SEWAGE TREATMENT SYSTEM (STS) DESIGN FOR:
Ellen Mangione
3832 Tower Road
Cincinnati, OH 45248
Par# 550-0293-0018-00
0.986 Acres

Designed By:
SCS ENGINEERS
2060 Reading Road, #200
Cincinnati OH 45202
513-421-5353
Design date: April 10, 2017
Site Visited: Jan 12, 2017

Design Details:
Existing building sewer to an Infiltrator IM-1530 1530 gallon septic tank, to an Infiltrator IM-1060 dosing tank, to a single sand mound with upslope interceptor drain and downslope perimeter drain. Owner chose to place mound along the southern portion of the property to avoid the stacking of the system and to save various trees that were in the northern portion of the property that shaded the house.

Design Rationale:
This replacement system design is for a 3 bedroom home with a Daily Design Peak Flow of 360 GPD. The peak flow should not be reached on a routine basis. Average flows of 216 GPD can be accommodated routinely with typical residential wastewater strength as specified in Ohio Administrative Code (OAC) 3701-29 for households.

Shallow soil with a seasonal water table at 12" - 14" and flow restrictive layer of high clay at 12" - 14" from the ground surface. Conditions require an 18" Vertical Separation Distance with 8" In Situ Soil. The site has 12" of in situ soil. Therefore, the mound will contain a minimum of 6" of sand [per OAC 3701-29-15 Appendix B (III)(c)] in order to satisfy the restrictive conditions. The "old drive" noted on the soil report was actually a small drainage way that showed on the 1996 CAGIS aerial but was gone by the 2001 CAGIS aerial. This was not wide enough to be a driveway, thus is not believed to have compacted soils underneath.

The property owner has chosen an Infiltrator IM-1530 Septic Tank and a sand mound soil absorption system for replacement of their existing system. Mound minimum design length and width are calculated based on the worst soil conditions under the soil absorption system. The loading rate was selected from tables in the Ohio Administrative Code. The Soil Loading rate for this silt loam with strong granular structure is 0.6 GPD/sq.ft for septic tank effluent. The Linear Loading Rate for this silty clay loam with moderate subangular blocky structure with an infiltrative distance of 8" to 12" and 14% slope is 3.0 GPD/Ln. Ft. The Linear Loading Rate for this silty clay loam with moderate subangular blocky structure with an infiltrative distance of 12" to 14" and 14% slope is 3.5 GPD/Ln. Ft. An effective LLR of 3.25 GPD/Ln. Ft. was used for this design. Slope was determined by field measurements between 13% and 14% - 14% was used for the mound calculations.

Mound Minimum Design Length is therefore 360 GPD divided by 3.25 Gal.Per Ln. Ft = 110.8 feet long. Total mound dimensions are 128.4 feet long by 17.5 feet wide.

System Installation, Operation And Maintenance (O&M)
All system devices and components must be operated and maintained in accordance with the Ohio Department of Health (ODH) product approval and Hamilton County Public Health Operation Permit Terms and Conditions. System devices and components must be installed per ODH product approval, Hamilton County Installation Manual and this design. Where conflicts exist, consult HCPH and designer for guidance before proceeding.
Infiltrator Owner's Manual: http://ow.ly/SM6WI
Champion Pumps: http://www.championpump.com
Hamilton County Installation Manual: http://ow.ly/ObNQs
This installation will require an electrical inspection(s) and approval by IBI (513) 381-6080, http://www.inspectionbureau.com/
Means for O&M is provided by the driveway which is within standard distances and elevations for a service truck.

Changes and Use of This Design
This plan is the sole ownership of the designer and may not be altered, changed, used or manipulated without approval of SCS Engineers. SCS Engineers is available to make adjustments and address questions about the system design.
It is the responsibility of the contractor to verify that the system can be installed as designed, based on their preliminary lay-out of the job. It is the responsibility the installer and property owner to inform the designer of any field or other conditions that may affect the installation, operation or maintenance of the STS, including site disturbances that may affect the performance of a soil absorption component. If design changes are needed, redesign fees may apply.

System Protection:
Property owner and installer are responsible to protect the soil absorption areas from disturbance. Only excavate basal area when soil is dry and friable to a depth of 12" and in compliance with Hamilton County Installation Manual requirements. Keep wheeled traffic off basal area. It is the owner and installation contractors responsibility to locate underground utilities. If utilities interfere with the designed system, construction shall not proceed without approval from HCPH and SCS Engineers.
No clearwater connections (downspouts, pool/spa water, footer tiles, cisterns, etc) shall be connected to this STS.
All system components must meet the horizontal isolation distances specified in OAC 3701-29-06(G)(3).

System Cost Information
The property owner has been informed of system options and briefed on cost factors. According to OAC 3701-29-10(B)(5), designers of STS systems must include approximate installation costs and operational costs of STS options to assist the homeowner in the selection of the STS options.
SCS Engineers estimates costs as follows :
$19,500 - 38,000 Installation cost*
$1,200 annual operational cost*
*This is a general estimate of costs for this system. It is not a bid to install or service the STS. Contact a licensed installer and service provider or distributor for actual bids.

Disclaimer
This plan set is not a site plan to be used for constructing anything other than the Sewage Treatment System. If an accurate legal site plan is required, contact a professional surveyor. This plan offers no guarantee as to the accuracy of information provided. This plan offers no guarantees for site stability. If site stability may be an issue, a geotechnical engineer should be consulted. Plan is only as accurate as the information provided by the property owner to the designer. Easements, right-of-ways, hidden objects or information not communicated to the designer invalidates the design. It is the property owner's responsibility to review this plan and information provided to verify all site conditions and design assumptions are correct. If conflicts are found or additional information must be supplied, the owner shall contact the designer and installation shall not proceed until the approval is granted. This design shall in no way be taken as guarantee that the system will function in a satisfactory manner for any given period of time, or that SCS Engineers or any of its agents or employees assume any liability for damages, consequential or direct, which are caused, or which may be caused by a malfunction of the STS.

STS PLANS APPROVED
AUG 17 2017
HCPH-Water Quality Division

3832-A

2 WORKING DAYS
BEFORE YOU DIG
CALL TOLL FREE 800-362-2764
OHIO UTILITIES PROTECTION SERVICE

SCS ENGINEERS
CONSULTING ENGINEERS, INC.
2060 READING ROAD SUITE 200 CINCINNATI, OHIO 45202
PH (513) 421-5353

PROJ. NO.	CADD FILE:	DATE:	SCALE:
27216008.47	MANGIONE SEPTIC V2b	JULY 2017	N.T.S.

SHEET 1
GENERAL NOTES AND DESIGN BASIS

3832 TOWER ROAD - MANGIONE RESIDENCE
PARCEL NUMBER: 550-0293-0018-00
HAMILTON COUNTY OHIO - 0.986 ACRES

\\cin-fs02\data\PROJECT\27216008.47\Deliverables\Working\Version 2\Mangione_Septic_V2b.dwg Aug 08, 2017 - 3:51pm Layout Name: Sheet1

250 William Howard Taft, 2nd Floor
Cincinnati, Ohio 45219
Phone: (513) 946-7800
Fax: (513) 946-7890
Web: www.hamiltoncountyhealth.org

Sub./Lot Review: _____ Fee Paid: 390.00
Complaint: _____ Receipt #: 1120
Other: _____ Received By: MB

HAMILTON COUNTY GENERAL HEALTH DISTRICT

APPLICATION TO CONSTRUCT OR REPLACE A SEWAGE TREATMENT SYSTEM

APPLICANT TO FILL OUT SHADED SECTIONS ONLY.

☐ NEW ☑ REPLACEMENT (Plumbing Permit Required If All Wastewater Is Not Directed To Septic System)

Address of Construction Site: 3832 Tower Road **Political Subdivision:** Green Township
Tax Parcel #: 550-0293-0018-00 **Lot Size:** 0.986 acre(s)
Owner(s) Name: Ellen Mangione
Phone Number: 513-205-9260
Mailing Address: 3832 Tower Road, Cincinnati, Ohio 45248

System To Serve	Water Supply
☑ Single Family	☑ Public (Water Supplier CWW)
☐ Duplex	☐ Private
☐ Triplex	☐ Well ☐ Cistern ☐ Hauled Water
☐ Other:	

☑ Plumbing Under Basement ☐ Ejector Pit ☐ Hung Sewer

Number of Bedrooms: 3 Number of People in Structure: 3 Monthly Water Usage: _____
☐ Watersoftner ☐ Garbage Disposal ☐ Whirlpool Style Tub ☐ High Capacity Shower
☐ Other Large Water Usage Fixtures: _____

Soil Type / Characteristics: See Soil's Report
STS Daily Design Flow: 360 STS Average Design Flow: 216 Soil Absorption Rate: 0.6 Linear Loading Rate: 3.25

Sewage Treatment System Type: Sand Mound

Primary Treatment Tank:
☒ Building Sewer Replace with 4" Sch 40 PVC
☒ Controls RJK CIN-1

☐ Trash Trap	____ Gallons	____ Compartment(s)		
☒ Septic Tank	1500 Gallons	2 Compartment(s)	Infiltrator IM-1530	
☒ Dosing Tank	1000 Gallons	1 Compartment(s)	Infiltrator IM-1060	
☐ Dosing Septic Tank	____ Gallons	____ Compartment(s)		
☐ Dosing Basin	____ Depth	____ Diameter or ____ x ____		
☒ Effluent Filter	Polylok PL-122			
☐ Screen Vault Filter				
☐ Other				

☒ Pump Barnes STEP 55.5/2
☐ Siphon
☐ Gravity

Comments: Tanks shall be watertight. Properly Abandon the existing Septic Tank, D-box & chlorinator. Tank cavity drains Required per design specs.

