STONEBRIDGE
PARK

CONTENTS

PRESSURE SEWER SYSTEM

SUMMARY
GRINDER PUMP LOW PRESSURE SEWER SYSTEM
for
STONEBRIDGE PARK

System Description

The Grinder Pump Low Pressure Sewer Systems for this project consist of two interconnected component assemblies; (1) the grinder pumps, pump vaults, control panels, alarm and pressurized sewage laterals from the house to the redundant check valve/shutoff valve (sewage curb stop) at the roadway easement line for each homesite and (2) the pressure sewer mains and appurtenances which transport sewage from the redundant check valve/shutoff valves of each individual homesite to the discharge point in the gravity sewer along Steamboat Boulevard.

There are three such systems on this project; one for Lots 4 through 12, one to serve Lots 2 & 3 and one for Lot 1.

Components in Item No. (1) above are to be installed, owned, operated and maintained by the individual homeowner, while components in Item No. (2) are installed by the developer and will be owned, operated and maintained privately by a designated provider as determined by the Homeowner's Association.

Neither the City of Steamboat Springs nor the Mount Werner Water District is responsible for any operation or maintenance on these systems.

Sole Source Pump Supplier

The systems have been designed specifically for installation and operation using Environment One (E\ONE) Grinder Pumps, which are available in prefabricated vault assemblies. A sole supplier is necessary to preserve overall system design parameters and integrity of operation. E\ONE was chosen for the following reasons:

- System service record across the country
- Overall system uniformity of components and parts
- Pumps provide constant flow over wide head range, avoiding cavitation or shut off
- Proven electrical and fire safety -- UL listed
- Non-clog grinding -- low speed, high torque motor
- Minimize field erection -- less field work = fewer mistakes & lowest cost
- Factory assembled and tested as complete unit
- Installation and start up services available from factory representatives

The E\ONE distributor in Colorado is:

GOBLE SAMPSON ASSOCIATES
7076 So. Alton Way, Bldg. F
Englewood, CO 80112
303-770-6418\FAX 303-770-6424
Contact: Steve Hansen

Practical Considerations

1. Vault storage capacity and the need for duplex units should be part of the pump and vault sizing and selection process. Consult with mechanical engineer and Environment One at the time of design.

2. Outside installation is recommended, in areas which are accessible and away from snow slide, snow storage and drainage. Grinder pumps\vaults can be installed inside the home, consult with Environment One prior to design.

3. It is recommended that the common, homeowner association-owned portions of the system be maintained on a twice-yearly basis (as a minimum) by the designated operation and maintenance provider.

4. For the individually owned portions of the system fresh water flushing is recommended prior to periods of inactivity over two weeks duration. It is also recommended that the maintenance provider have the ability to flush inactive systems on a monthly basis during periods of non-occupancy.

5. Each homeowner must provide 240 v electric power to the units, along with a disconnect switch, control panel and alarm. It is recommended that electrical wiring to the units be installed in conduit for protection.

6. Homeowner education is necessary so that the user knows how to deal with emergencies and how to avoid blockages or other emergency maintenance initiators.

7. Designated maintenance provider should have:

   - Local, short notice availability
   - Stock of "exchangeable" spare units and basic parts
   - Trained personnel
   - Shop equipped with simple tools and test gages
   - Vehicles equipped to handle transportation of parts and tools

Considerations for Architectural Guidelines

Grinder pump must come from a sole source supplier, Environment One, (E\ONE) Schenectedy, New York so that the integrity and operation of the overall system can be maintained. These are progressing cavity pumps and cannot be intermingled with centrifugal pumps.

Grinder pump and vault sizing to be verified by mechanical engineer and/or Environment One representatives. Number of fixture units, potential for power outages, unusual sewage flow requirements and homeowner knowledge about system care and operation must be taken into consideration.

Grinder pump location to be determined by mechanical engineer, Environment One representative and designated maintenance provider based upon site access and maintenance considerations.

Prior to excavating at the sewage curb stop the installed lateral shall be flushed through the "tail" extending to the ground surface to verify the operability of the existing lateral. The flushing shall be witnessed by the designated operation and maintenance provider.

Grinder pump vault and lateral installation and connection to the existing redundant check valve shall be witnessed by the designated operation and maintenance provider. Proper compaction of bedding and backfill is critical to preventing differential settlement and keeping sand and rocks out of the unit. Prior to backfill the system shall be allowed to cycle at least two times to verify that there is no leakage in the lateral line or at joints or connections

The location of the control panel and alarm shall be subject to review by the Architectural Control Committee and by E\ONE. The control panel is typically mounted on the house, within sight of and not more than 30-50 feet away from the pump vault. The alarm light can be inside or outside. Consult with electrician and E|ONE.

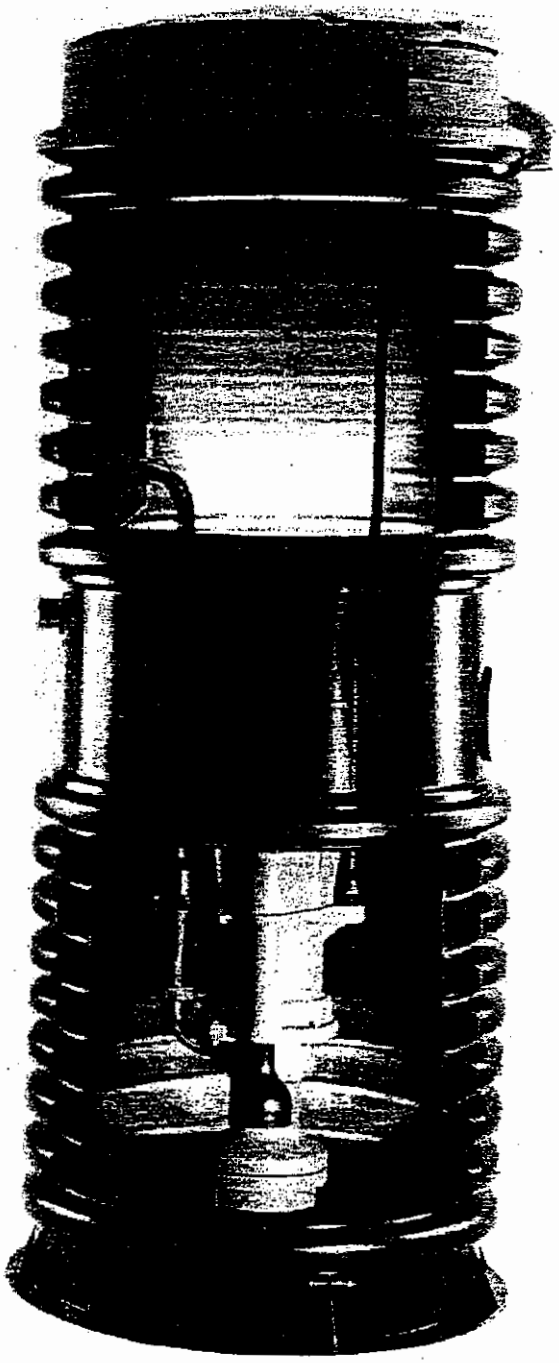
The sewage lateral shall be 1-1/4" pipe (HDPE or P.V.C.), rated at 160 p.s.i. minimum. Burial depth to the top of the sewage lateral from the pump to the shutoff valve should be 7 feet minimum.

Startup service to be provided by Environment One for initial installation(s). Do not start up dry. Follow manufacturer's specifications and recommended procedures.

