

Maintain Your Prelos™ or Orenco Sewer

Our Presenter

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- Focus on Municipal Systems – East Region
- Assists engineers with the design, development, installation, and maintenance of Orenco's collection and treatment.
- Worked for Orenco since 1998 (25 years)
- Associate's of Science Degree from Umpqua Community College – Manufacturing Engineering
- Interned at the Department of Veteran's Affairs as an AutoCAD draftsman
- US Navy veteran – Desert Storm
- Retired rodeo clown
- Avid fisherman

Overview

- Ordinances
- Commercial Connections
- Operation and Maintenance
- Collection Line O&M

First Things First

- Quality Design
- Quality Equipment
- Standardized Equipment
- Quality Installation
 - Inspections
 - As Builts



Ordinances

Having well written and enforced ordinances will prevent future headaches



Ordinances Continued...

- Define line of ownership/responsibility
 - Building sewer, Septic Tank, or Service Connection
 - Easements
- Rates
- Maintaining Access
 - Trees
 - Decks
 - Driveways
 - ?
- Flows per household
 - Max GPD/Home



Ordinances Continued...

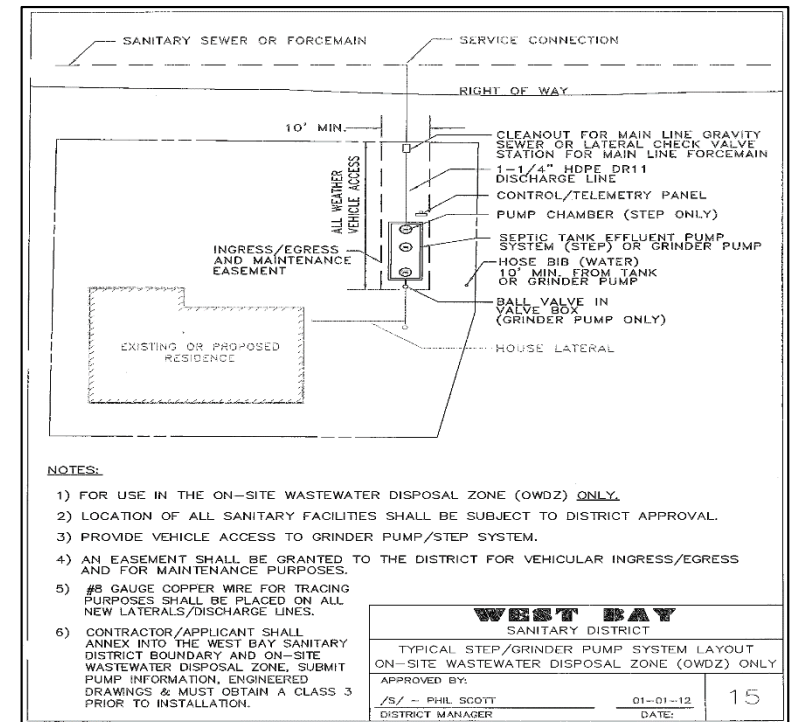
- Fees for Non-Routine O&M
 - Diapers
 - Baby wipes
 - Grease & Oil
 - Damage
 - Etc.
- Fees for Excessive Pumping
 - Should define minimum pump out frequencies along with rates should that frequency be violated
- Define pump out requirements



Ordinances Continued...

• Installation

- Location of tank
 - Front yard
 - Near street
 - Setbacks
- On Lot Components
 - Tank Type (Specs)
 - Required 2 hr watertight test
 - Tank Size (# Bedrooms = X Gallons)
- # Lots per Tank



Ordinances Continued...

Installation Continued...

- Panel Location
- Service Connection Location/Access



Commercial Connections

- EDU Conversion Chart
- Waste Strength Parameters
- Grease Tank Sizing & Pumping
- STEP Tank Pump Out Frequency
- Rates
- Responsibilities
- Ownership



Operations & Maintenance

O&M is Important Because ...

- Lack of O&M can negatively impact treatment processes
- It ensures system longevity
- It establishes accountability
- It protects the owner's investment



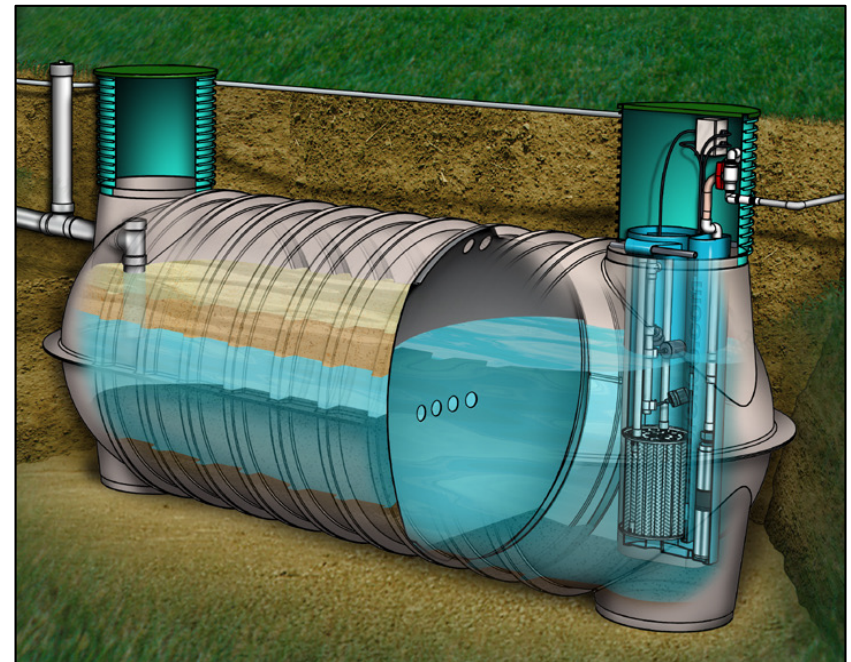
Effective O&M Requires ...