Secondary Treatment Unit:

☐ Intermittent Sand Filter	____ ft x ____ ft = ____ ft²	
☐ Recirculating Gravel Filter	____ ft x ____ ft = ____ ft²	
☐ Recirculating Sand Filter	____ ft x ____ ft = ____ ft²	
☐ Recirculating Textile Filter		Manufacturer ____ Unit(s)
☐ Peat Biofilter		Manufacturer ____ Unit(s)
☐ Aerobic Treatment Unit		Manufacturer ____ GPD
☐ Other		
☐ Filter Following Treatment Unit		
☐ Dosing Basin ____ Depth ____ Diameter or ____ x ____		
☒ Soil Absorption (See Below)		

☐ Pump
☐ Siphon
☐ Gravity

Comments: Follow the inspection protocol found in HCPH HSTS Installers Manual.

Soil Absorption Component:

☐ Gravel Pad	____ ft x ____ ft = ____ ft²	____ Depth	
☐ Leaching Trenches	____ ft x ____ ft = ____ ft²	____ Depth	____ Total Ln. Ft.
☐ Leach Bed	____ ft x ____ ft = ____ ft²	____ Depth	
☐ At-Grade	____ ft x ____ ft = ____ ft²		
☐ Modified Mound	____ ft x ____ ft = ____ ft²	____ Sand Thickness	
☒ Sand Mound	10.5 ft x 122.4 ft = 285.2 ft²	6" Sand Thickness	
☐ Other			

☐ Gravity Distribution
☐ Drip Distribution
☒ LPP Distribution 4 - 3/4" D x 28.5' L Laterals with 7/8" orifices 18" C-C, 76 Total orifices

Comments: Install on contour to design specs. Dose Vol. = 14.3 gallons plus drainback

Drainage Enhancement:
☒ Perimeter Drain 14" Depth
☒ Interceptor Drain 14" Depth
☐ Diversion Swale
☐ Other
☐ Pump

Disinfection Device:
☐ Chlorinator
☐ Chlorine Contact Chamber
☐ De-Chlorinator
☐ UV
☐ Other

Comments:

Remarks: A preconstruction meeting is required at the site. Installer must have system laid out prior to meeting. Electrical Approval from IBI Required.

Refer to Site Plan 3832-A For Additional Details And Install System Per HCGHD Manual.

ODH System Type:
☐ Below Grade
☒ At or Above Grade
☐ NPDES Discharge
☐ Pretreat SDC
☐ Pretreat SDC & Drip
☐ Drip Only
☐ Spray/Surface App.
☐ None of the Above

By my signature below I certify that I have read, I understand, and I agree to comply with the conditions set forth on the reverse hereof.

Owner's/Owner's Agent Signature: F. Daniel Brennan Date: 4/11/17

Field Inspection By: Greg Cassano, R.S. Date: 4/24/17 Approved By: Robert Galbraith, R.S. Date: 8-17-17

This Application Expires One Year From The Approved By Date. Replacement Systems Must Be Installed Within 120 Days of Approval Date.

Address of Construction Site: 3832 Tower Rd Political Subdivision: Green File #: PT20170236

Infiltrator IM-Series Tank Buoyancy Control Guidance

MARCH 2015

INFILTRATOR tanks

Before you Begin...

This document presents recommended buoyancy control methods for Infiltrator Systems Inc.'s (Infiltrator's) IM-Series tanks. Tank buoyancy control methods must be implemented according to state and/or local regulations, which may supersede the guidelines in this document. If unsure of the requirements for a particular site, contact the local health department or permitting authority.

This document provides procedures to determine if tank buoyancy control is required based on site conditions. Please obtain the following information to determine if control is necessary and what methods are applicable:

- Infiltrator tank model
- Maximum height of water outside the tank and above the tank bottom elevation
- Depth of soil cover over the tank top

Once tank buoyancy control measures are determined to be required and a method has been selected and implemented, refer to Infiltrator IM-Series Tank Installation Instructions and Riser Connection Guidance documents, as applicable, for completing the installation.

How to Use this Document

1. Become familiar with the descriptions in the Compatible Devices and Products section.
2. Verify that the water level outside the tank is below the outlet pipe saddle height using Step 1, Tables 1 and 2, and Figure 1.
3. Determine if buoyancy control is required using Step 1, Table 2. If buoyancy control is required, proceed to Step 2.
2. Use the respective table for the tank model from Step 2, Table 2 to determine the appropriate buoyancy control methods for the site conditions.
5. Once a preferred buoyancy control method is selected, follow the procedures for implementation provided in Step 3.

Parts and Supplies

The parts and supplies necessary are to be purchased separately from the tank. All parts and supplies are either commercially available or available through Infiltrator's network of tank distributors. Some parts may require fabrication on site using common construction practices.

Compatible Devices and Products

Infiltrator tanks are compatible with the following products for buoyancy control:

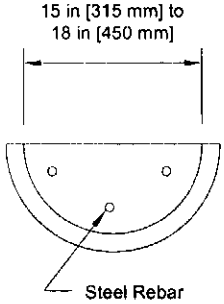
- **Tie-down straps:** high-tensile-strength webbing, 10,000 lb (4,500 kg) minimum capacity, nylon or polyester, with corrosion-resistant hardware.
- **Concrete deadmen anchors:** concrete-filled plastic half pipe, precast parking bumper, precast traffic barrier, or poured block.
- **Helical anchors:** Chance™ No-Wrench Screw Anchors with minimum 6-inch (150 mm) diameter, Class 7 or equal.

Tie-Down Straps

Straps are commercially available in varying lengths and with assorted hardware and tightening options. Nylon or polyester strapping with minimum 10,000 lb (4,500 kg) capacity is required for buoyancy control use with Infiltrator tanks. Place straps up and over the tank at specified locations only (see Figure 5). Tighten straps snugly with a ratchet or turnbuckle system to remove all slack and slightly pre-load the system. All connections, fittings, and hardware must be corrosion resistant or coated with epoxy or other corrosion-resistant materials to inhibit deterioration in the subsurface environment. Consider encapsulating such components in heat-shrink tubing or painting on additional corrosion-resistant coatings prior to burial.

Concrete Deadmen Anchors

Recommended concrete deadmen anchors include filled plastic half pipe, precast parking bumpers and traffic barriers, and poured blocks. The weight of the deadmen anchors combined with the weight of soil above them provides buoyancy control when properly secured. Deadmen anchors are placed at the bottom of the tank excavation on opposite sides of the tank. The deadmen anchors are fastened to each other with tie-down straps placed up and over the tank at the locations specified for each tank model (see Figure 5).

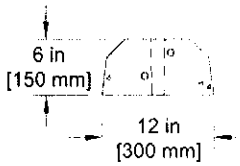


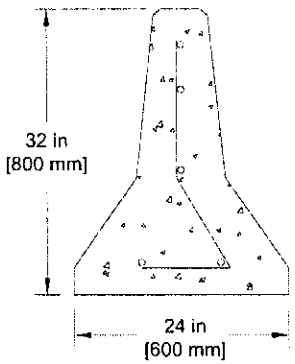
Concrete-filled plastic half pipe

Use Schedule 40 PVC plastic pipe having a minimum inside diameter of 15 inches (375 mm) or HDPE corrugated pipe having a minimum inside diameter of 18 inches (450 mm) cut in half lengthwise. Fill with concrete having a minimum unit weight of 145 lbs/ft^3 (2.32 metric tons/m^3) reinforced with three equally spaced 40-grade, 1/2-inch (13 mm) diameter steel bars. Weight is 61 lbs/ft (91 kg/m) minimum.

Concrete parking bumper

Use commercially available steel-reinforced parking bumpers with typical dimensions of 12 inches wide by 6 inches high (300 mm x 150 mm). Weight is 58 lbs/foot (86 kg/m) minimum.





Concrete traffic barrier

Use commercially available steel-reinforced concrete traffic barrier or equivalent. Typical dimensions include a 24-inch-wide base tapering to a 6-inch-wide top, with a height of approximately
32 inches (600 mm x 150 mm x 800 mm). Weight is 390 lbs/foot (580 kg/m) minimum.