A complete information, specifications and installation instructions package is available for review from the Architectural Control Committee or directly from the authorized Colorado distributors for E|ONE:

GOBLE SAMPSON ASSOCIATES
7076 So. Alton Way, Bldg. F
Englewood, CO 80112
303-770-6418\FAX 303-770-6424
Contact: Steve Hansen

e|one sewers™



GP2010

TYPICAL INSTALLATION INSTRUCTIONS

UL NSF CSA

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ENVIRONMENT ONE GRINDER PUMP
FEATURE IDENTIFICATION

1. **GRINDER PUMP BASIN** - High density polyethylene (HDPE).

2. **ACCESSWAY COVER** - FRP (furnished with padlock).

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 3R) 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.

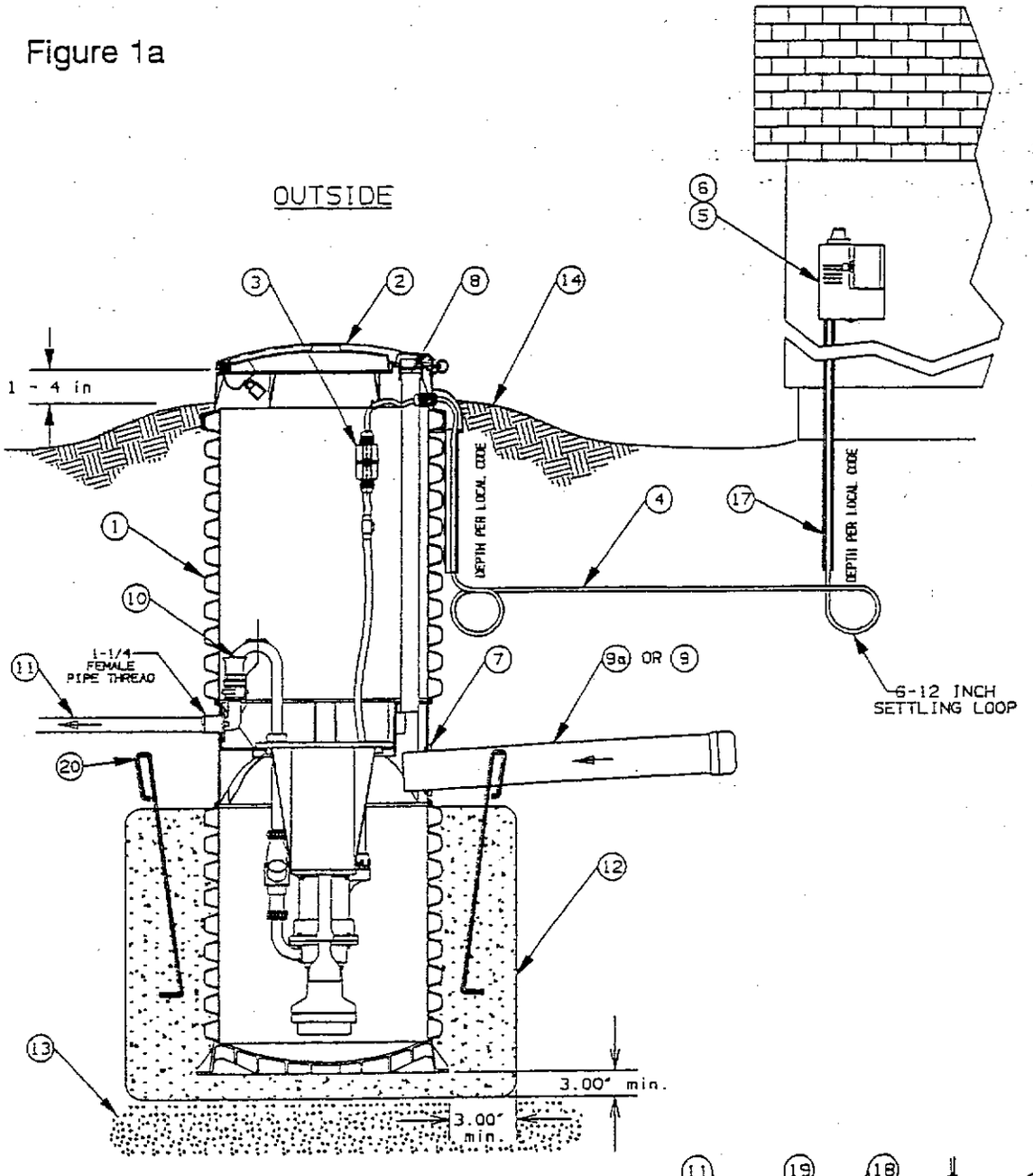
17. **CONDUIT** - 1" or 1-1/4", material and burial depth as required by local code. Supplied by others.

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.

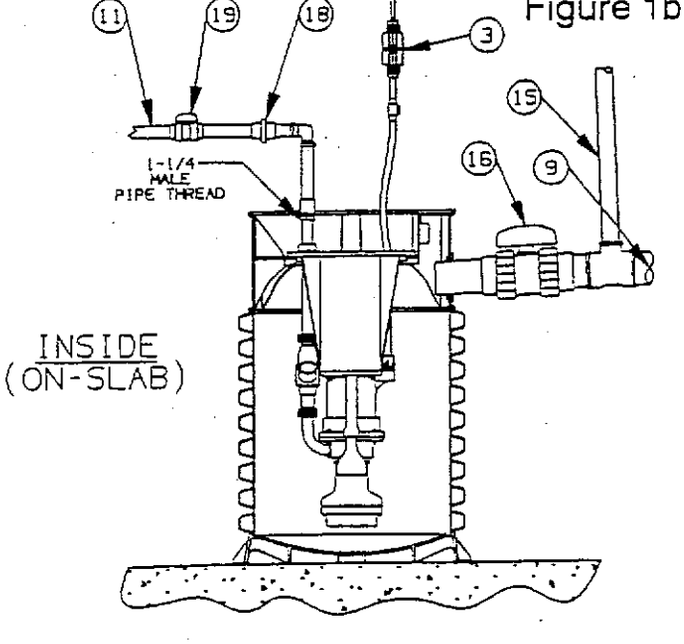
20. **REBAR** - Required to lift tank after ballast (concrete anchor) has been attached, 4 places, evenly spaced around tank.

Figure 1a



FAILURE TO COMPLY WITH INSTALLATION INSTRUCTIONS WILL VOID WARRANTY

Figure 1b



♦**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 then 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 SDR 21 or Schedule 40 and polyethylene pipe SDR 11 or SIDR 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.