- Knowing the system's configuration and components
- Knowing how the system operates
- Knowing the system's capabilities



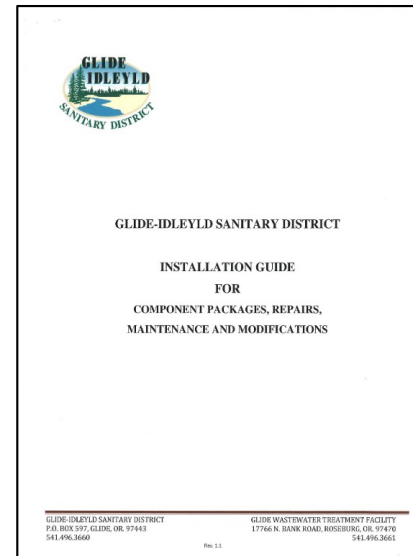
Maintenance Needs and Frequencies

- System maintenance is dependent on ...
 - Level of service desired
 - Run to Fail or Preventative Maintenance
 - Quality of system design
 - Quality of system components
 - Quality of Installation
 - Value of diligent inspection
 - Community education
 - Permit requirements



Installation

- Checklists
- Inspections
- Tank Inlet connection
- Riser Connections
- Water tight test - 2 hours
- As-builts
- Pictures (before, during, and after)
- Installer training conducted by an Orenco representative



**WEST BAY SANITARY DISTRICT
STEP SYSTEM INSPECTION RECORD**
Inspections are scheduled 24 hours in advance.

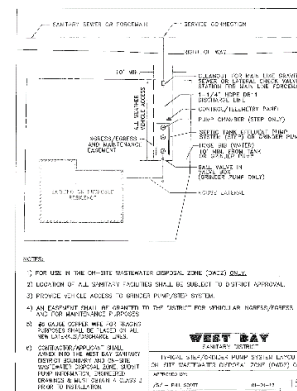
Permit No.: _____ Class: _____ Date issued: _____
 Owner: _____ Contractor: _____
 Owner Phone #: _____ Contractor Phone #: _____
 Address: _____ APN #: _____

	Date	Insp.	Hours		Date	Insp.	Hours
PLAN REVIEW				1.25" SCH. 40 FM W/ 6" GA. TRACED WIRE			
P.E. D MEET				NEW/EXIST. INSTALLATION (SHEETS)			
DATA LOCATION PER PLAN				BACKFILL			
CONCRETE VALVE CHAMBER				FM LATERAL CHECK VALVE			
1ST 3" SURVEYOR 30% COMP.				FM CORP VALVE SERVICE CONN.			
2ND 4" SURVEYOR 30% COMP.				W/ 6" GA. TRACED WIRE			
3RD 4" SURVEYOR 30% COMP.				CHECK VALVE BOX SET TO GRADE			
CONCRETE SLAB 4"				ALL WEATHER ACCESS			
FILTER CHAMBER 1"				TELEPHONE LINE / NUMBER			
CONTROL PANEL LOCATION				FLOAT OPERATION			
CONTROL PANEL HEIGHT				HOSE BIB			
INSPECT EXISTING LINES				HOSE DISCONNECT PLUG			
HOSE DISCONNECT PLUG				RAC START-UP			
GRAVITY CONN. TO TANK				CONTRACTOR START-UP			
RISER TO GRADE				WBSD Must Be Present			

Total Inspection Hours: _____ Total Inspection Hours: _____
 *Homeowner must supply and maintain cost of dedicated phone line.

COMMENTS / CORRECTIONS:

CONSTRUCTION INSPECTION COMPLETED
 Date: _____
 By: _____
 *PERMIT NOT FINAL UNTIL DISTRICT BOARD APPROVAL
 Inspection Record:
 Attach to original plans
 Copies to: SKR / BHK / RHH / KEB / GDS



Field Maintenance Reports (preventative)

- Helps track labor costs
- Keeps records on R&R for components and any odd occurrences
- Good historical record
- Helps ensure that no steps are missed

SAMPLE STEP Field Maintenance Report Form
Residential Site

Date: _____ Address/Acct #: _____ Operator: _____
Time on Site: _____ Time Leaving Site: _____

Maintenance Item	Time	Comments & Notes
Site Conditions		
Lid(s) are attached with bolts and in good physical condition	1	
Tank access and control panel access is acceptable	1	
Controls		
Record ETM/CT Readings	2	ETM _____ CT _____ Notes: _____
General condition of control panel. Note any damaged wires, etc.	2	
Confirm operation of audible & visual alarms	5	
Check pump operation in manual mode.	2	
Check pump operations in manual mode. Record Amperage & Voltage. Switch each pump from auto to manual. After ensuring that the pump operates properly, switch the pump back to auto. Use the back of this sheet if needed for additional pumps.	5	Volts _____ Amps _____ Notes: _____
STEP Tank		
Open each riser lid for visual inspection. Verify that there are no leaks in riser connections or grommetted intrusions. Inspect for high level marks on riser walls.	5	
Inspect splice boxes for moisture and loose connections.	5	
Verify condition and correct operation of all floats. Check neat wrap of float cords.	5	
Inspect Biotube effluent filter and clean if necessary.	10	
Take Sludge/Scum Readings. Note any problems (hair, baby wipes, etc.)	5	Sludge _____ Scum _____ Notes: _____
Verify lids are securely fastened and controls are in AUTO.	5	
Service Connection & Wrap Up		
Confirm service connection valve is accessible	5	

Detailed Records

- Contains
 - Permit
 - As-Builts
 - Pictures of Installation
 - Maintenance Records



O&M Tools

- Clip board with Field Maintenance Report (FMR)
- Personal Protective Equipment (PP&E)
- Biotube Cradle
- Bottle Brushes
- Drill
- Pump rebuild kit / Liquid end
- Replacement Floats
- Multi-Meter
- Sludge/Scum measuring device
- Hose and spray nozzle



Maintenance

- Condition of lids, etc.
- Access is acceptable
- ETM/CT Readings
 - Good indicator of usage or I&I
- Float and pump function
 - Amp/voltage readings
- Inspect float/pump cords for nicks or swelling
- Clean Biotube and pump screen as necessary
- Scum/Sludge measurements
- Service connection accessibility
(Exercise service connection valve)



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Inquire

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Documents


[AX-Max O&M Manual >](#)
[AX-Max Installation Manual >](#)
[AX100/AX20 O&M Manual >](#)
[AX100 Installation Manual >](#)
[AX-RT O&M Manual >](#)
[AX-RT Installation Manual >](#)
[Start-up and Maintenance >](#)
[Tips and Troubleshooting >](#)
[Control Panel Install Instructions >](#)
[STEP System Troubleshooting Chart >](#)
[Control Panel Troubleshooting Chart >](#)

Orenco O&M Tools

Orenco offers a variety of tools and resources for installers and service providers. These tools will help you to correctly install and maintain wastewater collection and treatment systems. If you're a homeowner in need of a service provider, please use our Distributor Locator to find a local Orenco dealer who can recommend a service provider in your area.

[Sludge Judge](#)
[SMUG](#)
[Lateral Brush Kit](#)
[Cleaning Wand](#)
[Biotube Brush](#)
[Field Test Kit](#)
[Biotube Cradle](#)

Sludge Judge:



The "Sludge Judge" is used to measure the depth of sludge accumulations in primary, recirculation, dosing, and STEP tanks.

The proper way to use the Sludge Judge is as follows:

- Slowly lower the tube into the septic tank until it touches the bottom of the tank.
- As the device is slowly pulled out of the water, the check valve closes capturing a liquid/solid profile of the septic tank water. The thickness of the sludge layer can be measured.