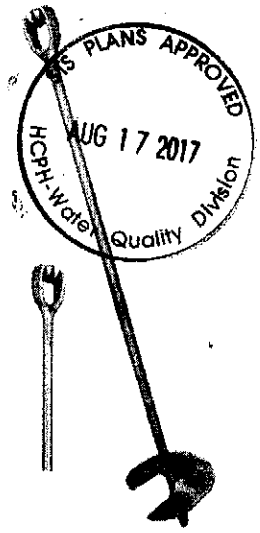
Poured Blocks

Concrete precasters can pour blocks of various dimensions and weights. Blocks are often an affordable option if they satisfy the weight requirements for use as buoyancy control (see Table 2 and the Supplemental Force section of Step 2 for more information).

Helical Anchors

Chance™ No-Wrench Screw Anchors with a 6-inch (150 mm) diameter flight, Class 7, or equal. These anchors rely on the shear strength of the soil combined with the weight of the soil above the anchor flight to provide holding strength. Proper installation is to 4 feet (1.2 m) below the bottom of the tank excavation and to within 5° of alignment with the webbing load. Determine the proper locations for anchor installation to ensure that tie-down straps will be aligned properly for each tank model (see Step 3: Implementation), and follow anchor manufacturer installation instructions.

Typical working torque:
¾" Rod 400 ft. lbs. (542 N·m)
1" Rod 1,000 ft. lbs. (1,356 N·m)
1¼" Rod 2,300 ft. lbs. (3,118 N·m)



Step 1 – Determine Need for Buoyancy Control

Required information: the maximum height of water outside the tank and above the tank bottom AND the depth of soil cover above the tank top. Tank buoyancy control may be required if the water level outside the tank has the potential to rise 30 inches (750 mm) or more above the bottom of the tank, AND less than 12 inches (300 mm) of soil cover is to be placed as backfill over the tank top. Otherwise, no buoyancy control is required.

Allowable Subsurface Water Elevation

Groundwater elevation, groundwater table, and water table are terms for the subsurface condition where water is held in the subsurface soil pores or rock. The seasonal high groundwater elevation represents the highest point the water table has the potential to reach at any time of the year, and is not necessarily the level at which groundwater may be observed seeping from the soil at the time of tank installation. In general, a qualified soil evaluator or engineer can estimate the seasonal high groundwater elevation from careful examination of the soil profile.

Under certain conditions, a perched water table may be present in the subsurface. A perched water table occurs where there is an impermeable or low-permeability soil that causes water to be present in the soil pores above the main water table. A perched water table elevation may exceed the seasonal high elevation of the main water table. The vertical position of the tank must account for both the seasonal high groundwater table and any existing or future perched water table condition. **Verify that the subsurface water level will not exceed the height of the outlet pipe saddle of the tank, as show in Tables 1 and Figure 1.**

Figure 1: Water Elevation

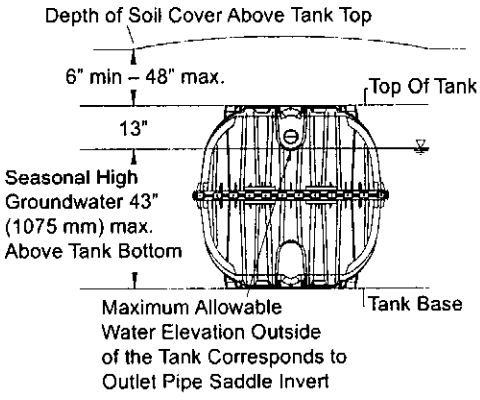
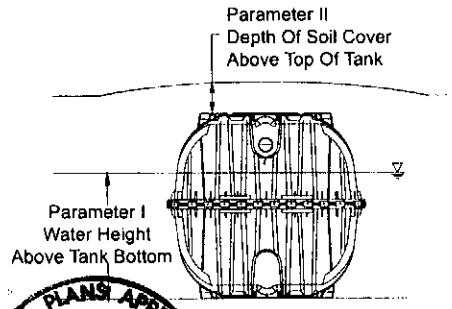


Table 1 Instructions

1. In the left-hand column of Table 1, locate the row corresponding to the height of the water elevation outside the tank and above the tank bottom (Parameter I) for the site conditions. See Figure 2.
2. Follow that row to the right until reaching the column corresponding to the depth of soil cover proposed above the tank top (Parameter II). See Figure 2.
3. If the tank model is listed in that cell, then buoyancy control is required (proceed to Step 2). If the tank model is not listed in that cell, then no buoyancy control is required.
4. The tank shall not be installed where the water level outside the tank exceeds the height of the outlet pipe saddle.

Figure 2: Buoyancy Control Parameters



STS PLANS APPROVED
AUG 17 20
HCPH-Water Quality Division

Table 1: Infiltrator tank models[1] and conditions requiring buoyancy control

Parameter I: Water height[2] above tank bottom		Parameter II: Soil cover depth above tank top[3]	
		A	B
		6 in (150 mm) to 12 in (300 mm)	Above 12 in (300mm)
1	Above outlet pipe saddle[4] (greater than 43")	Do not install	Do not install
2	36" (900 mm) to 43" (1075 mm) to outlet pipe saddle	All models	Not Required
3	30" (750 mm) to 36" (900 mm)	IM-1530	Not Required
4	Less than 30" (750 mm)	Not Required	Not Required

NOTES:

1. Infiltrator tank models include: IM-540, IM-1060, and IM-1530.
2. Water height corresponds to seasonal high groundwater elevation or perched water elevation measured from bottom-of-tank elevation.
3. Minimum 6 inches soil cover backfill is required.
4. The tank shall not be installed where the water level outside the tank exceeds the height of the outlet pipe saddle.

Design Example

A contractor plans to install an IM-1060 tank where the water level outside the tank has the potential to rise to 37 inches (940 mm) above the tank bottom (Parameter I), and the design plan calls for 8 inches (200 mm) of soil cover above the top of the tank (Parameter II). In Step 1, Table 1, a 37-inch (940-mm) exterior water height corresponds to row 2 (36 inches [900 mm] to outlet pipe saddle) under Parameter 1. The 8-inch (200-mm) soil cover corresponds to column A (6 inches [150 mm] to 12 inches [300 mm]) under Parameter II in Table 1. At the intersection of Parameter I, row 2 and Parameter II, column A, Cell 2A indicates "All models", meaning all tank models, including the IM-1060, require buoyancy control under these conditions. Referring to Step 2, Table 2, under the IM-1060 heading, Case 1 would apply for 37 inches (940 mm) of water above the bottom of tank and 8 inches (200 mm) of soil cover. Available options are as follows (see specific strapping and construction information under Step 3):

- If concrete block is specified to anchor the IM-1060, the total combined minimum weight of blocks placed on each side of the tank shall be 2,700 pounds (1,225 kg). The size and shape can be determined by locally available materials. Connect using two straps.
- For concrete-filled half pipe and concrete traffic barrier, the minimum length on each side of the tank would be 4.2 feet (1.3 m), while at least 4.5 feet (1.4 m) of concrete parking bumper would be required. These controls would be connected with two straps, ensuring that the control extends a minimum of 6 inches (150 mm) beyond the strap positions (see Figure 3).
- If helical anchors were selected, a minimum of two 6-inch (150 mm) diameter anchors per side of tank (4 total) would be installed using two straps.

Design Example Table 1: Infiltrator tank models and conditions requiring buoyancy control

Parameter I: Water height above tank bottom		Parameter II: Soil cover depth above tank top	
		A	B
		6 in (150 mm) to 12 in (300 mm)	Above 12 in (300 mm)
1	Above outlet pipe saddle	Do not install	Do not install
2	36" (900 mm) to 43" (1075 mm) to outlet pipe saddle	All models	Not Required
3	30 in (750 mm) to 36 in (900 mm)	IM-1530	Not Required
4	Less than 30 in (750 mm)	Not Required	Not Required

Step 2 – Determine Buoyancy Control Method

Step 2 is used if the Step 1 analysis shows that buoyancy control is required for the tank model and the conditions of installation. As before, the maximum height of the water outside of the tank and above the tank bottom AND the depth of soil cover above the tank top must be known for the installation conditions to complete Step 2.

Table 2 Instructions

For each tank model, find the Case row on the left side of the table that corresponds to both the water height (Parameter I) and soil cover measurements (Parameter II) for the tank installation conditions. Follow the row to the right for a listing of the appropriate buoyancy control methods for the installation conditions under each method description column. Refer to the Compatible Devices and Products and Step 3 – Implementation sections of this document for additional information.

Table 2: Buoyancy Control Selection

Case	Parameter I: Water height above tank bottom	Parameter II: Soil cover depth above tank top	Minimum supplemental force required[1] (total, both tank sides)	Buoyancy Control Methods (minimum per side of tank)			
				Concrete-filled half pipe (min. length/side)	Concrete parking bumpers (min. length/side)	Concrete traffic barriers (min. length/side)	Helical anchors (min. no./ side)
IM-540							
1	36 in (900 mm) to outlet pipe saddle[2]	6 in (150 mm) to 12 in (300 mm)	2,200 lbs (1,000 kg)	3.8 ft (1.2 m)	3.8 ft (1.2 m)	3.8 ft (1.2 m)	2
IM-1060							
1	36 in (900 mm) to outlet pipe saddle[2]	6 in (150 mm) to 12 in (300 mm)	2,700 lbs (1,225 kg)	4.2 ft (1.3 m)	4.5 ft (1.4 m)	4.2 ft (1.3 m)	2
IM-1530							
1	30 in (750 mm) to outlet pipe saddle[2]	6 in (150 mm) to 12 in (300 mm)	4,300 lbs (1,955 kg)	6.3 ft (2.0 m)	6.5 ft (2.0 m)	6.3 ft (2.0 m)	2

NOTES:

1. See Supplemental Force discussion below.
2. IM-Series outlet pipe saddle height is 43 inches (1,075 mm) above tank bottom.

