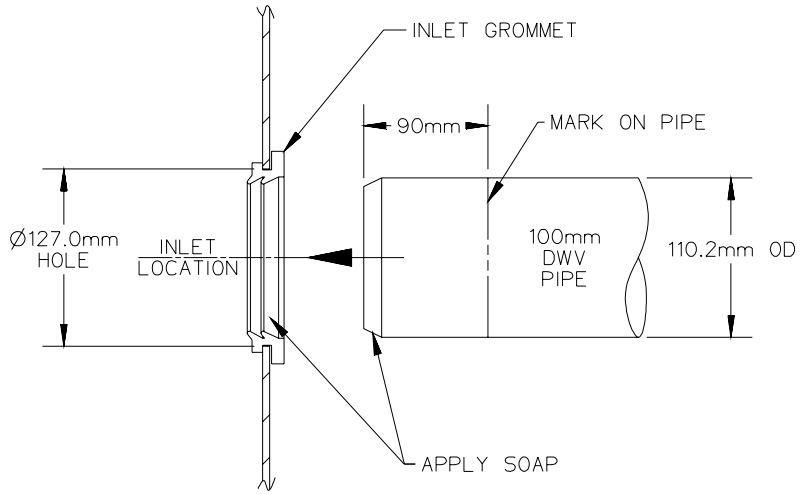


Fig. 5 - Inlet Installation

through the polyethylene tank wall at the marked inlet location (Section 4). Remove any burrs or chips from the drilled-hole edges.

Note: Other grommet sizes are available upon request. Alternate grommet sizes may require a different diameter tank penetration. Consult an E/One representative before drilling the tank inlet if an alternate grommet is required.

Install the supplied inlet grommet in the drilled hole. Place a mark on the inlet pipe about 90 mm from the end that will enter the tank. A bevel should be ground or filed on the pipe end to aid in installation through the grommet (Figure 5). Clean the grommet and pipe surfaces to remove any debris. Apply a film of pipe soap or dish soap to the outside surface of the inlet pipe end and the inside of the grommet. Insert the beveled pipe end into the grommet and push the inlet pipe into the tank until the 90 mm mark lines up with the grommet's outside edge. Inspect the grommet flange on the outside of the tank. The flange should be flush against the tank wall and completely visible when the pipe and grommet are installed properly.

8. Tank Discharge Piping Connection

(Figure 6)

Connect the tank discharge piping to the threaded tank fitting. The 1-1/4" BSP female thread on the discharge fitting will accommodate a variety of pipe materials and fittings. Discharge piping must be selected in accordance with local and national plumbing codes. If allowable, the use of PE100, 40 mm OD, PN16, SDR11 polyethylene pipe is recommended. If polyethylene discharge piping is used, compression type fittings that provide a smooth inner passage should be utilized. It is recommended that an isolation valve and a redundant check valve assembly (boundary kit) be installed between the pump discharge valve and the street main on all installations. Never use a ball type valve as a check valve. It is recommended that the valves be installed as close to the public right-of-way (road reserve) as possible. Check local codes for applicable requirements.

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

11. Tank Backfill

Proper backfill is essential to the long-term reliability of the 2010iP grinder pump station. The choice of backfill material is dependent upon the local soil and groundwater conditions and must be in accordance with the site engineer's requirements. The recommended method of backfilling is to surround the unit to the burial level (Figure 4) with proper fill. The backfill material shall be to the satisfaction of the local relevant authority. Backfill shall be free of organic and compressible material and shall be free of voids and cavities. Compaction moisture content shall generally be 1% dry and 2%wet of the optimum content.

Backfill shall be compacted to the minimum standard dry density ratios, AS1289, 95%. Clays and silts (12% or more passing through #200 (.075 mm) sieve) are not suitable backfill for this or any underground 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 ensure proper backfilling and compaction with dry materials.

Flowable fills should not be dropped with more than 1-1/4 meters between the discharge nozzle and the bottom of the hole because this can cause separation of the constituent materials.