Cleaning the Biotube[®] Filter Cartridge

- Watch Biotube Cleaning Video linked from the orenco.com website under Operations and Maintenance



Cleaning the Pump

- Remove pump(s)
- Wash off particles, as necessary
- Clean or replace pump intake screen
- Report abnormal particles on the Field Maintenance Report Form
- Inspect cord for nicks or swelling
- Rebuild liquid end or replace pump (if required)
- Reinstall pump
- Run pump before reconnecting discharge to expel any trapped air
- Reconnect discharge assembly



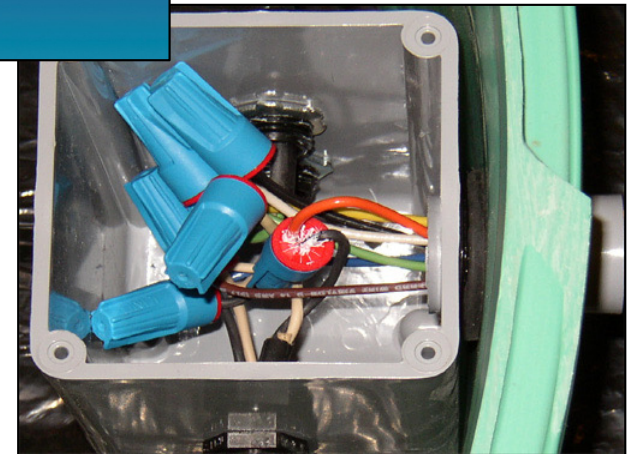
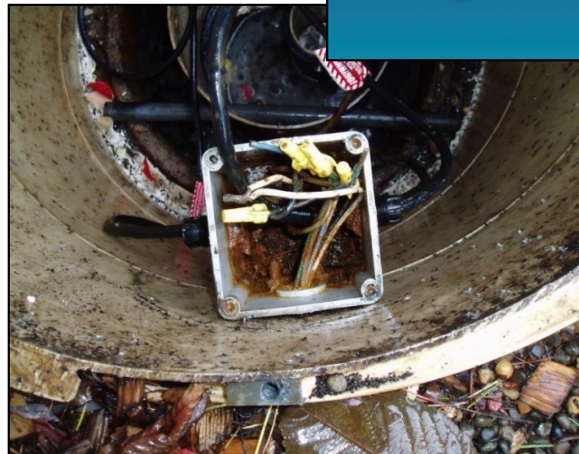
Rebuilding a Pump

- "Too expensive"??
- Some do it in the field
- Typical rebuilds take 5 to 15 minutes
- 1/2 hp rebuild kits list for under \$200
- Rebuilt liquid ends on service truck for a quick change out



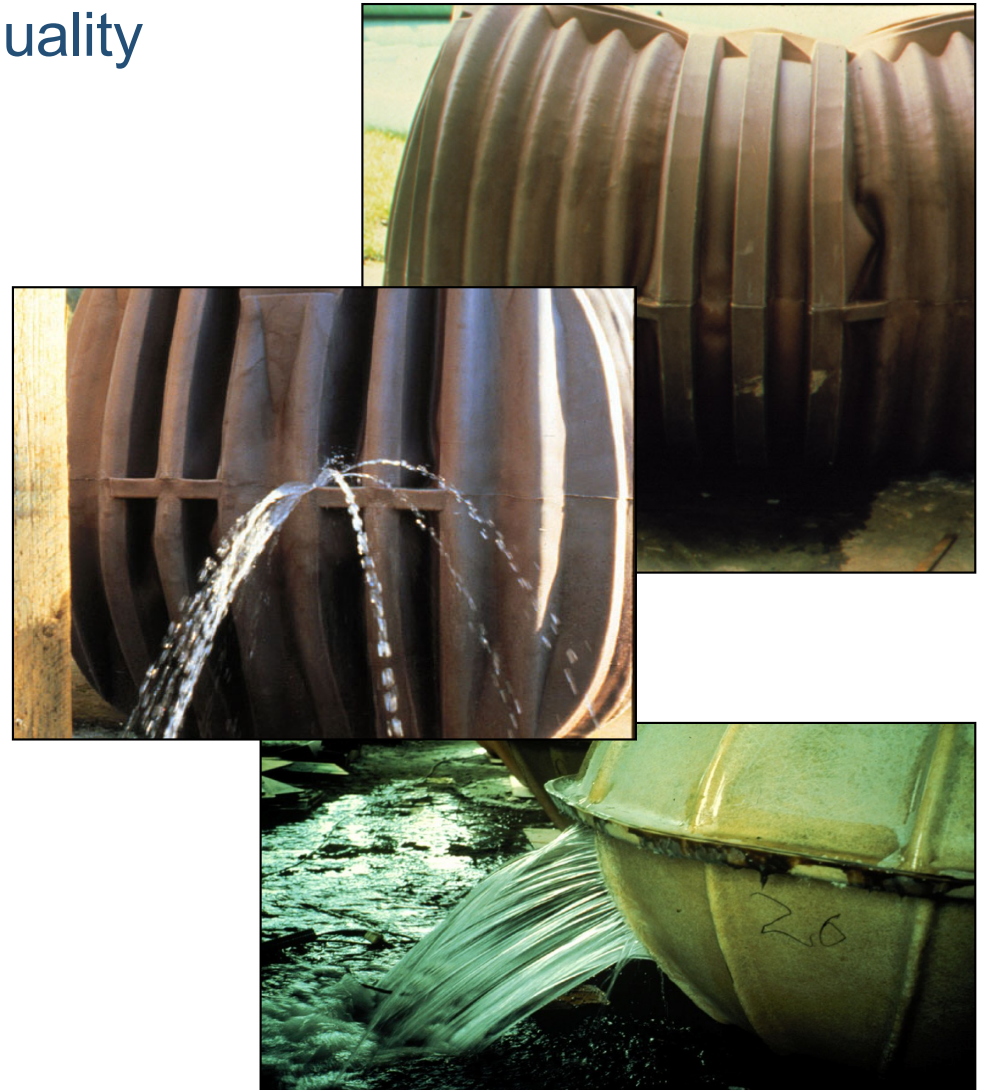
Inspect Floats/Splice Box

- Test operation
- Inspect the cord
- Damage?
- Inspect connections in the splice box
- Moisture in the splice box?
- Waterproof connectors?
- Replace if needed



Septic Tank

- Extremely important to have a quality watertight tank
- Materials of construction
 - Concrete
 - Fiberglass
 - Poly
 - Dicyclopentadiene (DCPD)
- Inlet Tee
- Single or two compartment