Supplemental Force

The minimum supplemental downward force required is included in Table 3 to allow custom buoyancy control methods. These values include a factor of safety of 1.5 applied to the calculated force required to restrain the tank. Custom-designed buoyancy control methods shall consider saturated conditions. So long as buoyancy control is provided that supplies the minimum weight listed in the table (for poured-concrete blocks or other methods designed by third parties), the tanks will be stable for the water height outside the tank and above the tank bottom and corresponding soil cover conditions. All Infiltrator strapping and fastening recommendations would still apply for custom-designed buoyancy control methods. Contact Infiltrator's Technical Services Department with any questions regarding supplemental force requirements.

Step 3 – Implementation

Effective buoyancy control of Infiltrator tanks requires careful preparation, thorough excavation, precise placement, secure strapping and proper backfilling, as described and illustrated below.

Excavation Requirements

It is recommended that the excavation width provide a minimum of 36 inches (900 mm) clearance beyond the tank on all sides when utilizing buoyancy control. This will allow sufficient space within the excavation to place deadmen anchors and fasten strapping. The excavation should provide a minimum of 48 inches (1,200 mm) when using Chance™ No-Wrench Screw Anchors to allow for room to properly install the screw anchors. The actual excavation size shall be determined by the installer. Refer to Infiltrator IM- Series Tank Installation Instructions for additional excavation procedures.

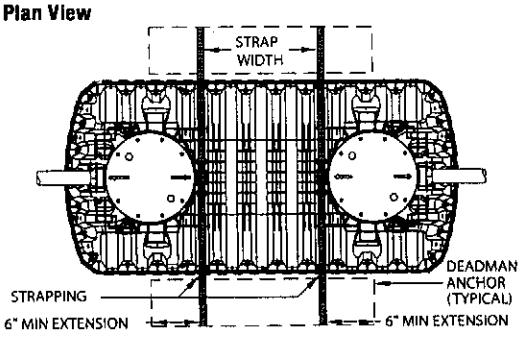
Concrete-filled Half Pipe Construction

Concrete-filled half pipe shall be supported with soil or other stabilizing means below the pipe haunches prior to concrete placement. The stabilization shall prevent the pipe from rolling during placement and curing of the concrete. Concrete shall be allowed to cure for a minimum of one day prior to tank backfilling.

Placement of Deadmen and Anchors

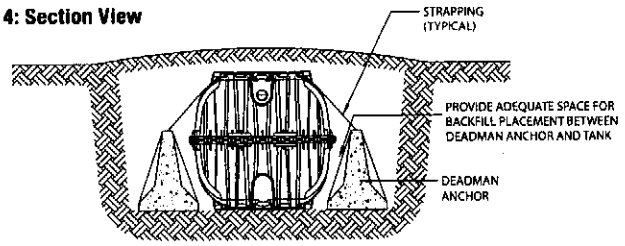
Concrete deadman anchors are to be installed at the bottom of the tank excavation, parallel to the long axis of the tank (see Figure 3).

Figure 3: Plan View



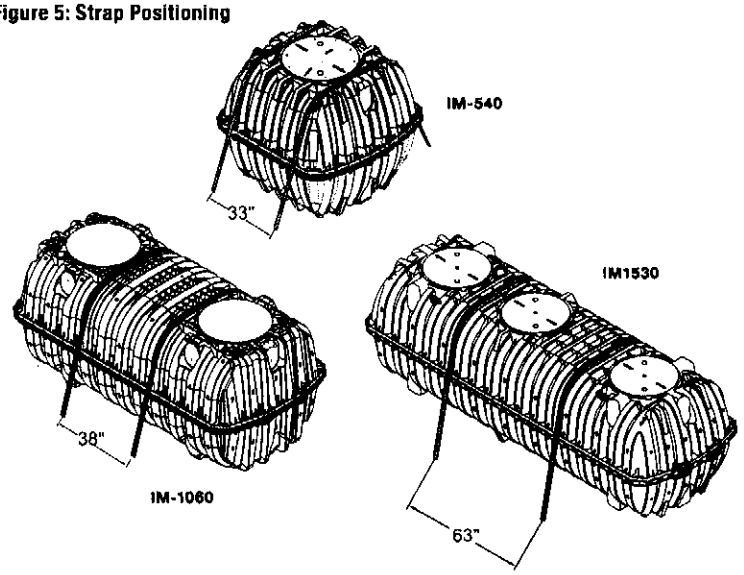
The deadmen should be placed close to, but not touching, the tank on both sides of the tank to allow the placement of backfill between the deadman anchor and tank sidewall (see Figure 4).

Figure 4: Section View



Helical anchors should be installed so that the eye loop is level with the bottom of the tank excavation. They must be in line with the tank model strapping locations (see Figure 5) or lifting lugs, as appropriate. Anchors must also be installed at such a distance from and angle to the tank so that the strapping is within 5° of alignment with the anchor shaft per manufacturer's recommendations.

Figure 5: Strap Positioning



Strapping

Preparation and fastening of webbing to/over the tanks is critical for tank stability under constant and fluctuating water conditions both inside and outside the tank. Straps must be placed at the specified strapping locations for each model as illustrated in Figure 5. The IM-Series tank strapping locations correspond to structurally reinforced areas of the tank body. Straps must never be placed over access openings, lids, or inlet/outlet piping. Straps must be tightened with a ratchet or turnbuckle system to remove slack and slightly pre-load the system.

STRAPPING NOTES:

1. The buoyancy control shall be centered across the straps (excludes helical anchors). The control shall extend a minimum of 6 inches (150 mm) beyond the maximum strap width (see Figures 3 and 5).
2. The minimum deadman length corresponds to the tank model-specific strap width plus 12 inches (300 mm).

Backfill and Cover

Place backfill between deadman anchor and tank sidewall to fully fill void and tank body corrugations. A minimum 6" layer (150 mm) of suitable cover material is required over all Infiltrator tank installations. Mound cover to direct surface water drainage away from the tank excavation footprint. Establish a strong stand of erosion-resistant vegetation. Refer to Infiltrator IM-Series Tank Installation Instructions for complete backfilling and cover procedures.

General Specifications

- Prior to ground disturbance, check for subsurface obstructions and utilities in conformance with applicable requirements.
- Excavations shall conform to applicable safety regulations.
- Follow manufacturer instructions for all products and devices used for Infiltrator tank buoyancy control.
- Buoyancy control methods described herein do not account for unanticipated conditions such as surface flooding or other natural disasters, unintended removal of cover fill over tank, etc.
- Buoyancy control methods described herein are recommendations only; consult a professional engineer if desired.

INFILTRATOR® systems inc.

4 Business Park Road
P.O. Box 768
Old Saybrook, CT 06475
860-577-7000 • Fax 860-577-7001
1-800-221-4436
www.infiltratorsystems.com

U.S. Patents: 4,759,661; 5,017,041; 5,156,488; 5,336,017; 5,401,116; 5,401,459; 5,511,903; 5,716,163; 5,588,778; 5,839,844 Canadian Patents: 1,329,959; 2,004,564 Other patents pending. Infiltrator, Equalizer, Quick4, and SideWinder are registered trademarks of Infiltrator Systems, Inc. Infiltrator is a registered trademark in France. Infiltrator Systems, Inc. is a registered trademark in Mexico. Contour, MicroLeaching, PolyTuff, ChamberSpacer, MultiPort, PosiLock, QuickCut, QuickPlay, SnapLock and StraightLock are trademarks of Infiltrator Systems Inc. PolyLok is a trademark of PolyLok, Inc. TUF-TITE is a registered trademark of TUF-TITE, INC. Ultra-Rib is a trademark of IPEX Inc.

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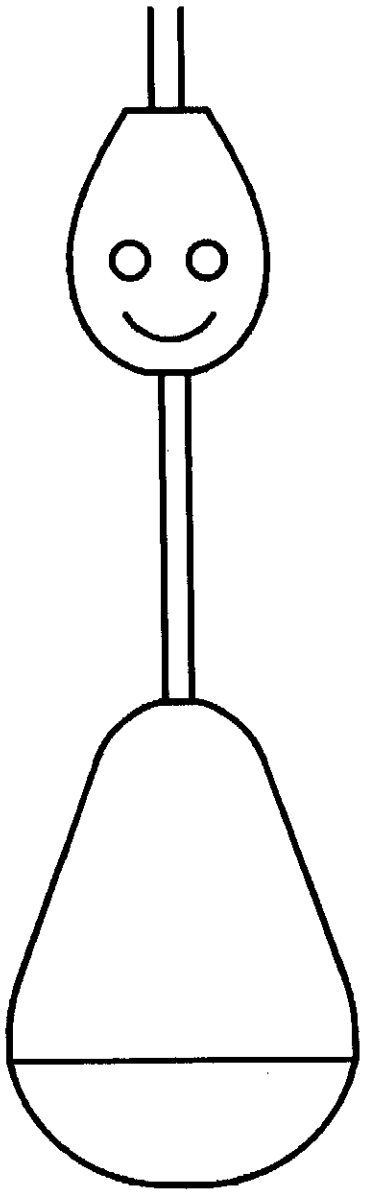
CONERY MFG. INC.