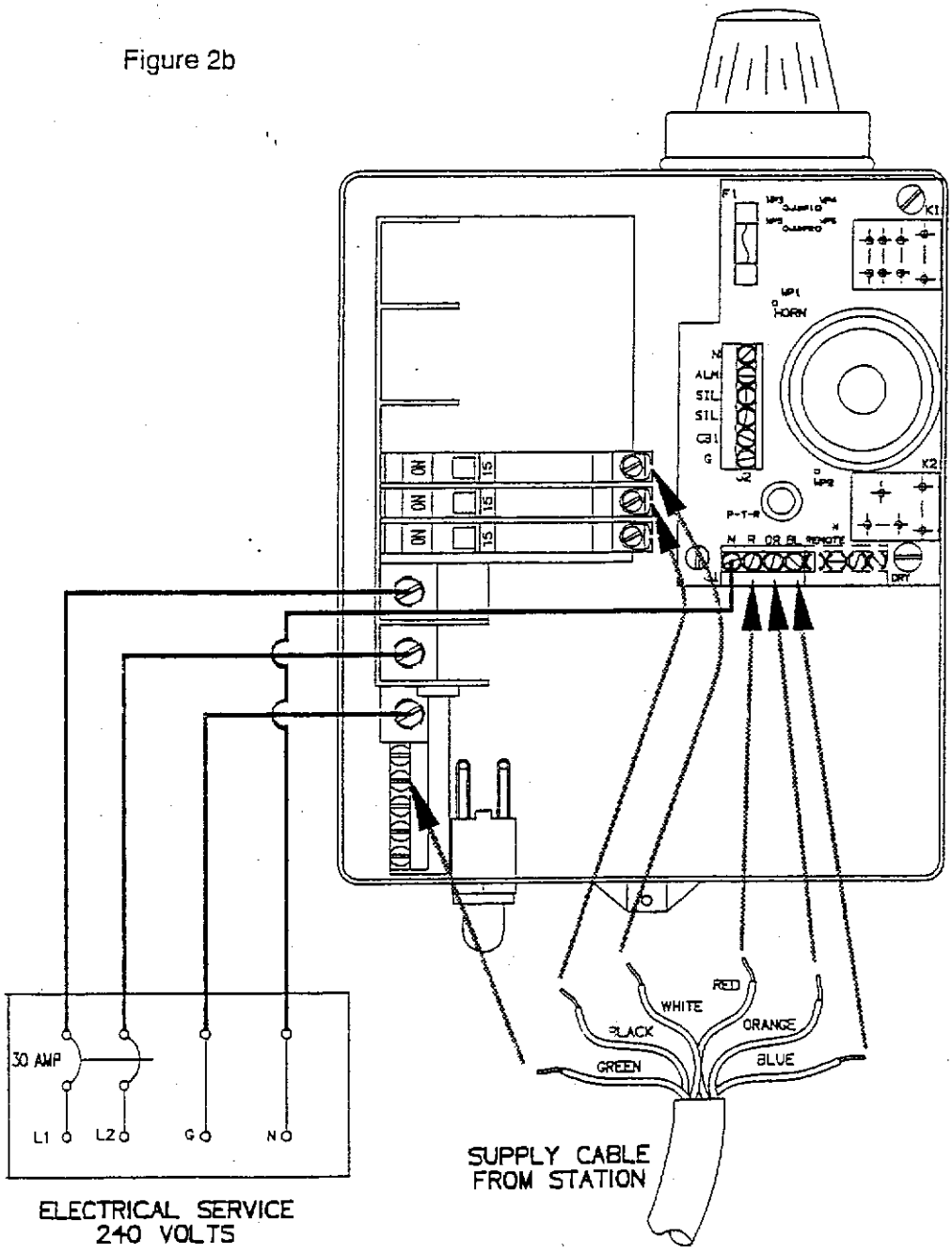
CAUTION:

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:

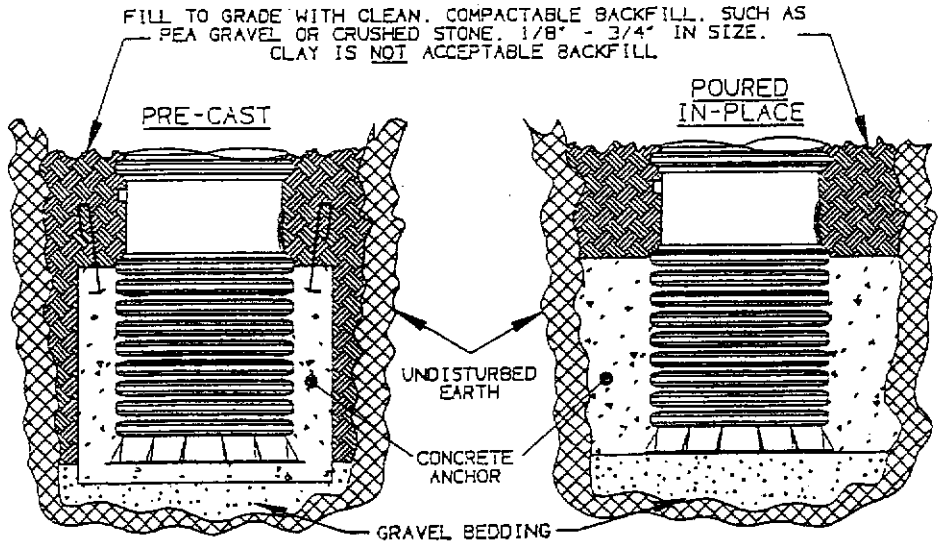
The unit must be properly vented to assure correct operation of the pump. If you have an indoor unit it can be vented through the 2" port supplied at the top of the wet well or through the incoming sewer line with a 2" pipe (the vent must be within four feet of the grinder pump, and before the first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

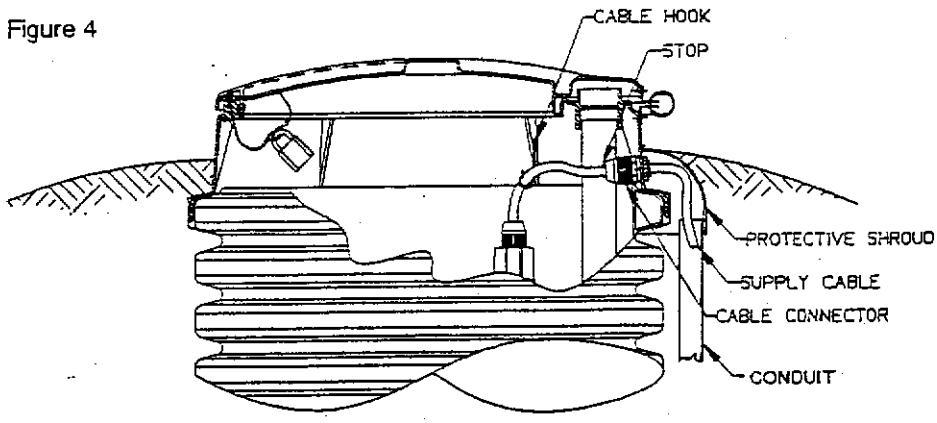
a) Make sure that the discharge shutoff valve is fully open. This valve must not be closed when the pump is operating. In some installations there may be a valve, or valves, at the street main that must also be open.

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 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 over lap 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.

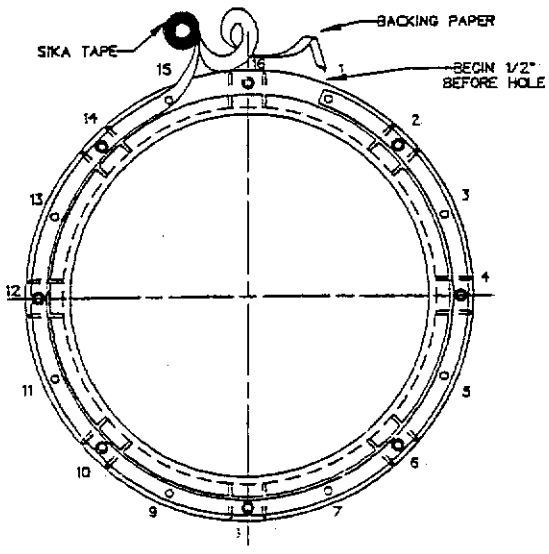


Figure 5a

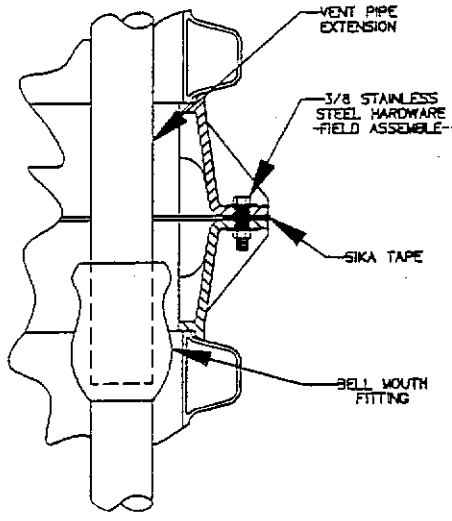


Figure 5b

BALLAST CALCULATIONS

A ballast, or concrete anchor, of proper volume and weight is required on all in-ground
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
present if the station were being installed in water. Therefor