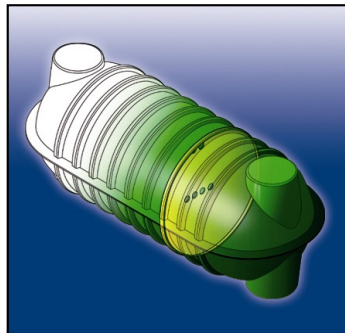


Processing Tanks

- Primary treatment
- 24-hour emergency storage
- Abuses stay in interceptor tank
- Chemical sources easier to identify



Concrete



Orenco Fiberglass



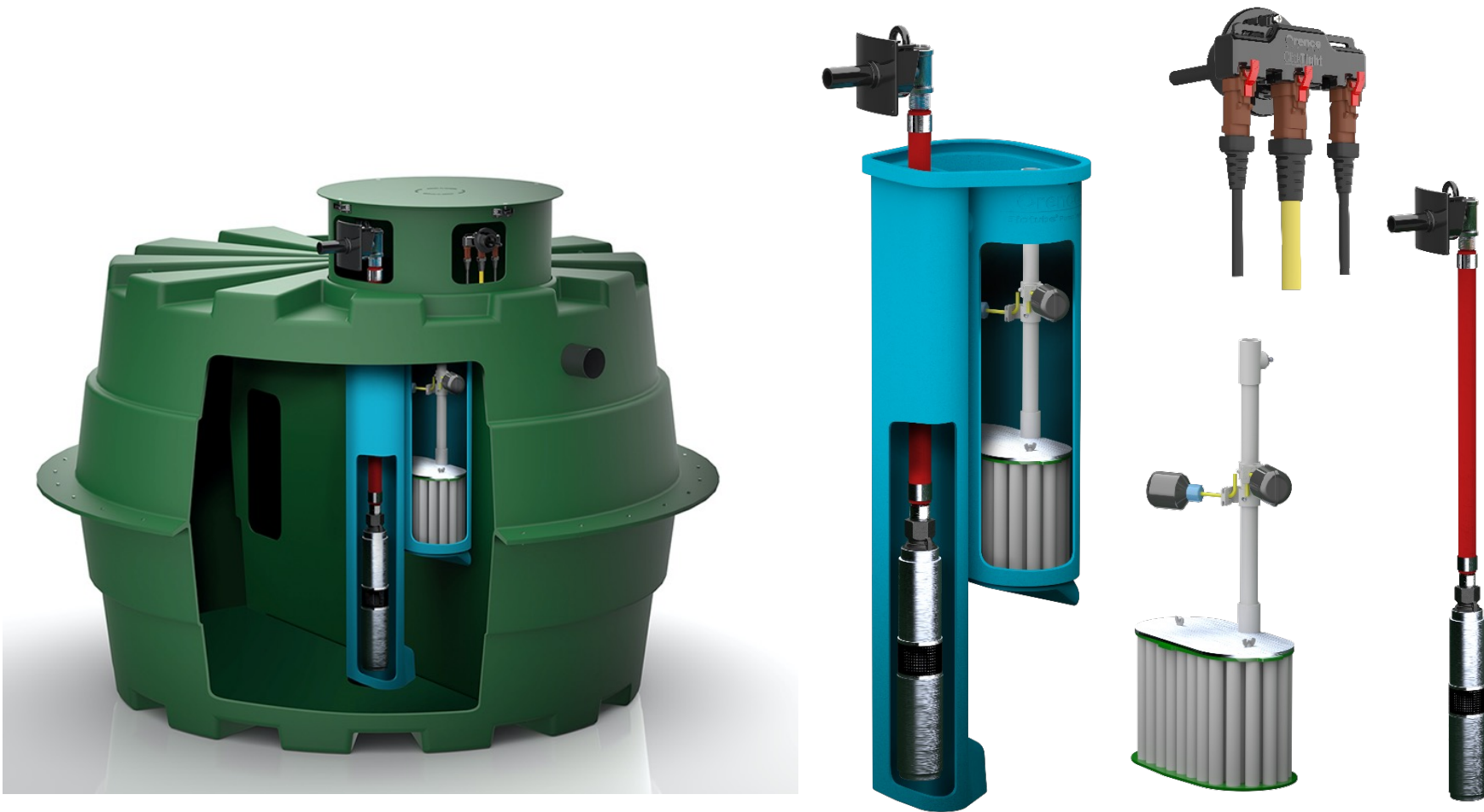
Roth Tank



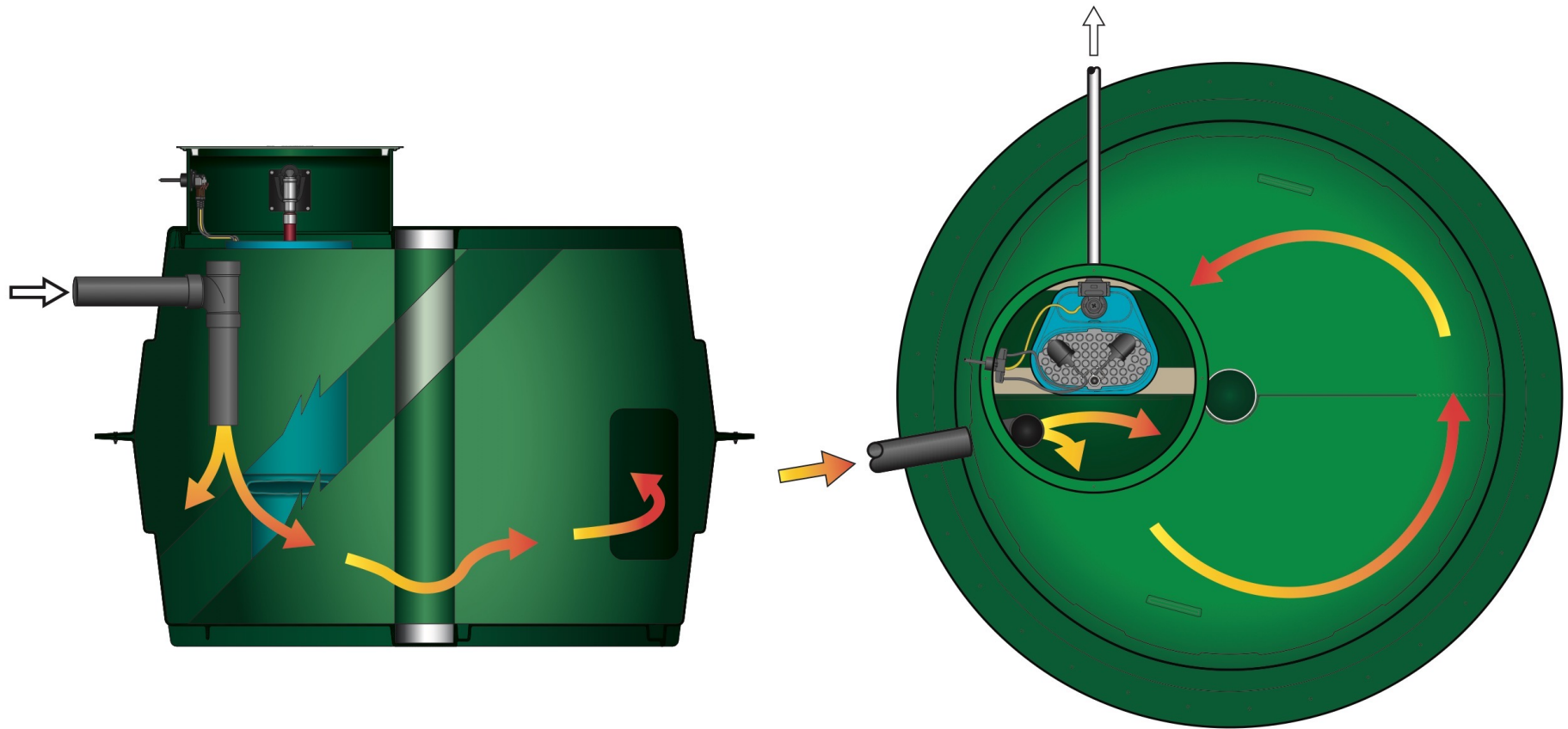
Prelos (DCPD)