FLOAT SWITCH – CONTROL DUTY

2900 MERCURY SERIES – NARROW ANGLE FLOAT SWITCH



GENERAL

DESIGNED FOR ACCURATE LIQUID LEVEL CONTROL IN MANY APPLICATIONS INCLUDING SEWAGE ENVIRONMENTS. THE FLOAT SWITCH CAN BE UTILIZED TO SIGNIFY SPECIFIC WATER LEVELS OR FOR DIRECT ALARM ACTUATION.

SWITCH VARIATIONS

NORMALLY OPEN (N/O)

THE CONTACTS ARE OPEN (OR OFF) IN THE HANGING POSITION. AS THE FLOAT RISES 1" (5°) ABOVE HORIZONTAL, THE CONTACTS BECOME CLOSED AND ACTUATE (TURN ON) THE SWITCH. THIS FLOAT IS GENERALLY USED IN PUMP DOWN APPLICATIONS.

NORMALLY CLOSED (N/C)

THE CONTACTS ARE CLOSED (OR ON) IN THE HANGING POSITION. AS THE FLOAT RISES 1" (5°) ABOVE HORIZONTAL, THE CONTACTS BECOME OPEN AND ACTUATE (TURN OFF) THE SWITCH. THIS FLOAT IS GENERALLY USED IN PUMP UP APPLICATIONS.

SINGLE POLE, DOUBLE THROW (SPDT)

A VARIATION OF THE PREVIOUSLY LISTED SWITCHES. THIS FLOAT SWITCH CAN BE WIRED TO OPERATE AS EITHER (BUT NOT BOTH) A NORMALLY OPEN OR NORMALLY CLOSED SWITCH BASED ON THE USER'S NEED.

SWITCH SPECIFICATIONS

2900 SERIES MERCURY FLOAT SWITCHES ARE DESIGNED TO OPERATE UNDER THE FOLLOWING PARAMETERS.

MINIMUM OPERATING TEMPERATURE	-	32 DEGREES F.
MAXIMUM OPERATING TEMPERATURE	-	170 DEGREES F.
ELECTRICAL RATING	-	10 AMP – 120 VAC, 3 AMP – 240 VAC
ACTUATION POINT	-	1" ABOVE / BELOW HORIZONTAL.

POWER CORD SPECIFICATIONS

CONDUCTOR CORD – PHYSICAL	-	CHLORINATED POLY ETHYLENE.
ELECTRICAL FOR N/O OR N/C SWITCH	-	18 AWG 2, TYPE SJOOW-300 VOLT.
ELECTRICAL FOR SPDT SWITCH	-	18 AWG 3, TYPE SJOOW-300 VOLT.

FLOAT SPECIFICATIONS

DURABLE POLYPROPYLENE MATERIAL CONSTRUCTION.
SOLID POLYURETHANE FOAM INTERIOR.
LEAK PROOF, SHOCK PROOF, AND IMPACT RESISTANT.
RESISTANT TO SEWAGE AND WASTEWATER APPLICATIONS.
FOR USE WITH INTRINSICALLY SAFE CIRCUITS.

STS PLANS APPROVED
AUG 17 2017
HCPH-Water Quality Division

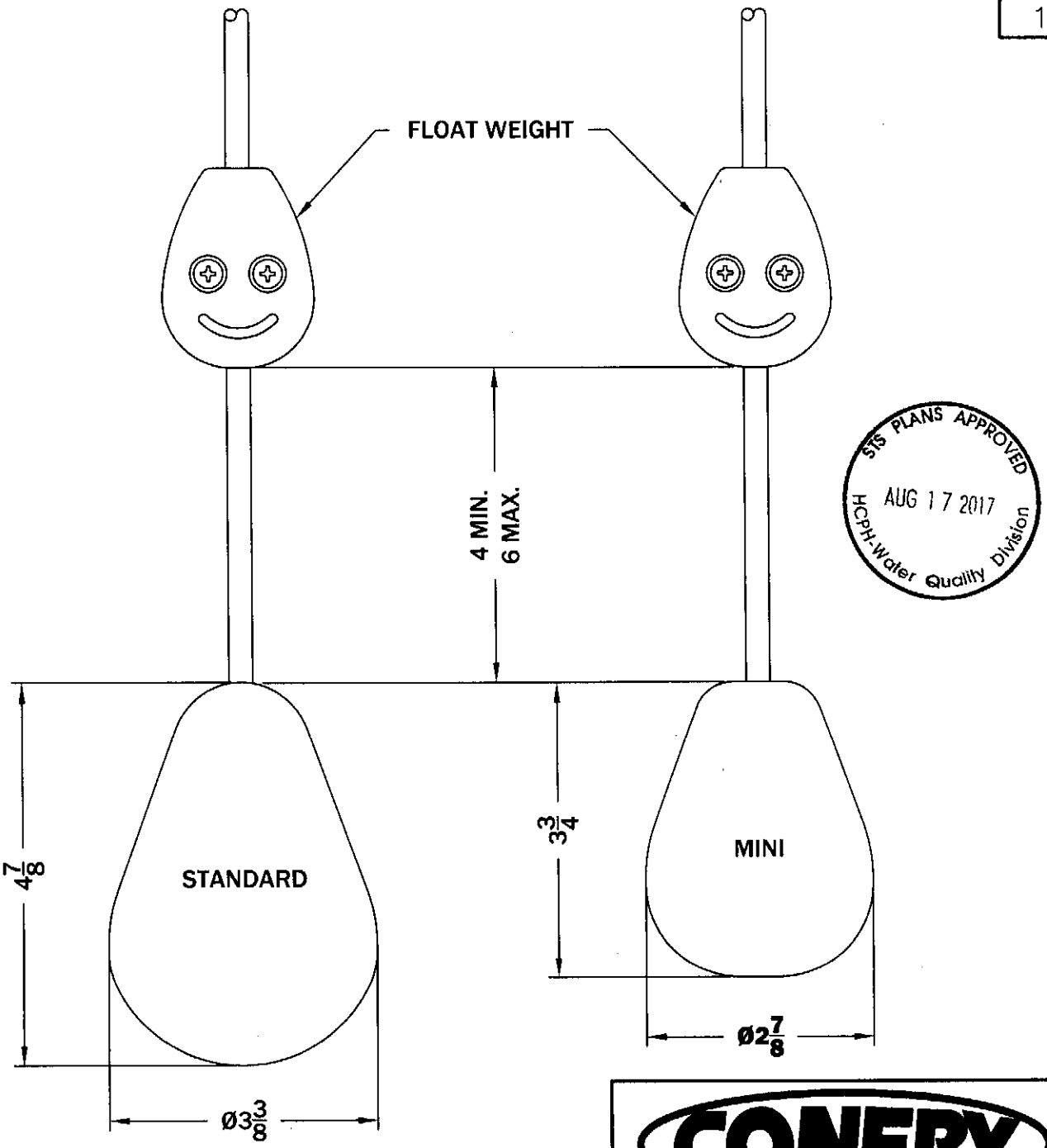
CORD WEIGHT

ZINC PLATED CAST IRON – 1.22 LBS.
SPLIT WEIGHT DESIGN ALLOWS FOR EASY ADJUSTMENT.
DESIGN ALLOWS FOR SECURE AND PERMANENT ATTACHMENT TO CORD.

c UL us
LISTED
IND. CONT. EQ.
47UF

CONERY MFG INC 1380 ENTERPRISE PARKWAY ASHLAND, OH 44805
info@conerymfg.com PH (419) 289-1444 FAX (419) 281-0366

2900 SERIES B1,B2



SFS PLANS APPROVED
AUG 17 2017
HCPH-Water Quality Division

ALL INFORMATION CONTAINED IN THIS DRAWING IS CONFIDENTIAL AND PROPRIETARY TO CONERY MFG, INC.

CONERY MFG INC

CHANGES	TOLERANCES	DRAWN BY	DATE
F	DECIMALS .XXX = ±.005 .XX = ±.010 FRACTIONAL X/X = ±.1/64 ANGLES X° = ±1/2°	D. MIDDLETON	03/18/04
E		MATERIAL SPECIFICATION: NARROW ANGLE FLOAT SWITCH	
D			
C			
B			
A			

SPECIFICATION SHEET
MERCURY FLOAT

SCALE:	PART NO.
HALF	2900 SERIES B1,B2

NOTE: ALL ELECTRICAL DIAGRAMS SHOWN ARE EXAMPLES ONLY, CONSULT WITH LOCAL ELECTRICAL AUTHORITIES AND CODES. DO NOT USE THESE PRODUCTS IN GASOLINE, VOLATILES, OTHER COMBUSTIBLES.