STATION VOLUME **X** THE WEIGHT OF WATER PER CUBIC FOOT (62.4 LBS/CU
$F_{BUOYANT}$

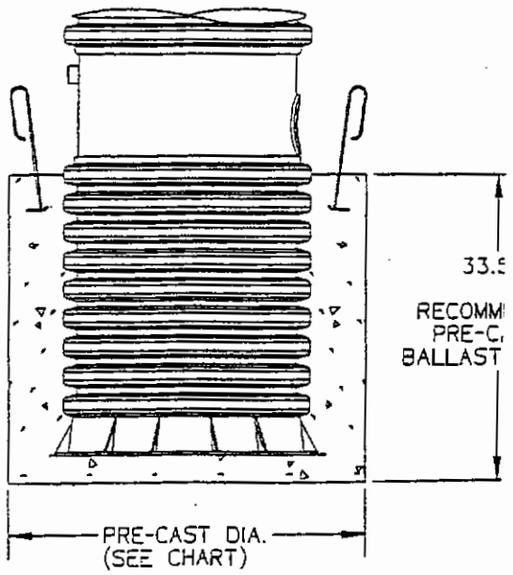
BUOYANT FORCES - STATION WEIGHT =
FORCE REQUIRED FROM BALLAST
$F_{BALLAST}$

BALLAST FORCE ÷ WEIGHT OF CONCRETE PER CUBIC FOOT IN WATER
VOLUME OF CONCRETE REQUIRED
$V_{CONCRETE}$

VOLUME OF CONCRETE **X** WEIGHT OF CONCRETE PER CUBIC F
WEIGHT OF CONCRETE REQUIRED
$W_{CONCRETE}$

Chart 1.

	STATION VOLUME	$F_{BUOYANT}$	STATION WEIGHT	$F_{BALLAST}$	$V_{CONCRETE}$	BA WE
2010-58	17.6 ft³	1098 lbs	238 lbs	860 lbs	9.8 ft³ (.36 yd³)	1500 lbs
2010-74	22.7 ft³	1413 lbs	254 lbs	1159 lbs	13.2 ft³ (.48 yd³)	2000 lbs
2010-93	28.6 ft³	1783 lbs	270 lbs	1513 lbs	17.3 ft³ (.53 yd³)	2600 lbs
2010-124	38.6 ft³	2407 lbs	280 lbs	2127 lbs	24.3 ft³ (.90 yd³)	3700 lbs
2010-129	40.0 ft³	2496 lbs	300 lbs	2196 lbs	25.1 ft³ (.93 yd³)	3800 lbs
2010-158	49.5 ft³	3089 lbs	325 lbs	2764 lbs	31.6 ft³ (1.17 yd³)	4800 lbs
2010-160	49.9 ft³	3117 lbs	329 lbs	2788 lbs	31.8 ft³ (1.18 yd³)	4800 lbs



FAILURE TO FOLLOW THESE INSTRUCTION COMPLETELY WIL

Lifting Instructions

FAILURE TO FOLLOW THESE INSTRUCTION COMPLETELY WILL VOID WARRANTY.

1. Transporting unit to installation site:

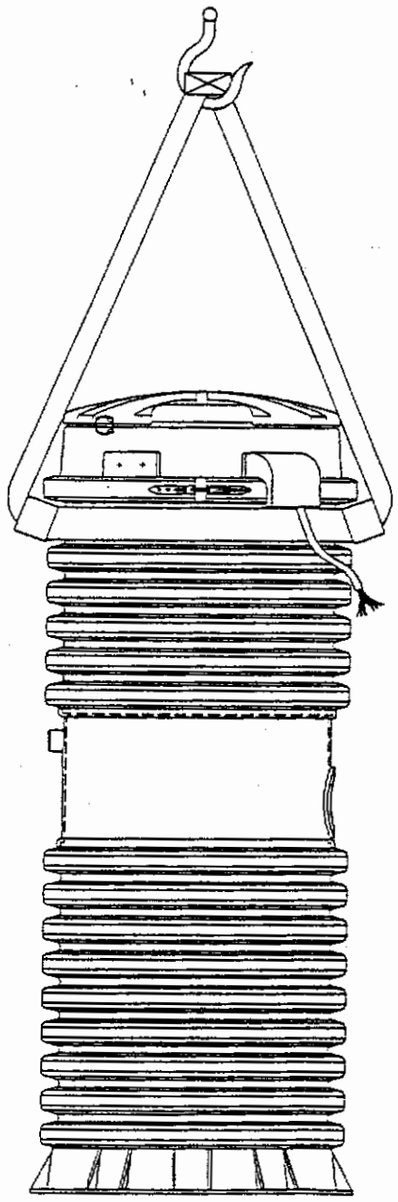
Always lift a unit from the bottom for the purpose of transportation. The station should be received attached to a pallet for this purpose. **Never roll a station or move it on its side.**

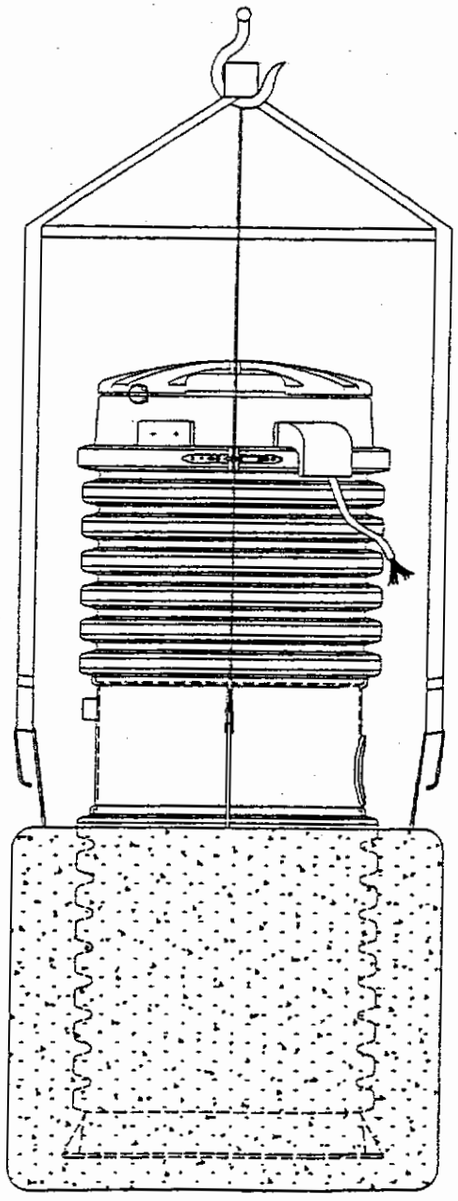
2. No Ballast, (to be poured in place):

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.