New Orenco Effluent Sewer System:

Pressurized Liquid Only Sewer = Prelos Processor

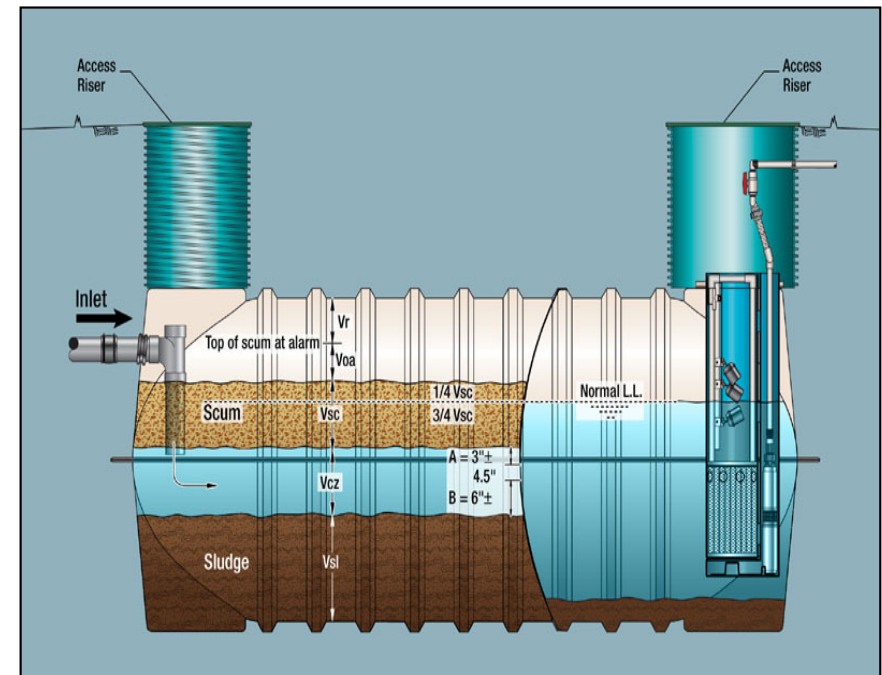


Prelos™ Liquid Only Sewer

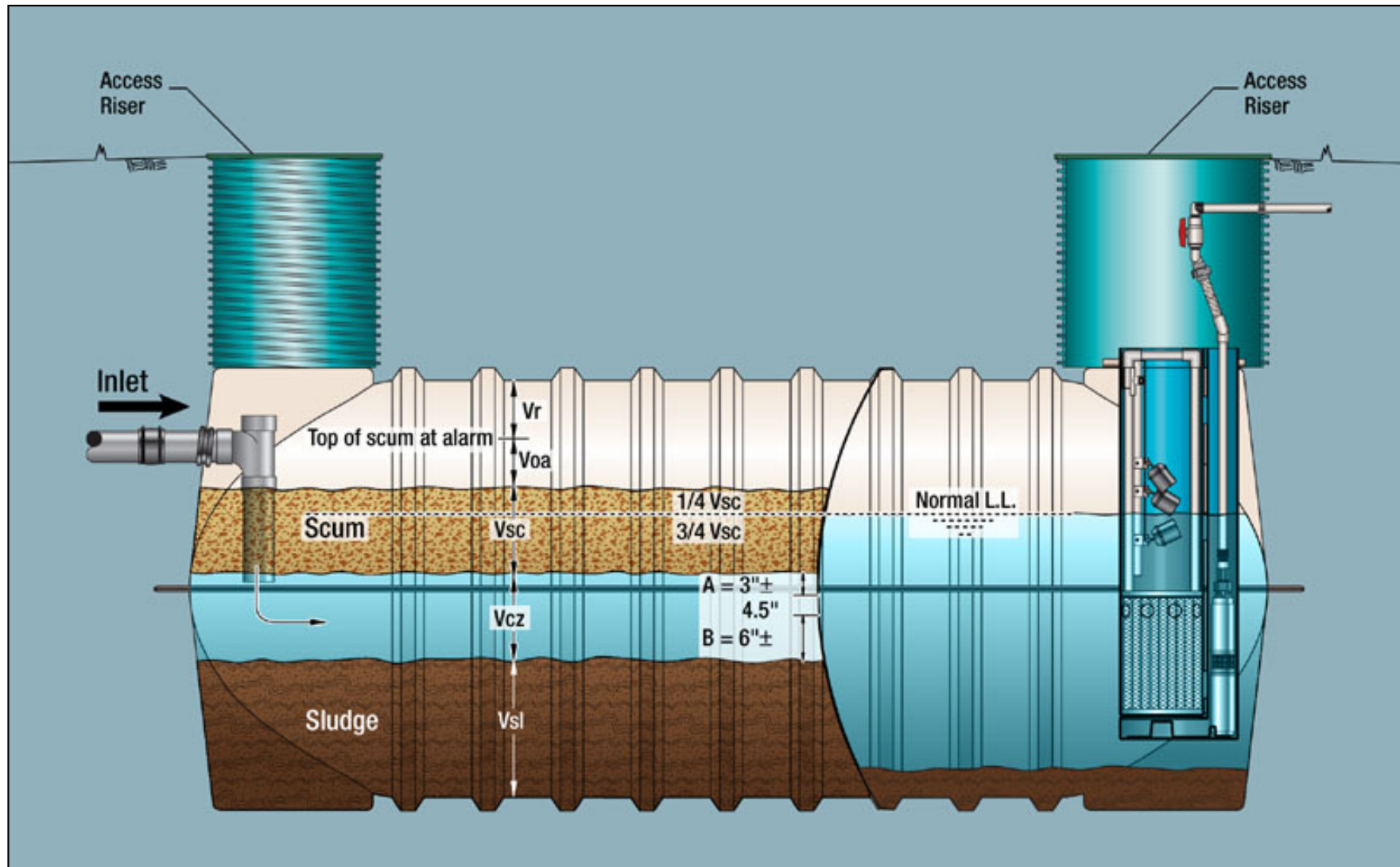


Primary Treatment in the STEP Tanks

- Residential STEP Tank Influent:
 - BOD = 250-400 mg/L
 - TSS = 250-400 mg/L
 - FOG = 50-150 mg/L
- Residential STEP Tank Effluent:
 - BOD = 60% reduction
 - TSS = 90% reduction
 - FOG = 90% reduction
- Also: Sludge/Biosolids are reduced/digested