2900 SERIES B1, B2

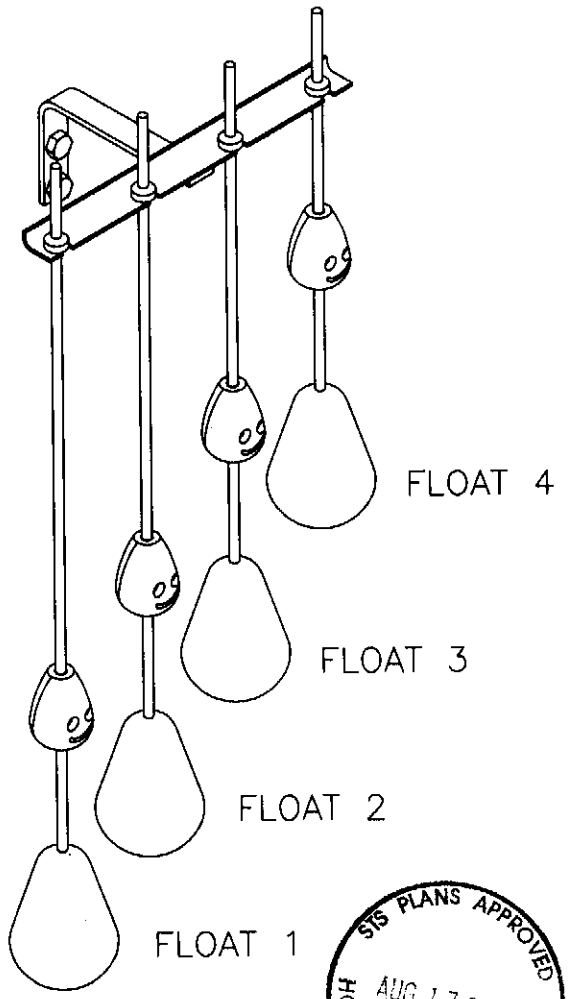
FOR PUMP DOWN USE
(NORMALLY OPEN FLOATS)

FOR PUMP UP USE
(NORMALLY CLOSED FLOATS)

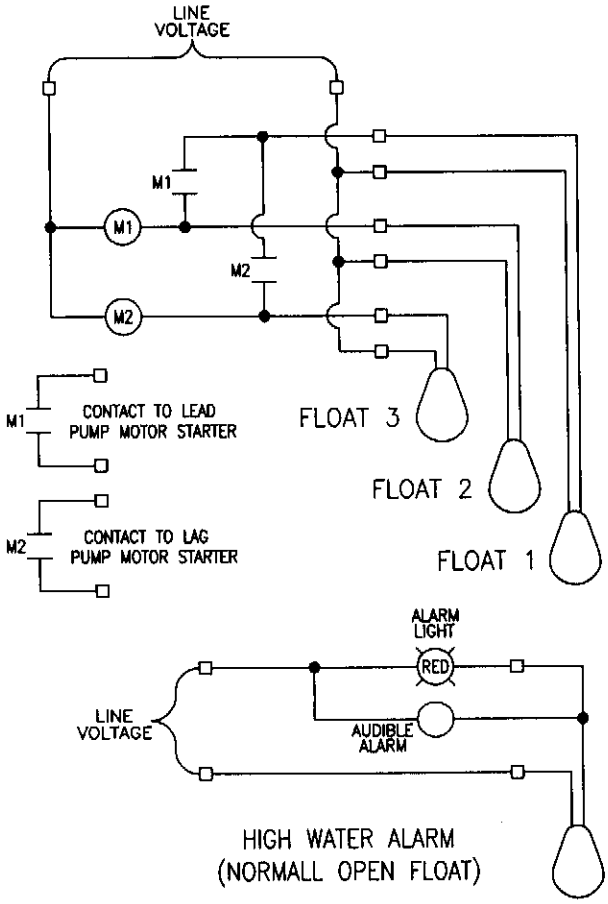
FOR SPDT FLOATS
GREEN – N/O
WHITE – COMMON
BLACK – N/C

c UL us LISTED

TYPICAL MOUNTING



TYPICAL 2 PUMP USES



SIS PLANS APPROVED
AUG 17 201?
HCPH-Water Quality Division

ALL INFORMATION CONTAINED IN THIS DRAWING IS CONFIDENTIAL AND PROPRIETARY TO CONERY MFG, INC.

CONERY MFG INC

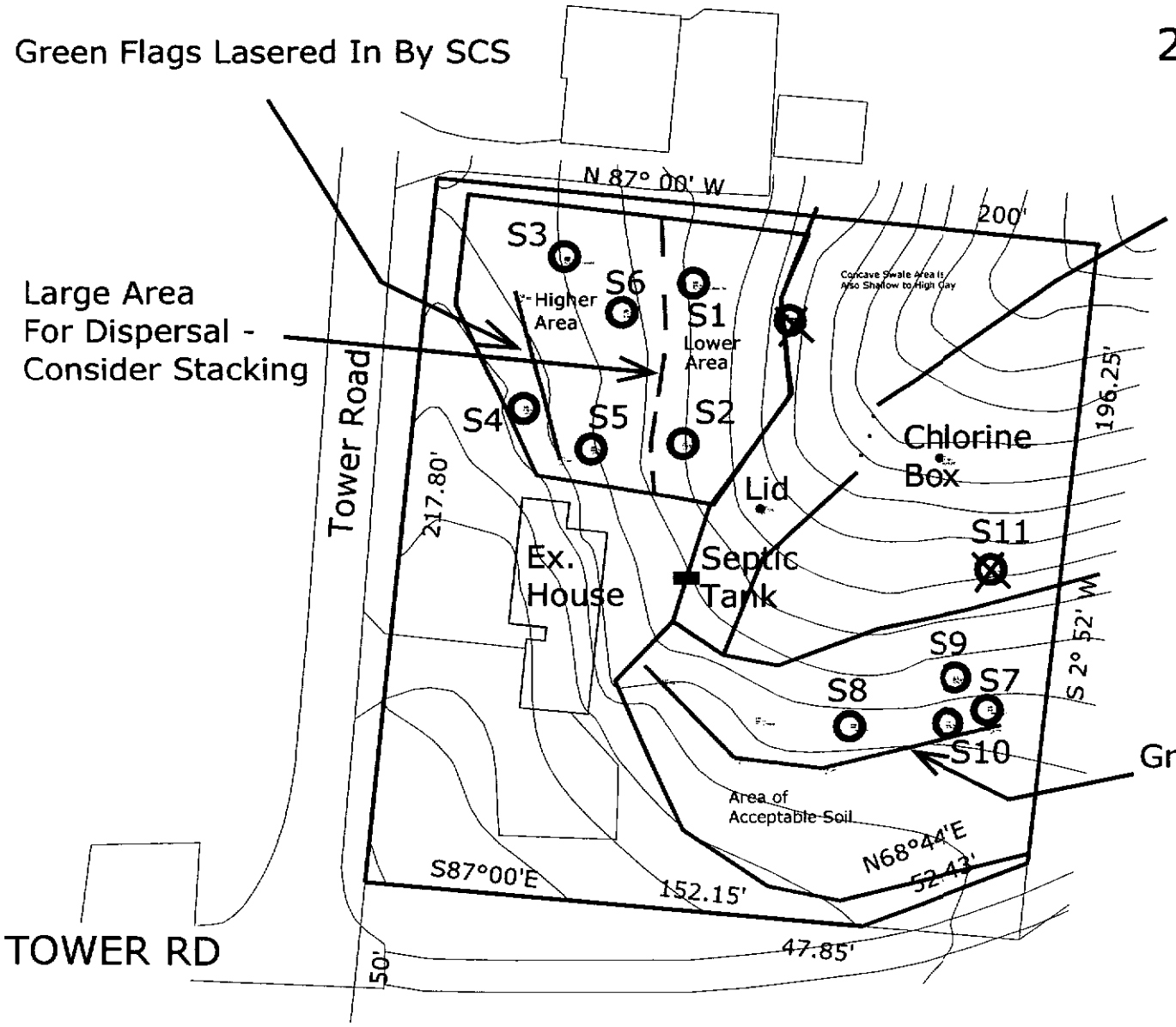
CHANGES	TOLERANCES	DRAWN BY	DATE
F	DECIMALS	D. MIDDLETON	03/18/04
E	.XXX = ±.005		
D	.XX = ±.010	MATERIAL SPECIFICATION:	
C	FRACTIONAL	NARROW ANGLE FLOAT SWITCH	
B	X/X = ±1/64		
A	ANGLES X° = ±1/2°		

SPECIFICATION SHEET
MERCURY FLOAT

SCALE:	PART NO.
NONE	2900 SERIES B1,B2

Green Flags Lasered In By SCS

2' GIS Contours Shown



Green Flags Lasered In By SCS

SIS PLANS APPROVED
AUG 17 2017
HCPH-Water Quality Division

Soil Locations

Unacceptable Soil Locations

Scale

0 50 100

1" = 50'

Mangione Property
3832 Tower Road
Cincinnati, OH 45248
0.986 Acres
Green Twp.