SYSTEM INSPECTION

Perform the following inspections:

• Proper burial depth – the tank should have been buried to the burial level shown (Figure 4).
•Proper grading – the surrounding soil should be graded down, away from the station.
• Station supply cable – the station supply cable must not be exposed outside of the station. Suitable conduit, per AS3000, should be used. Proper burial depth (500 mm) shall be maintained.

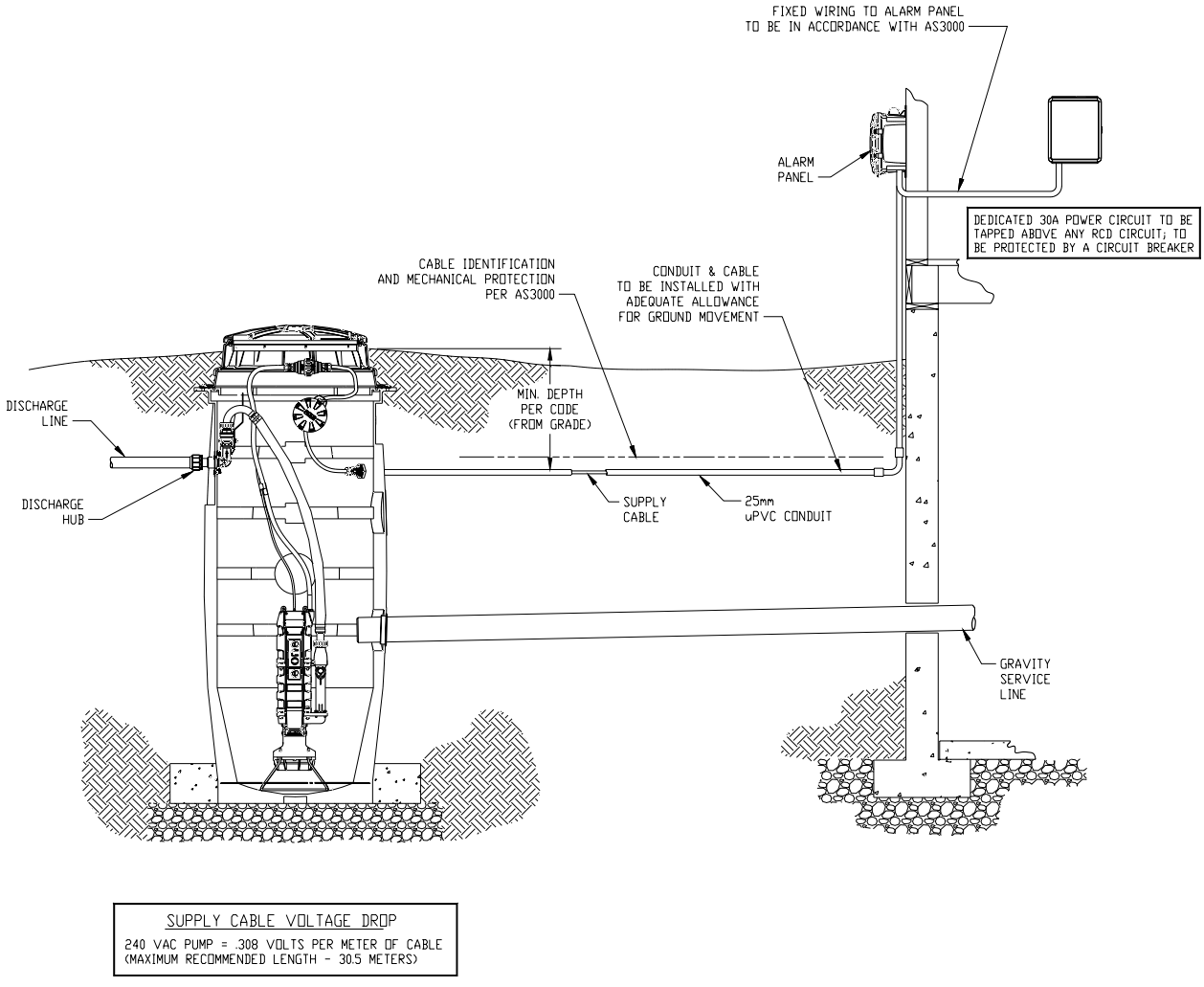


Fig. 6 - Typical Station Installation

Lifting Instructions

FAILURE TO FOLLOW THESE INSTRUCTIONS COMPLETELY WILL VOID WARRANTY.