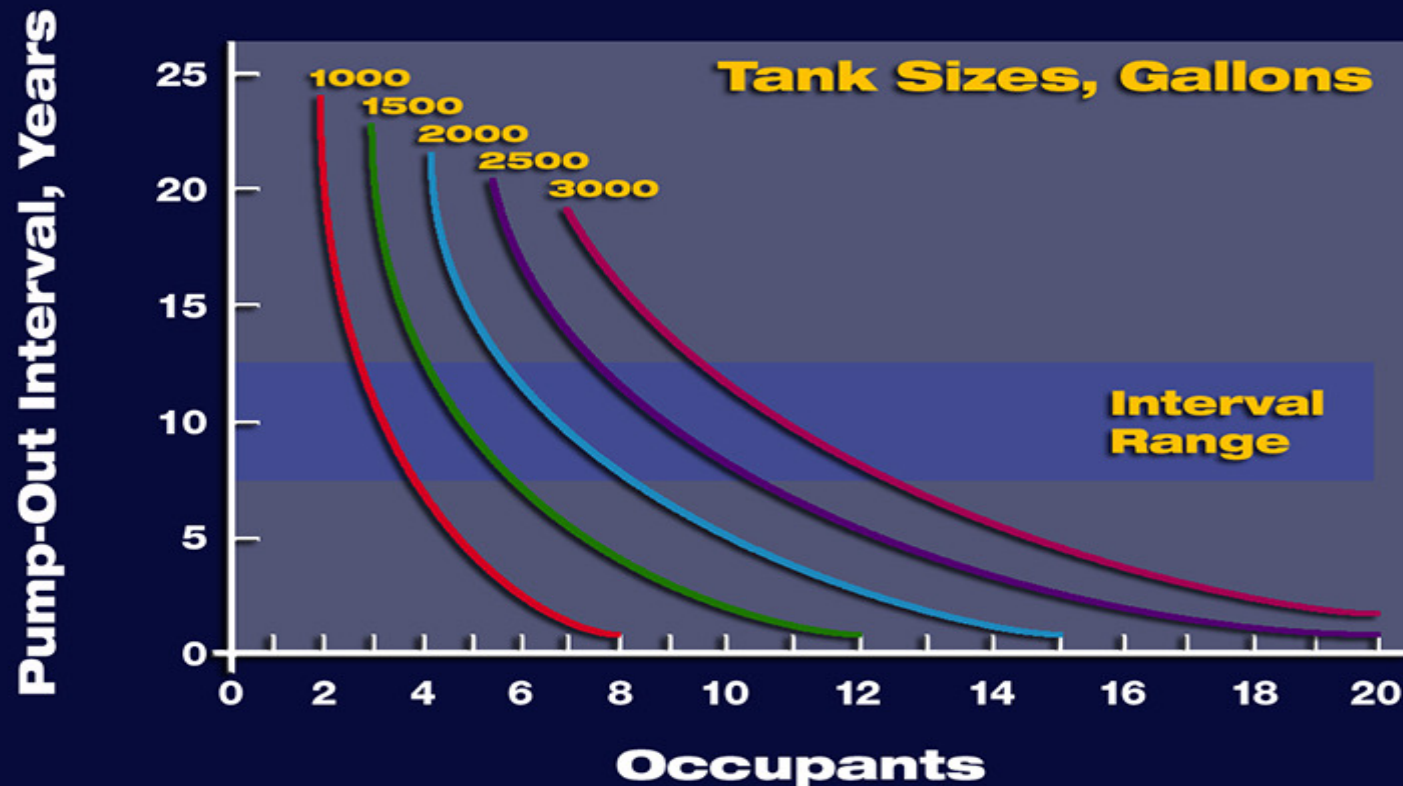


Measuring Sludge/Scum Thickness



Tank Pump-Out Intervals

Pump-Out Intervals @ 95% Level of Confidence



Typical pump-out intervals for residential Effluent Sewer tanks.