3832-A

Soil and Site Evaluation for Sewage Treatment and Dispersal

County: Hamilton
Township/Sec.: Green
Property Address/Location: 3832 Tower Road
Cincinnati, OH 45248
Parcel # / Subdiv. Lot #: #550-0293-0018
Applicant Name: Mangione
Address: c/o SCS 2060 Reading Road Suite 200
Cincinnati, OH 45202
Phone #: 513-375-0586
Lot #:
Test Hole #: S1,S2,S7,S8,S9,S10
Latitude/Longitude:
Method: ____Pit ____Auger __X__ Probe

Land Use/Vegetation: grass
Landform: upland
Position on Landform: side slope
Percent Slope: 15%
Shape of Slope: linear
Coord. Method/Accuracy: GPS - 3 ft.

STS PLANS APPROVED
AUG 17 2017
HCPH-Water Quality Division

Date: 11/4/2016
Evaluator: Dan Michael
620 North Broadway
Lebanon, OH 45036

Certification Stamp or Certification# #30586
Signature:
Phone # : 513-934-1040

Soil Profile		Estimating Soil Saturation			Estimating Soil Permeability							
		Munsell Color (hue, value, chroma)										
			Redoximorphic Features		Texture			Structure				
Horizon	Depth (inches)	Matrix color	Concentrations	Depletions	Class	Approx. % clay	Approx. % Fragments	Grade	Size	Type (shape)	Consistence	Other Soil Features
Ap	0 - 8	10YR 4/2 dark grayish brown			silt loam	15%	0%	3 - strong	f	gr	friable	
Bt	8 - 12	10YR 4/4 dark yellowish brown			silty clay loam	27%	0%	2- moderate	m	SBK	firm	
2Bt	12 - +	10YR 4/4 dark yellowish brown	10YR 3/1 1%	10YR 5/2 10%	silty clay	50%	0%	1- weak	co	SBK	very firm	very high in clay

Limiting Conditions	Depth to (in.)	Descriptive notes	Remarks/Risk Factors:
Perched Seasonal Water Table	12 to 14 in.		See map for locations.
Ground Water/Aquifer	> 50 in.		
Highly Permeable Material (range)	> 50 in.		If there can be a fit, it is likely best to stay entirely in the north west section (stacked system)
Bedrock	> 50 in.	Fractured - Karst (circle one)	
Flow Restrictive Layer	12 to 14 in.	c	
Highly Weathered Soil	> 50 in.		It is acceptable to use the LLR as shown which is the 12 to 24 inch column.
Fractured Glacial Till	> 50 in.		
Other High Risk Limiting Condition	> 50 in.		

Note: The evaluation shall include a complete site plan or site drawing including all requirements in paragraphs (B)(1) through (B)(4) of OAC 3701-29-08

3832-A

Table 3. Soil Infiltration Loading Rates.

Soil Characteristics			Soil Infiltration Loading RRate (gpd/ft2)		
Texture	Structure		CBOD5		
	Shape	Grade	>25mg/L (septic tank effluent)	<=25mg/L (pretreated effluent)	Row
COS, S, LCOS,LS	--	0SG	0.8	1.6	1
FS, VFS, LFS, LVFS	--	0SG	0.4	1	2
CSL, SL	--	0M	0.2	0.6	3
	PL	1	0.2	0.5	4
		2, 3	0	0	5
	PR/BK/GR	1	0.4	0.7	6
		2, 3	0.6	1	7
FSL, VFSL	--	0M	0.2	0.5	8
	PL	1,2,3	0	0	9
	PR/BK/GR	1	0.2	0.6	10
		2,3	0.4	0.8	11
L	--	0M	0.2	0.5	12
	PL	1,2,3	0	0	13
	PR/BK/GR	1	0.4	0.6	14
		2,3	0.6	0.8	15
SIL	--	0M	0	0	16
	PL	1,2,3	0	0	17
	PR/BK/GR	1	0.4	0.6	18
		2,3	0.6	0.8	19
SCL, CL, SICL	--	0M	0	0	20
	PL	1,2,3	0	0	21
	PR/BK/GR	1	0.2	0.3	22
		2,3	0.4	0.6	23
SC, C, SIC	--	0M	0	0	24
	PL	1,2,3	0	0	25
	PR/BK/G	1	0	0	26
		2,3	0.2	0.3	27

Soil Characteristics			Hydraulic Linear Loading Rate (gpd/ft)									
			Slope 0-4%			Slope 5-9%			Slope >10%			
Texture	Structure		Infiltrative Distance, (Inches)			Infiltrative Distance, (Inches)			Infiltrative Distance, (Inches)			
	Shape	Grade	8 - 12	12-24	24-48	8 - 12	12-24	24-48	8 - 12	12-24	24-48	Row
COS, S, LCOS,LS	--	0SG	4.0	5.0	6.0	5.0	6.0	7.0	6.0	7.0	8.0	1
FS, VFS, LFS, LVFS	--	0SG	3.5	4.5	5.5	4.0	5.0	6.0	5.0	6.0	7.0	2
CSL, SL	--	0M	3.0	3.5	4.0	3.6	4.1	4.6	5.0	6.0	7.0	3
	PL	1	3.0	3.5	4.0	3.6	4.1	4.6	4.0	5.0	6.0	4
		2, 3										5
	PR/BK/	1	3.5	4.5	5.5	4.0	5.0	6.0	5.0	6.0	7.0	6
	GR	2, 3	3.5	4.5	5.5	4.0	5.0	6.0	5.0	6.0	7.0	7
FSL, VFSL	--	0M	2.0	2.3	2.6	2.4	2.7	3.0	2.7	3.2	3.7	8
	PL	1,2,3										9
	PR/BK	1	3.0	3.5	4.0	3.3	3.8	4.3	3.6	4.1	4.6	10
	GR	2,3	3.3	3.8	4.3	3.6	4.1	4.6	3.9	4.4	4.9	11
L	--	0M	2.0	2.3	2.6	2.4	2.7	3.0	3.2	3.2	3.7	12
	PL	1,2,3	-	-	-	-	-	-	-	-	-	13
	PR/BK	1	3.0	3.5	4.0	3.3	3.8	4.3	3.6	4.1	4.6	14
	GR	2,3	3.3	3.8	4.3	3.6	4.1	4.6	3.9	4.4	4.9	15
SIL	--	0M	2.0	2.5	3.0	2.2	2.7	3.2	2.4	2.9	3.4	16
	PL	1,2,3										17
	PR/BK	1	2.4	2.7	3.0	2.7	3.0	3.3	3.0	3.5	4.0	18
	GR	2,3	2.7	3.0	3.3	3.0	3.5	4.0	3.3	3.8	4.3	19
SCL, CL, SICL	--	0M										20
	PL	1,2,3										21
	PR/BK	1	2.0	2.5	3.0	2.2	2.7	3.2	2.4	2.9	3.4	22
	GR	2,3	2.4	2.9	3.2	2.7	3.0	3.3	3.0	3.5	4.0	23
SC, C, SIC	--	0M										24
	PL	1,2,3										25
	PR/BK	1										26
	GR	2,3	2.0	2.5	3.0	2.2	2.7	3.2	2.4	2.9	3.4	27

Soil and Site Evaluation for Sewage Treatment and Dispersal

County: Hamilton
Township/Sec.: Green
Property Address/Location: 3832 Tower Road
Cincinnati, OH 45248
Parcel # / Subdiv. Lot #: #550-0293-0018
Applicant Name: Mangione
Address: c/o SCS 2060 Reading Road Suite 200
Cincinnati, OH 45202
Phone #: 513-375-0586
Lot #:
Test Hole #: S3,S4,S5,S6 - Upper area
Latitude/Longitude:
Method: ____Pit ____Auger __X__ Probe

Land Use/Vegetation: grass
Landform: upland
Position on Landform: side slope
Percent Slope: 13%
Shape of Slope: linear
Coord. Method/Accuracy: GPS - 3 ft.