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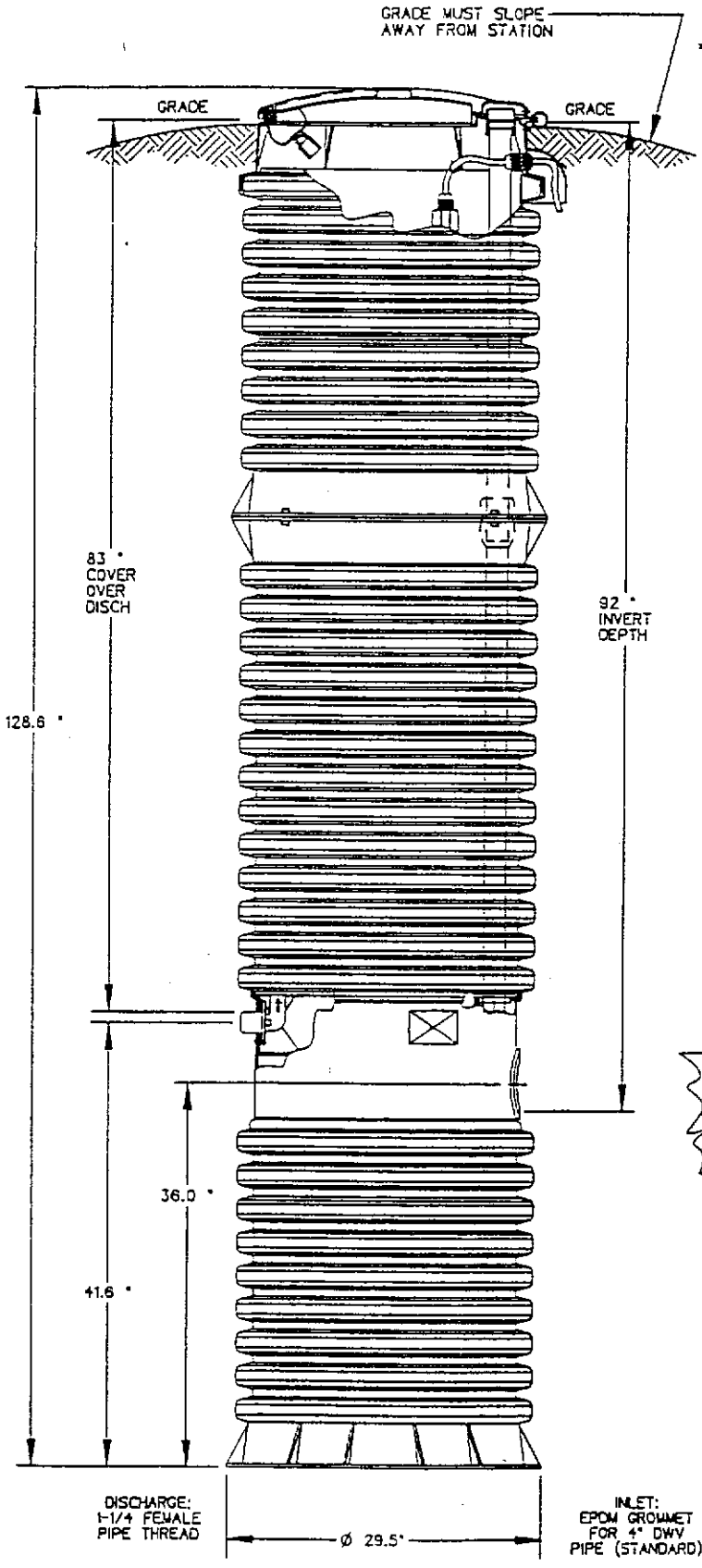
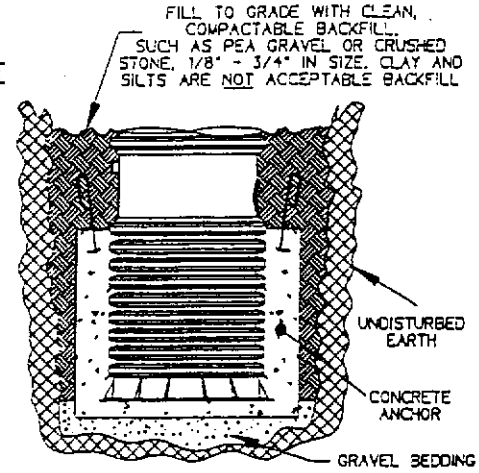


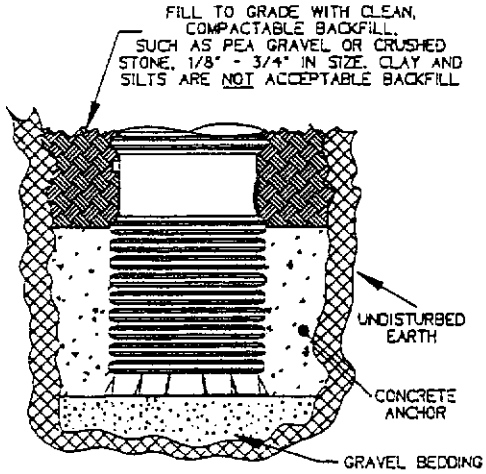
**SEE INSTALLATION INSTRUCTIONS FOR FURTHER DETAILS

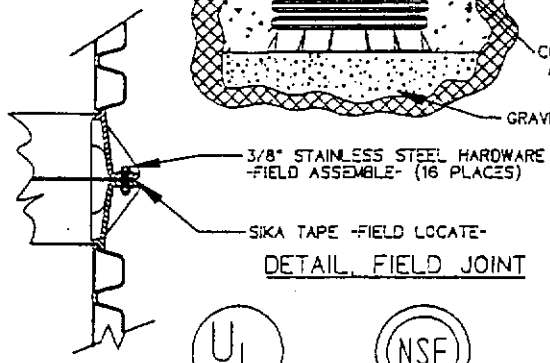
NOTE: A CONCRETE ANCHOR OF 3800 lbs (25.1 cu ft) IS REQUIRED ON ALL MODEL 2010 129" STATIONS.