1. Transporting unit to installation site:

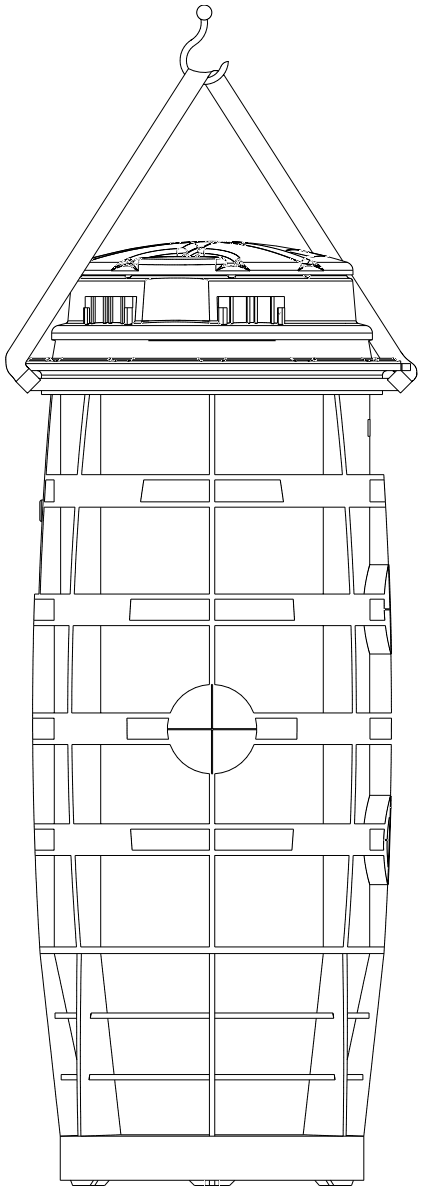
If the station has been shipped secured to a pallet, lift the unit from the bottom during transportation. Alternatively, lift the unit using 2 nylon straps wrapped around the tank exterior, just below the cover flange as shown below. **Never roll a station or move it on its side.**

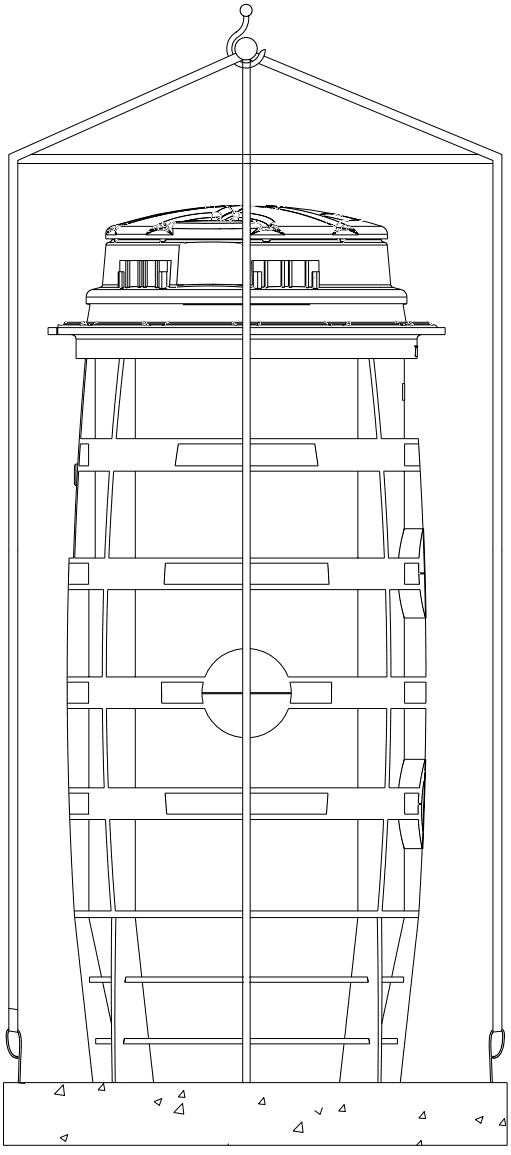
2. No Ballast, (to be poured in place):

If the concrete anchor is to be poured while the station is in place lift the unit using 2 nylon straps wrapped around the tank exterior just below the cover flange, as shown below. Keep station oriented vertically to avoid any damage.