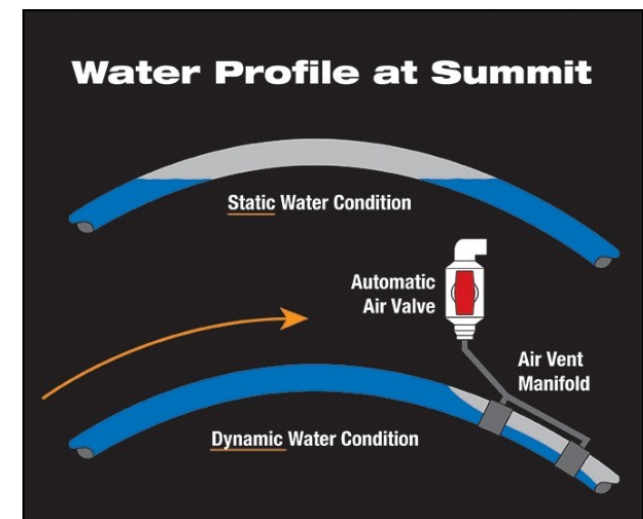
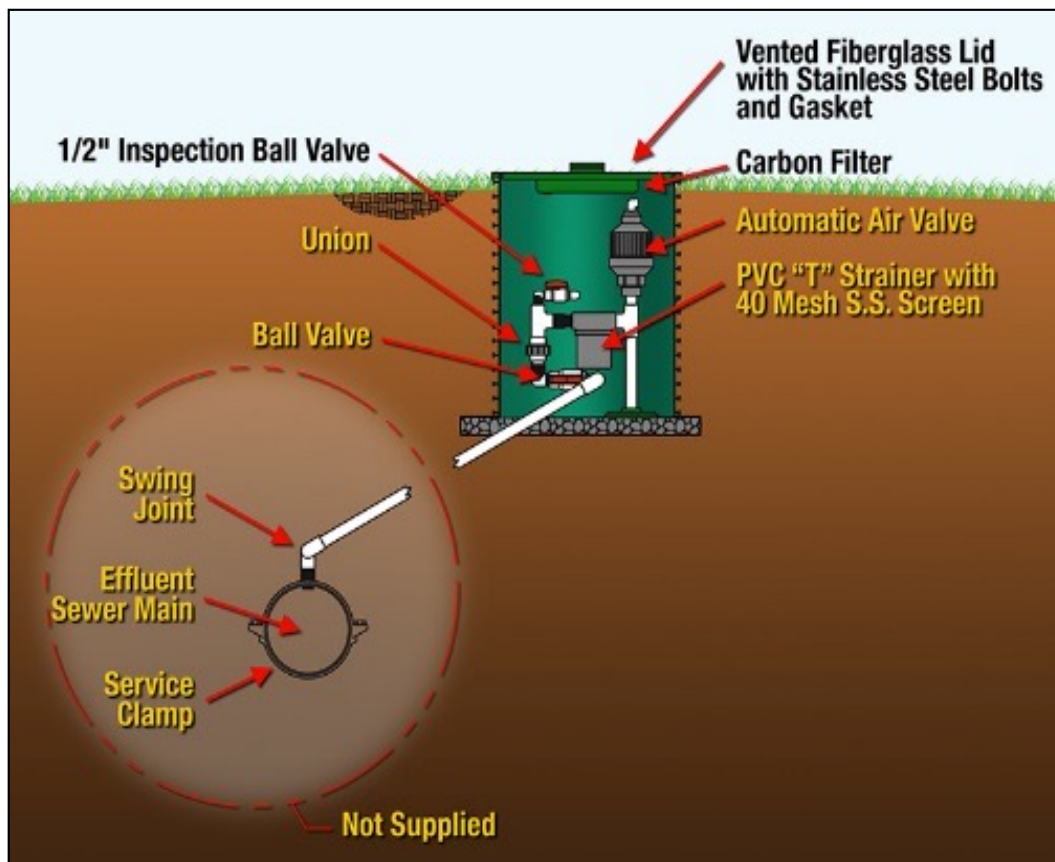
Before Leaving the Site

- Verify that valves are back to proper operating positions
- Test pump operation in manual
- Place control panel switch back to “automatic”
- Make sure all points have been inspected and recorded on the FMR



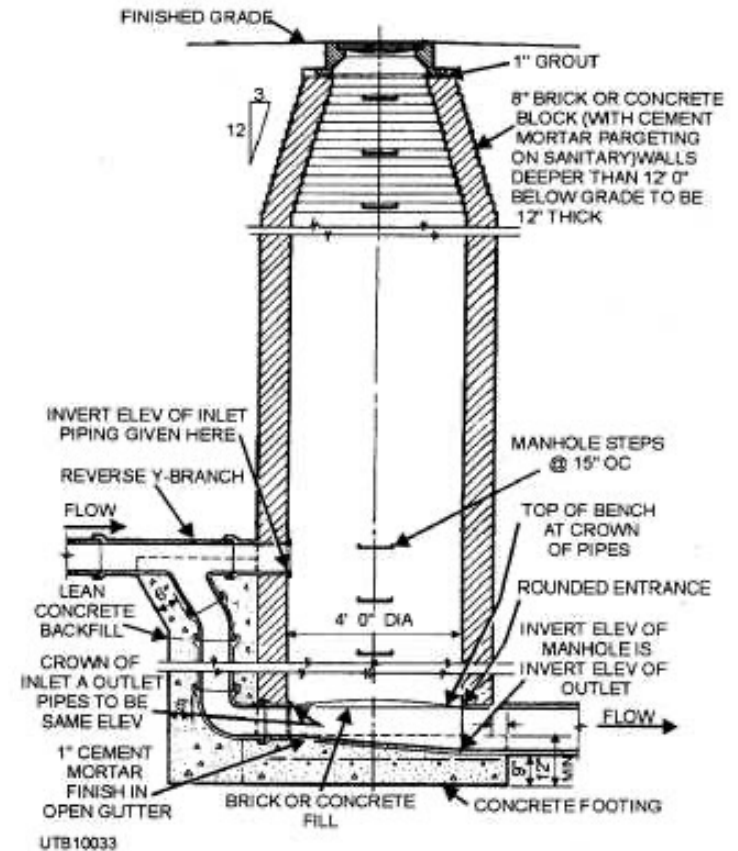
Collection Line O&M

- Collection system air release assemblies



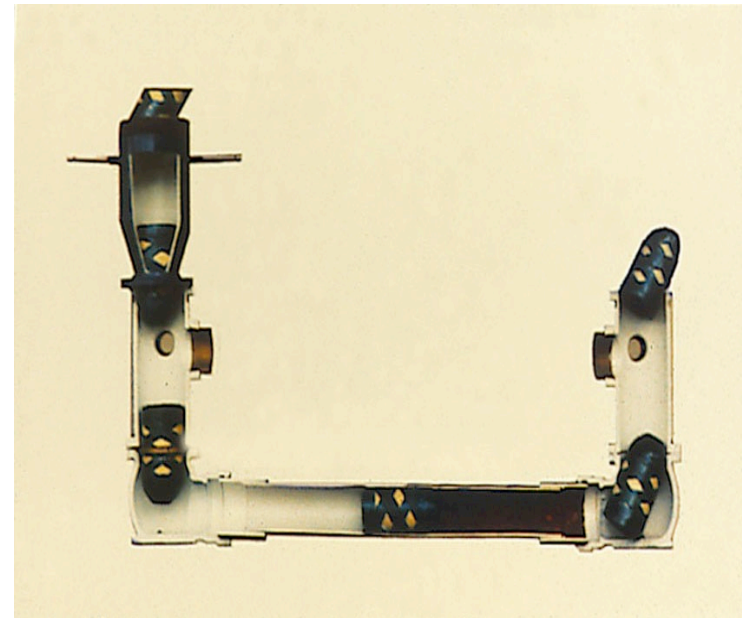
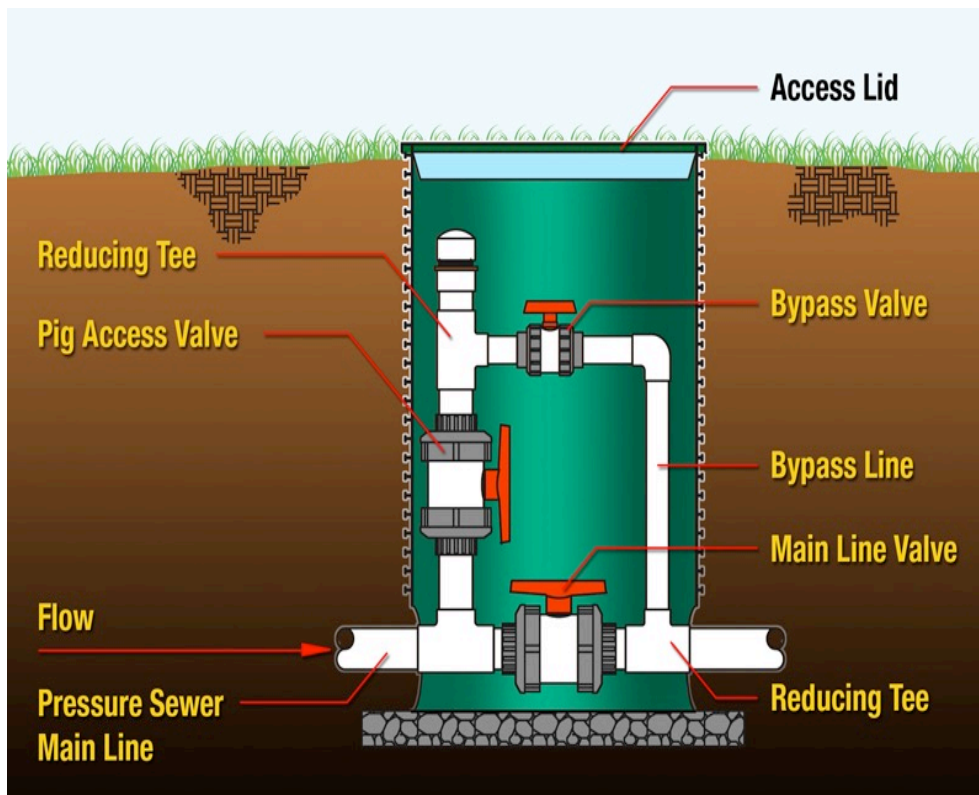
Collection Line O&M: Outfall to Gravity Sewer