PRE-CAST



POURED IN-PLACE





DETAIL, FIELD JOINT

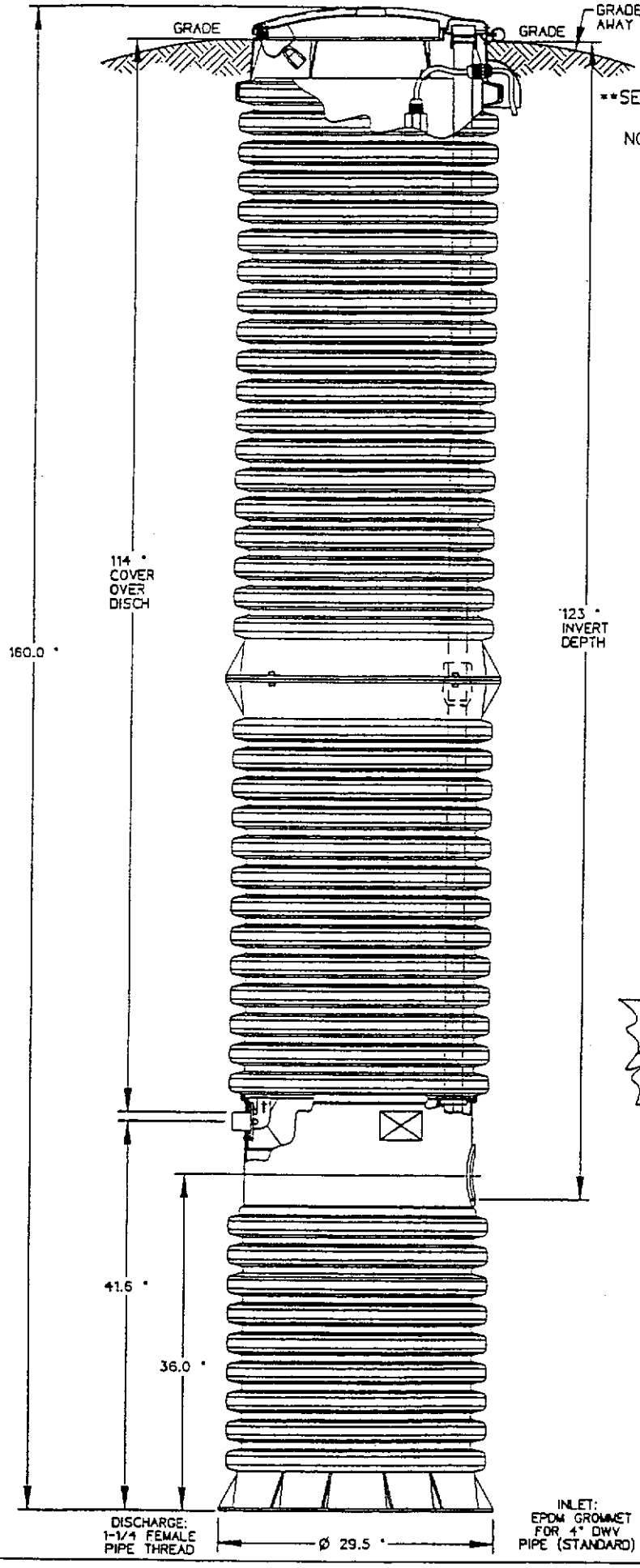
SG	GAE	08/23/96	-	1/16
DR BY	CHK'D	DATE	ISSUE	SCALE

environment | one
CORPORATION

MODEL 2010-129

PA 0856 P07

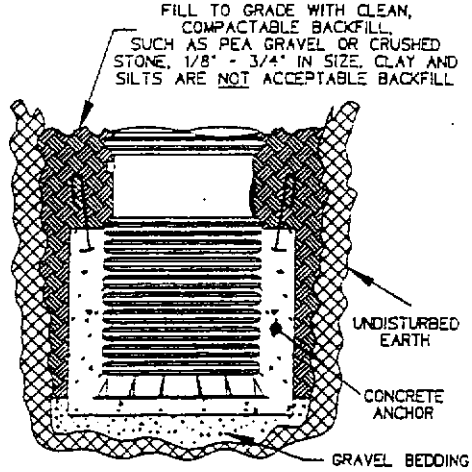
2010 -160



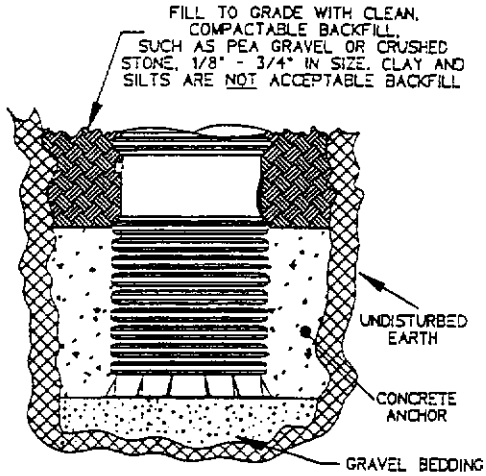
**SEE INSTALLATION INSTRUCTIONS FOR FURTHER DETAILS

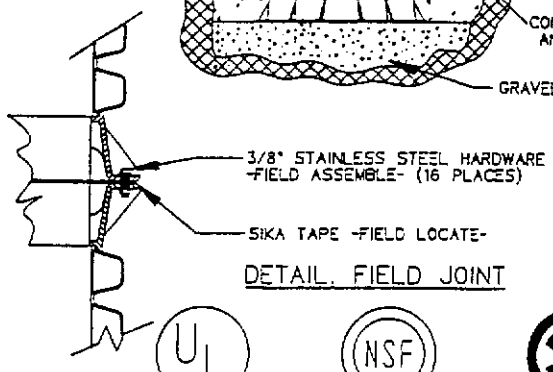
NOTE: A CONCRETE ANCHOR OF 4850 lbs (31.8 cu ft) IS REQUIRED ON ALL MODEL 2010 160" STATIONS.