3. Precast Ballast:

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





E/One Series 2010iP Grinder Pump Station
Ballast Calculations

A ballast, or concrete anchor, of proper volume and weight is required on most in-ground installations. The following section 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 force exerted on a fully submerged station.

Installation Site Assumptions

1. Water table – under worst case, the ground water level is assumed to be at the finished grade level.

2. Backfill materials per E/One Installation Instructions (Model 2010iP).

3. The consulting engineer should perform a soil test to determine if the assumptions that have been made are valid for the specific installation site. If the site conditions differ from these assumptions, then the consulting engineer may revise the calculations as shown in this document.

Physical Constants

1. Density of Water = 1000 kg/m^3
2. Density of Concrete (in air)= 2402 kg/m^3
3. Density of Concrete (in water)= 1402 kg/m^3
4. Density of Saturated Backfill = 1120 kg/m^3

Procedure

A. Determine The Buoyant Force Exerted On The Station

1. Determine the buoyant force that acts on the grinder pump station when it is submerged in water.
2. Subtract the weight of the tank from the buoyant force due to the submerged tank to determine the net buoyant force acting on the station.

B. Determine The Ballast Force Exerted On The Station

1. Determine the ballast force applied to the station from the concrete and saturated soil surrounding the station.

C. Subtract The Ballast Force From the Buoyant Force.

1. Note – if the installation site conditions are different from those listed above, the consulting engineer should recalculate the concrete ballast.

Ballast Calculations

The following calculations are to outline the areas used to determine the volumes of the different materials for the ballast. All sections referred to in the calculations are marked on the accompanying drawing.

E/One Series 2010iP Grinder Pump Station Ballast Calculations

Sample Calculation GP 2010iP, 800mm x 2100mm Station

Volume of Station = .79 m^3
Tank Weight = 75 kg
Station Height = 2.02 m

A. Buoyant Force

1. The buoyant force acting on the submerged GP 2010iP is equal to the weight of the displaced water for the section of the tank that is submerged.

$F_{buoyant}$ = (density of water)(volume of station)
= (1000 kg/m^3)(.79 m^3)
= 790 kg

2. The net buoyant force acting on the station ($F_{net\text{-}buoyant}$) is equal to the buoyant force ($F_{buoyant}$) minus the weight of the station tank.

$F_{net\text{-}buoyant}$ = 790 kg - 75 kg
= 715 kg

B. Ballast Force

1. Determine the volume of concrete & soil

Section I: Used To Determine The Volume Of Concrete
(Note: .691m = assumed, inside diameter of concrete ballast ring around tank bottom flange)

Volume = (Height)(Area)
= (.178 m)(π)((1.066 m)^2 - (.691m)^2)/4
= (.178 m)(.517 m^2)
= .092 m^3

Section II: Used To Determine The Volume Of Saturated Soil
(Note: .815 m = assumed, inside diameter of soil column around tank maximum diameter)

Volume = (Height)(Area)
= (2.02 m - .178 m)(π)((1.066 m)^2 - (.815 m)^2)/4
= (1.842 m)(.371 m^2)
= .683 m^3

2. Determine the combined ballast

Ballast (total) = Ballast (concrete) + Ballast (saturated soil)
= ($V_{concrete}$)(density concrete in water) + (V_{soil})(density saturated soil)
= (.092 m^3)(1402 kg/m^3) + (.683 m^3)(1120 kg/m^3)
= 128 kg + 765 kg
= 892 kg

C. Subtract the net buoyant force from the ballast force to determine the final condition

Final Condition = Ballast Force - Net Buoyant Force
= 892 kg - 715 kg
= 177 kg (excess ballast)

E/One Series 2010iP Grinder Pump Station
Ballast Calculations

Sample Calculation GP 2010iP, 800mm x 2100mm Station Continued

The approach outlined on previous page may be used to calculate the ballast requirements listed below.