- Odor Control
- Corrosion
- Design considerations



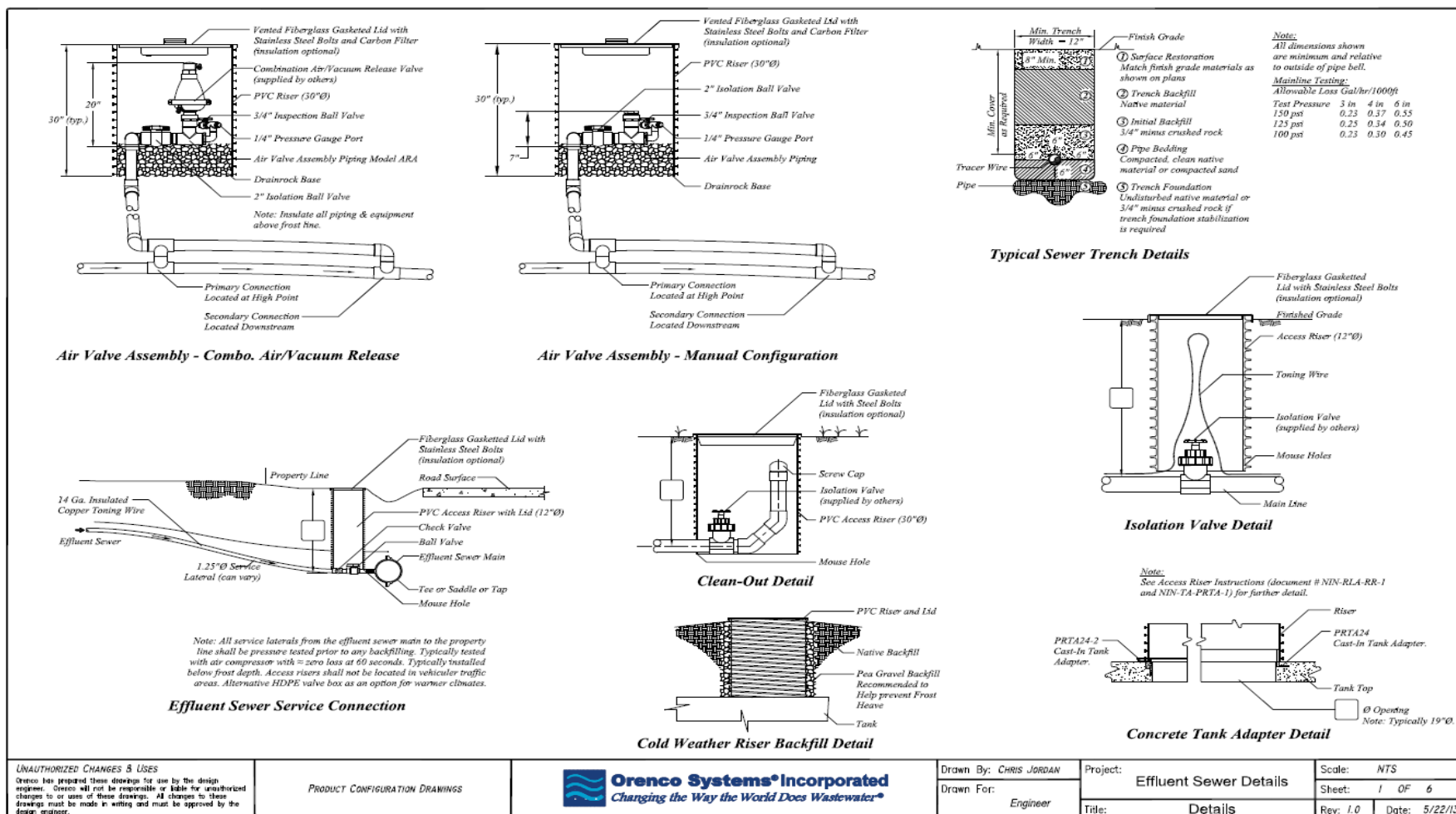
Collection Line O&M: Pigging

Pigging port



Collection Line O&M

Other components



UNAUTHORIZED CHANGES & USES
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PRODUCT CONFIGURATION DRAWINGS



Orenco Systems® Incorporated
 Changing the Way the World Does Wastewater®

Drawn By: CHRIS JORDAN

Drawn For: Engineer

Project: Effluent Sewer Details

Title: Details

Scale: NTS

Sheet: 1 OF 6

Rev: 1.0 Date: 5/22/13

Summary

- Ordinances, quality of materials, and proper installation are just as important to O&M as the actual maintenance
- Operators should participate and have a say in the design of the collection system they intend to maintain
- A proactive approach to O&M is more desirable than run-to-fail
- Proper and consistent O&M protects the community's investment and keeps costs down
- Proper documentation and record keeping is important for history and identifying trends
- O&M of a LOS system is actual pretty easy

Solutions for Decentralized Wastewater Treatment

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