PRE-CAST



POURED IN-PLACE





DETAIL, FIELD JOINT

SG	GAE	08/23/96	-	1/16
DR BY	CHK'D	DATE	ISSUE	SCALE

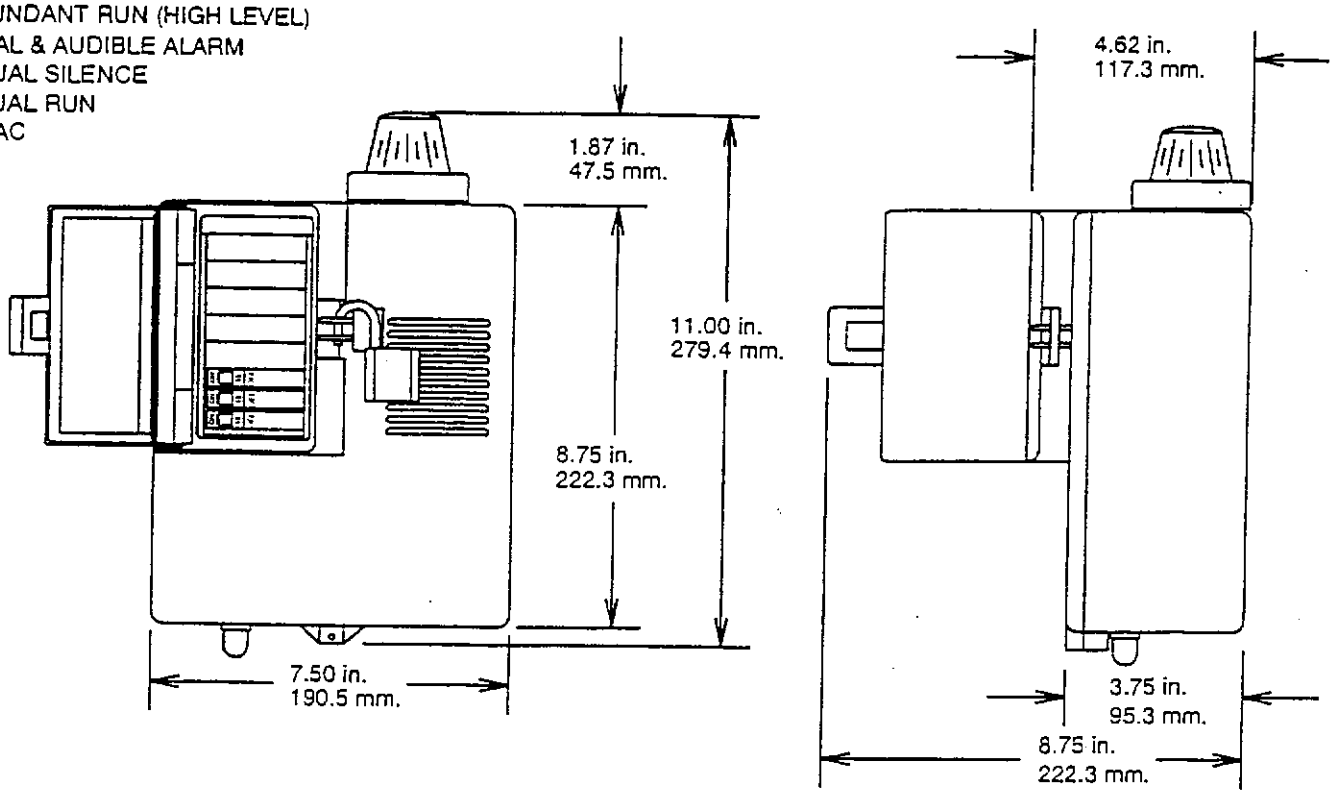
environment one CORPORATION

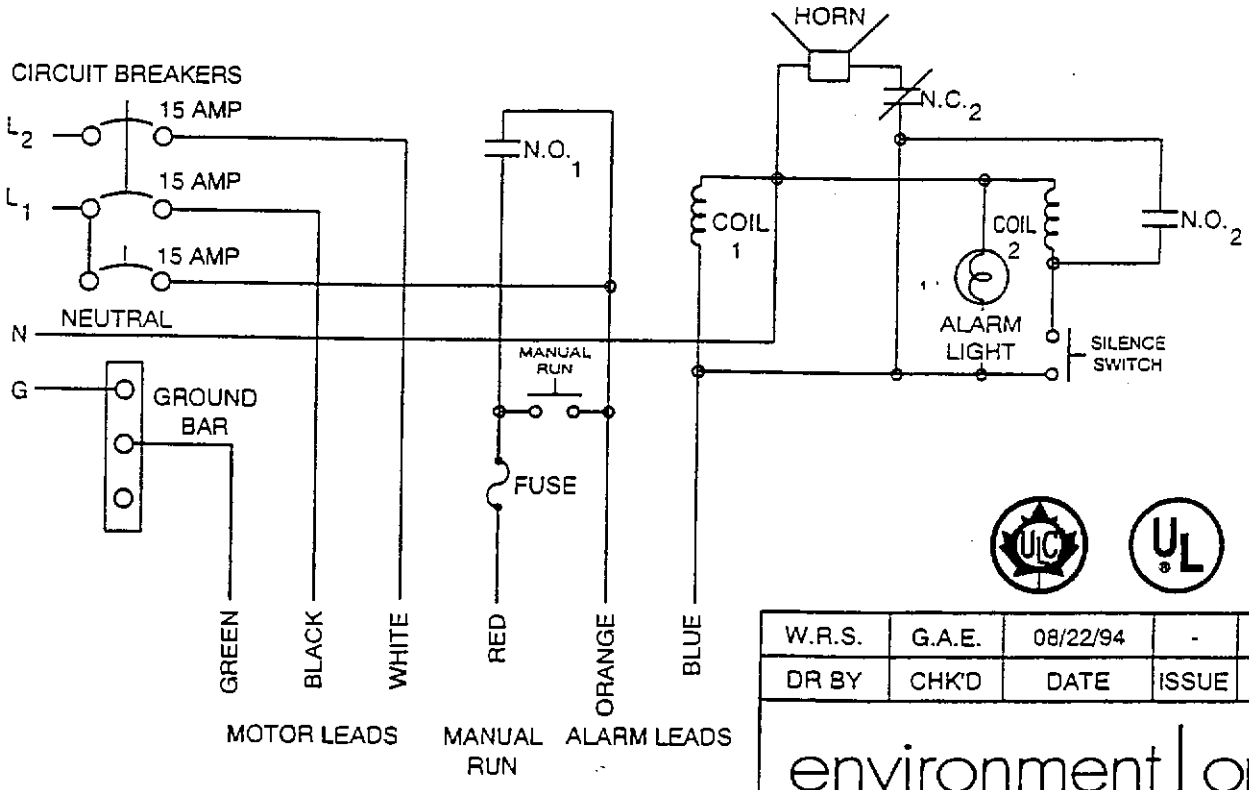
MODEL 2010 -160

PA 0856 P09

MOD 250-1

REDUNDANT RUN (HIGH LEVEL)
VISUAL & AUDIBLE ALARM
MANUAL SILENCE
MANUAL RUN
240VAC





CONTROL CABLE:

TYPE TC; DIRECT BURIAL, 12AWG, SIX CONDUCTOR.

W.R.S.	G.A.E.	08/22/94	-	1/4
DR BY	CHK'D	DATE	ISSUE	SCALE

environment | one
CORPORATION

PANEL, MODEL 250 - 1

PA 1135 P01

0869p01.dsf

SEWER LINE TEST SUMMARY

Civil Design Consultants, Inc.
Box 775167
Steamboat Springs, CO 80477
(970) 879-3022

Project Name: STONEBRIDGE PARK
CDC Job No.: 2072.016B
Inspector: CHUCK LOCKE

Date: 8 NOVEMBER '99

Test Section: FROM NEAR TIE-IN ON NORTH STEAMBOAT BLVD TO TERMINAL MANHOLE AT ROAD STATION 8+90

Length: 860 LF
Diameter: 2 IN
Lamping:
Mandrel:

Test Pressure:
Initial: 125 PSIG
Final: 124 PSIG
Duration: 2.0 HOURS

Type of Test:
HYDROSTATIC PRESSURE

Pass or Fail: PASSED

Services to Lots: 4 THRU 9

NOTE: THIS TEST DOES NOT INCLUDE THE FUTURE MAIN EXTENSION DOWN TOWARDS THE EXISTING GOLF MAINTENANCE BUILDING.

SEWER LINE TEST SUMMARY

Civil Design Consultants, Inc.
Box 775167
Steamboat Springs, CO 80477
(970) 879-3022

Project Name: STONEBRIDGE PARK
CDC Job No.: 2072.016B
Inspector: BOB FURMAN

Date: 18 NOVEMBER '99

Test Section: LOT 2/3 DRIVEWAY, FROM NEAR TIE-IN ON NORTH STEAMBOAT BLVD. TO CURB STOPS AND TERMINAL CLEANOUT, APPROX. D/W STA. 2+00

Length: 200 LF
Diameter: 2 IN
Lamping:
Mandrel:

Test Pressure:
Initial: 130 PSIG
Final: 130 PSIG
Duration: 2.0 HOURS

Type of Test:
HYDROSTATIC PRESSURE

Allow. Loss = 0.2gal. Actual loss = 0.04 gal.

Pass or Fail: PASSED

Services to Lots: 2 AND 3

NOTE: Gage was accidentally hit, knocking it down to 126 p.s.i. No futher drop after knocking. Pumped back up to 130 psi and measured line loss anyway.

Civil **D**esign **C**onsultants, Inc.
ENGINEERS AND PLANNERS
P.O. Box 775167 405 South Lincoln Avenue Steamboat Springs, CO 80477
(970) 879-3022 phone (970) 879-3028 fax

MEMORANDUM

To: Steve Hansen
Goble-Sampson Associates, Inc.
7076 S. Alton Way, Bldg. F
Englewood, CO 80112

Date: 6/14/99

Job No: 2072.016B

From: Bob Furman

cc:

Re: Stonebridge Park
Low Pressure Sewer

Please find enclosed the proposed final design calculations, the final plan and the details sheet for the low pressure sewer system for the above-referenced project.

Could you look over the documents in a general sense? Any comments would be appreciated.

I have a couple questions:

I've added 20% equivalent pipe length for minor fitting losses-is that reasonable?