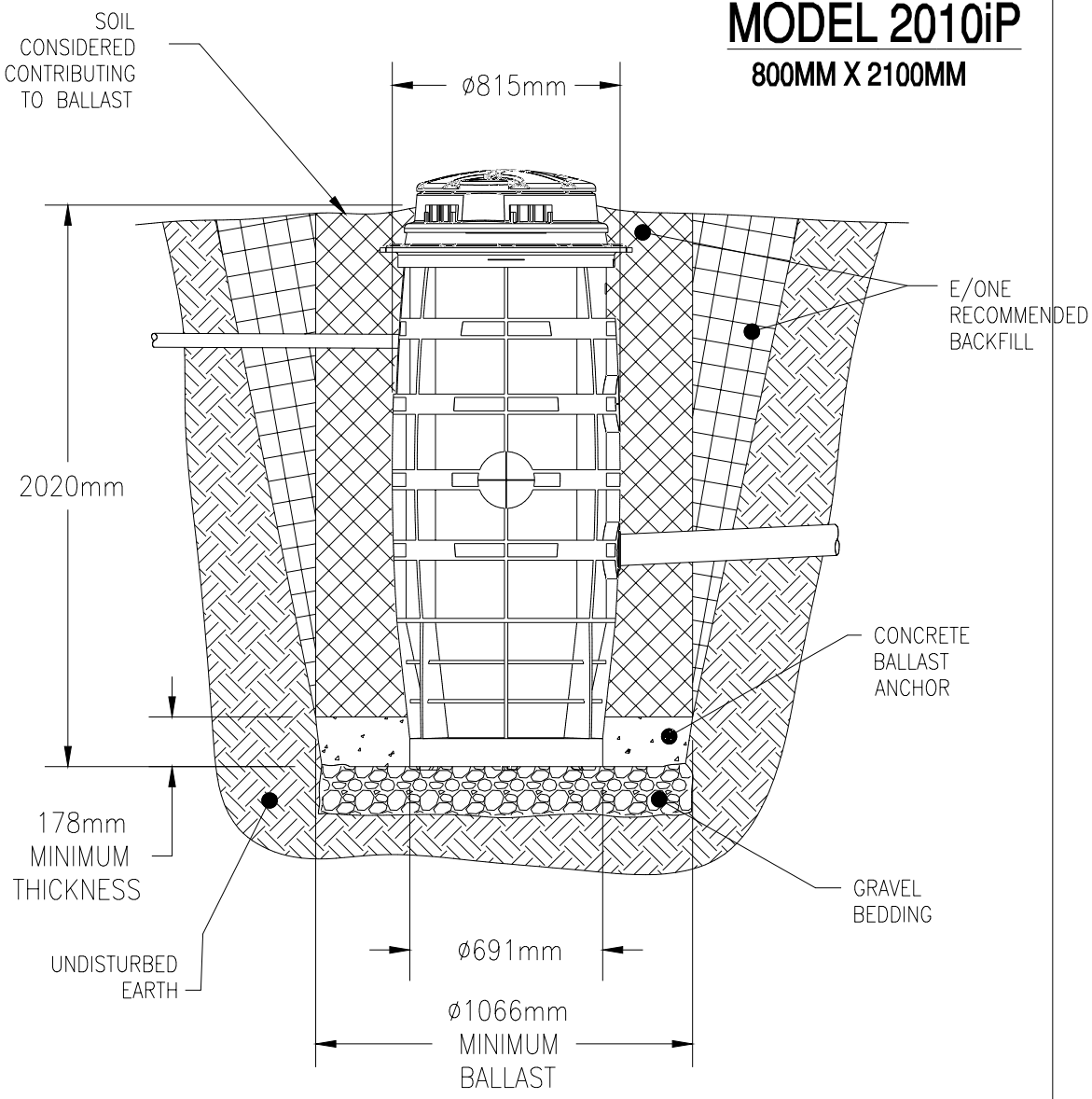
Chart 1

GP Model 2010iP	Station Volume (m^3)	FNet Bouyant (kg)	Tank Weight (kg)	FBallast (kg)	Volume Concrete (m^3)*	Weight Concrete in Air (kg)*	Minimum Diameter of Concrete Anchor (mm)	Minimum Thickness of Concrete Anchor (mm)
800 x 2100	.79	715	75	892	0.09	216	1,066	178