Do we need to take any special precautions if some units don't get built for a few years? Seems like the service laterals and upstream lines may get some very old sewage buildup.

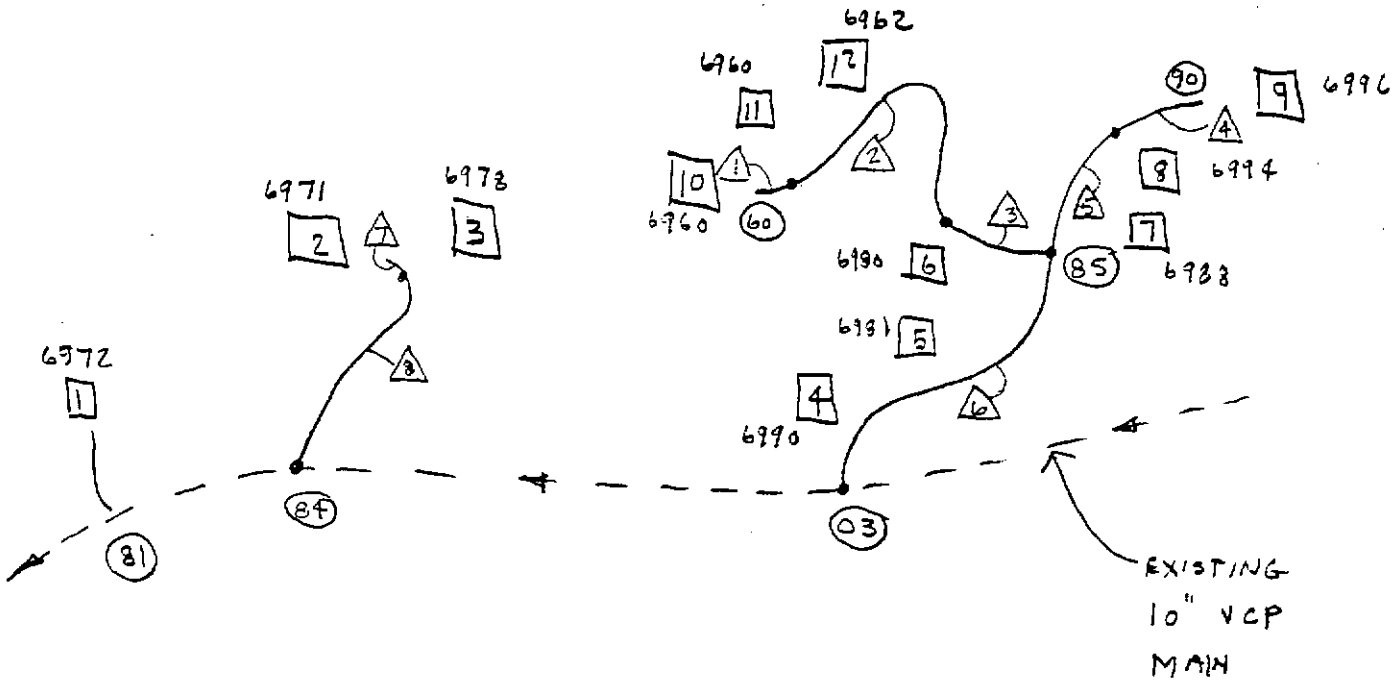
The covenants for the subdivision will require E-One pumps, with the final pump sizing and location up to the individual homeowner. A seven foot burial depth for the discharge line will be required. I plan to include the typical grinder pump station specifications in the homeowner package.

I've also included a copy of your preliminary analysis and my preliminary plan to help refresh your memory.

Thanks....

STONEBRIDGE PARK
LPSS DESIGN

5/13/99
R.M.



[1] = LOT NUMBER

6972 = F.F.E. PER DEVELOPMENT PERMIT

(81) = ROAD GRADE

△1 = BRANCH NUMBER

LATERALS ARE 1-1/4" SIDR 7, PE PIPE OD = 1.380
(I.D. based IPS) (PE3408 CELL) WALL = .197

MAIN IS 2" OD = 2.375
(OD based IPS) WALL = .216

MIN. PUMP ELEV'S @ 20' BELOW F.F.E. OF HOMES

STONEBRIDGE PARK

LPSS Branch Analysis

Jun-99

Branch No.	No. of Pumps	Accum. Total	Max. No. On *	Max. Flow g.p.m.	Pipe I.D. (In.)	Max. Vel. (f.p.s.)	Length (ft.)	Frict. Loss (Ft./100 ft.)	Frict. Loss Incl. 20% (ft.)	Accum. Fric. Loss (ft.)	Max. Main Elev.(ft.)	Min. Pump Elev. (ft.)	Elev. Diff. (ft.)	Max. Total Head (ft.)	Max. Total Head (p.s.i.)
						NORTH SPUR									
1	1	1	1	11	1.380	2.36	150	1.74	3.13	24.00	6996	6940	56	80.00	34.7
2	2	3	2	22	1.940	2.39	350	1.20	5.03	20.87	6996	6940	56	76.87	33.3
3	1	4	3	33	1.940	3.58	100	2.54	3.05	15.84	6996	6960	36	51.84	22.5
						EAST SPUR									
4	1	1	1	11	1.380	2.36	300	1.74	6.27	22.65	6996	6976	20	42.65	18.5
5	2	3	2	22	1.940	2.39	250	1.20	3.59	16.39	6996	6968	28	-44.39	19.2
6	2	9	3	33	1.940	3.58	420	2.54	12.79	12.79	6996	6961	35	47.79	20.7
						LOT 2/3									
7	1	1	1	11	1.380	2.36	100	1.74	2.09	4.96	6977	6951	26	30.96	13.4
8	1	2	2	22	1.940	2.39	200	1.20	2.88	2.88	6977	6958	19	21.88	9.5

* from Environment One Design Manual

Pipe is SIDR 7 PE for single laterals, 2" SDR 11 for main

Minor friction loss allowance of 20% is included

FAX #303-770-6424
TEL #303-770-6418

GOBLE SAMPSON ASSOCIATES INC.

NO. OF PAGES: one DATE June 18, 1999

TO: BOB FURMAN CIVIL DESIGN CONSULTANTS, INC.

FROM: STEVE HANSEN GOBLE SAMPSON-COLORADO

REF: STONEBRIDGE PARK-DESIGN REVIEW

PLEASE CONTACT GOBLE SAMPSON IF ANY PART OF THIS FAX IS ILLEGIBLE

Bob,

I have reviewed your design calculations and concur with your results. I have also reviewed the drawings and everything looks good. It is debatable whether or not you will need an air release valve on such a small system but I suppose since build out will occur over a few years it is better to be safe than sorry! With regard to your questions:

- The addition of 20% for minor losses makes a conservative design even more conservative. The reason is that since you use the entire length of the main in each zone to calculate friction loss no matter where the lateral ties into the main there is extra friction loss built into the calculations. I ran the calculations both ways and found there to be a less than 2% difference in TDH.
- Yes, I would suggest an annual flush via the terminal connections in zones were build-out progresses slowly. If a lot at the "end-of-a-line" is purchased there will probably be no need to flush. Remember that since curb stops will remain closed until connected to a station, there will not be any dead spaces per say. The exception would be if a home were used only seasonally. In that case, an annual flush as described above would be recommended!

I think everything is in order. If you have any other questions, comments and/or concerns, please do not hesitate to call.

Thanks,

Steve

CC. Steve Kreitzmann w/attach. (4 pp.)