* Volume calculated is for minimum dimensions given. Minimum dimensions must be met or exceeded for actual application.

MODEL 2010iP

800MM X 2100MM



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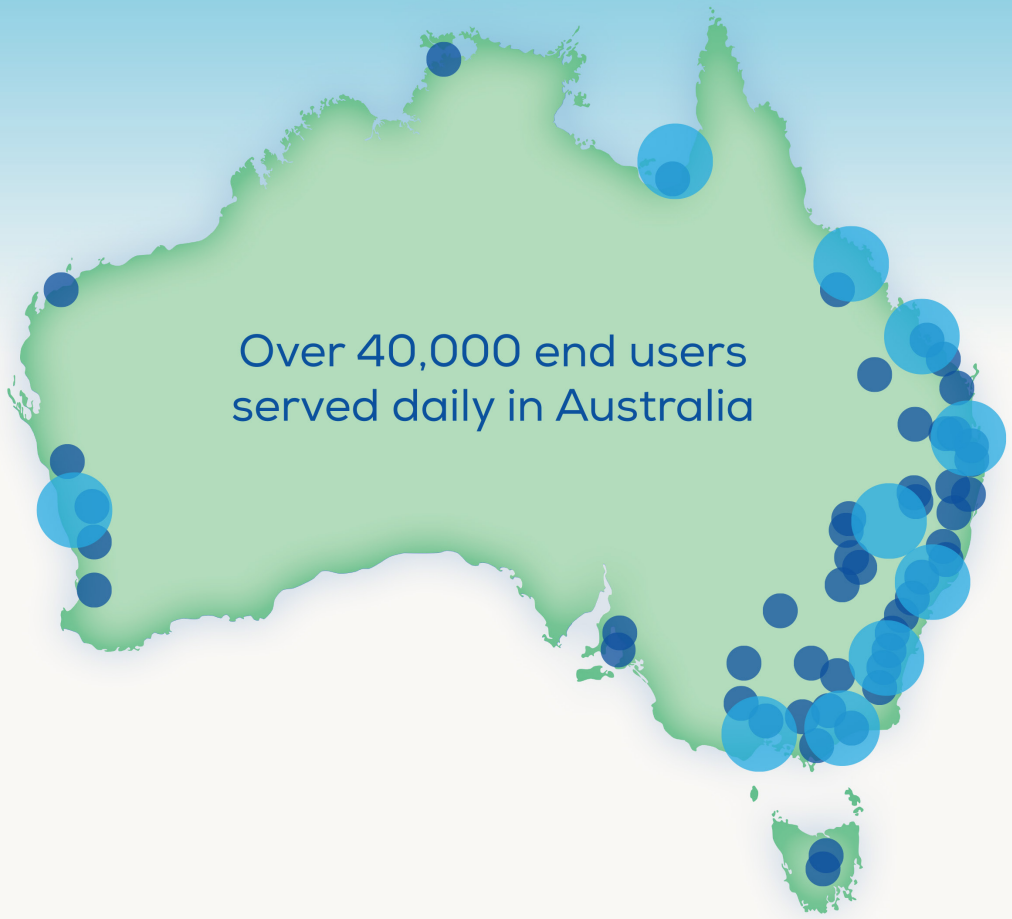
SEWER SYSTEMS

MODEL 2010iP BALLAST INFORMATION
(800mm X 2100mm)



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