Date: 11/4/2016
Evaluator: Dan Michael
620 North Broadway
Lebanon, OH 45036

Certification Stamp or Certification# #30586
Signature:
Phone # : 513-934-1040

Soil Profile		Estimating Soil Saturation			Estimating Soil Permeability							
		Munsell Color (hue, value, chroma)										
			Redoximorphic Features		Texture			Structure				
Horizon	Depth (inches)	Matrix color	Concentrations	Depletions	Class	Approx. % clay	Approx. % Fragments	Grade	Size	Type (shape)	Consistence	Other Soil Features
Ap	0 - 8	10YR 4/2 dark grayish brown			silt loam	15%	0%	3 - strong	f	gr	friable	
Bt1	8 - 12	10YR 4/6 dark yellowish brown			silty clay loam	27%	0%	2- moderate	f	SBK	friable	
Bt2	12 - 38	10YR 4/6 dark yellowish brown	10YR 3/1 1%	10YR 5/2 20%	silty clay loam	32%	0%	2- moderate	m	SBK	friable to firm	
2Bt	38 - 50	10YR 4/4 dark yellowish brown	10YR 3/1 1%	10YR 5/2 30%	clay loam	36%	2%	2- moderate	m	SBK	firm	
3Bt	50 - +	2.5Y 4/4 olive brown	10YR 3/1 1%	10YR 5/2 20%	silty clay	50%	2%	1- weak	co	SBK	very firm	very high in clay

Limiting Conditions	Depth to (in.)	Descriptive notes	Remarks/Risk Factors:
Perched Seasonal Water Table	12 to 18 in.		This is the upper portion of the north west area. (Above dashed line on map)
Ground Water/Aquifer	> 50 in.		
Highly Permeable Material (range)	> 50 in.		
Bedrock	> 50 in.	Fractured - Karst (circle one)	
Flow Restrictive Layer	50 in.	c	It is acceptable to use the LLR of the column of 12 to 24 inches.
Highly Weathered Soil	> 50 in.		
Fractured Glacial Till	> 50 in.		
Other High Risk Limiting Condition	> 50 in.		

Note: The evaluation shall include a complete site plan or site drawing including all requirements in paragraphs (B)(1) through (B)(4) of OAC 3701-29-08

3832-A

ODH-2006

Table 3. Soil Infiltration Loading Rates.

Soil Characteristics			Soil Infiltration Loading RRate (gpd/ft2)		
Texture	Structure		CBOD5		
	Shape	Grade	>25mg/L (septic tank effluent)	<=25mg/L (pretreated effluent)	Row
COS, S, LCOS,LS	–	0SG	0.8	1.6	1
FS, VFS, LFS, LVFS	–	0SG	0.4	1	2
CSL, SL	--	0M	0.2	0.6	3
	PL	1	0.2	0.5	4
		2, 3	0	0	5
	PR/BK/GR	1	0.4	0.7	6
		2, 3	0.6	1	7
FSL, VFSL	--	0M	0.2	0.5	8
	PL	1,2,3	0	0	9
	PR/BK/GR	1	0.2	0.6	10
		2,3	0.4	0.8	11
L	--	0M	0.2	0.5	12
	PL	1,2,3	0	0	13
	PR/BK/GR	1	0.4	0.6	14
		2,3	0.6	0.8	15
SIL	--	0M	0	0	16
	PL	1,2,3	0	0	17
	PR/BK/GR	1	0.4	0.6	18
		2,3	0.6	0.8	19
SCL, CL, SICL	--	0M	0	0	20
	PL	1,2,3	0	0	21
	PR/BK/GR	1	0.2	0.3	22
		2,3	0.4	0.6	23
SC, C, SIC	--	0M	0	0	24
	PL	1,2,3	0	0	25
	PR/BK/G	1	0	0	26
		2,3	0.2	0.3	27

Soil Characteristics			Hydraulic Linear Loading Rate (gpd/ft)									
			Slope 0-4%			Slope 5-9%			Slope >10%			
Texture	Structure		Infiltrative Distance, (Inches)			Infiltrative Distance, (Inches)			Infiltrative Distance, (Inches)			
	Shape	Grade	8 - 12	12-24	24-48	8 - 12	12-24	24-48	8 - 12	12-24	24-48	Row
COS, S, LCOS,LS	--	0SG	4.0	5.0	6.0	5.0	6.0	7.0	6.0	7.0	8.0	1
FS, VFS, LFS, LVFS	--	0SG	3.5	4.5	5.5	4.0	5.0	6.0	5.0	6.0	7.0	2
CSL, SL	--	0M	3.0	3.5	4.0	3.6	4.1	4.6	5.0	6.0	7.0	3
	PL	1	3.0	3.5	4.0	3.6	4.1	4.6	4.0	5.0	6.0	4
		2, 3										5
	PR/BK/	1	3.5	4.5	5.5	4.0	5.0	6.0	5.0	6.0	7.0	6
	GR	2, 3	3.5	4.5	5.5	4.0	5.0	6.0	5.0	6.0	7.0	7
FSL, VFSL	--	0M	2.0	2.3	2.6	2.4	2.7	3.0	2.7	3.2	3.7	8
	PL	1,2,3										9
	PR/BK	1	3.0	3.5	4.0	3.3	3.8	4.3	3.6	4.1	4.6	10
	GR	2,3	3.3	3.8	4.3	3.6	4.1	4.6	3.9	4.4	4.9	11
L	--	0M	2.0	2.3	2.6	2.4	2.7	3.0	3.2	3.2	3.7	12
	PL	1,2,3	-	-	-	-	-	-	-	-	-	13
	PR/BK	1	3.0	3.5	4.0	3.3	3.8	4.3	3.6	4.1	4.6	14
	GR	2,3	3.3	3.8	4.3	3.6	4.1	4.6	3.9	4.4	4.9	15
SIL	--	0M	2.0	2.5	3.0	2.2	2.7	3.2	2.4	2.9	3.4	16
	PL	1,2,3										17
	PR/BK	1	2.4	2.7	3.0	2.7	3.0	3.3	3.0	3.5	4.0	18
	GR	2,3	2.7	3.0	3.3	3.0	3.5	4.0	3.3	3.8	4.3	19
SCL, CL, SICL	--	0M										20
	PL	1,2,3										21
	PR/BK	1	2.0	2.5	3.0	2.2	2.7	3.2	2.4	2.9	3.4	22
	GR	2,3	2.4	2.9	3.2	2.7	3.0	3.3	3.0	3.5	4.0	23
SC, C, SIC	--	0M										24
	PL	1,2,3										25
	PR/BK	1										26
	GR	2,3	2.0	2.5	3.0	2.2	2.7	3.2	2.4	2.9	3.4	27

3832 Tower Rd.

OSU Mound Calculations

Based on OSU Bulletins 813 and 829
(3/4" Laterals)

Wastewater Volume per Day

Number of Units	No. of bedrooms	3.0	Determined from Provided Information
Unit Flow Rate	(gal/d)		

Existing Water Usage per Day

Unit Flow Rate	(cu ft)	
Days per Recording Period	days	
Avg. Unit Flow Rate	(gal/d)	

Site & Soil Conditions

Site Slope Perpendicular to Mound Long Axis (Length):	(%)	14.0	From Site Investigation
Liner Loading Rate (LLR)	(gpd/ft)	3.25	From Site Investigation
Additional LLR capacity	(gpd/ft)	0.0	(if applicable)
Basal Loading Rate (BLR)	(gpd/sq ft)	0.6	From Site Investigation
Depth to Limiting Condition	(inches)	12.0	From Site Investigation

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Design Parameters and Calculations

Will System Have Pretreatment?	N	Drop down list
Regulatory Vertical Separation Distance (in)	18	Default value is 18"
Effective vertical separation distance (in)		Any soil credits?
Regulatory in-ku soil depth (in)	8	Default value is 8"
Sand Depth (inches) (D)	6	Use 4" (min) for pretreat mounds; 6" (min) for septic effluent
Sand Depth (ft) (D)		
Top Soil Depth (inches) (H)	6	Use 6"-8" topsoil
Top Soil Depth (ft) (H)		
Width of Distribution Area (ft) =		LLR/Sand Fill Loading Rate (1 GPD/ft2)
Length of Distribution Area (ft) =		Design flow rate / LLR
LLR Reduction (if applicable) (%) =	0%	Reduction as allowed by OAC 3701-29-15(N)(2)(h) - up to 10% for new construction; up to 30% for replacement.
Adjusted Length of Distribution Area (ft) =		Length of distribution x (1-reduction factor)
Adjusted LLR after reduction (if applicable)		Back-calculated LLR based on adjusted length
Adjusted width after reduction (if applicable) (A)		Design flow rate/SLR/Adjusted length of distribution
Minimum # of Laterals =		Laterals must be split with either 1,2,4,8,etc supply lines. If 8 laterals, think about using 1" laterals
Lateral Length (ft) =		Maximum lateral length = 32' (for 3/4" laterals)
Initial Length of Gravel Bed (ft) =		Equal initial total lateral lengths
Min No. of Orifice =		Equals initial area of distribution bed (initial length of gravel bed x adj. width) divided by 6 (Max 6 ft2
Number of manifolds =		If Distribution Area width is 4 ft or greater, use dual manifolds
Total # of laterals (all manifolds) =		No. of laterals x No. of manifolds
Min. # of orifices per lateral =		Min. # of orifices / total # of laterals
Max Orifice Spacing =		Lateral length / # of orifices
Effective orifice spacing	1.50	(feet/inches)
Effective No of orifices per lateral		Lateral length / effective orifice spacing
Effective total No. of orifices		Effective # of orifices per lateral x total number of laterals
Effective total Width (each)		Effective orifice spacing x effective # of orifices per lateral
Effective TOTAL Lateral Length (ft) =		Equals # of laterals x lateral lengths
Effective Length of Gravel Bed (ft) (B) =		Equal effective total lateral lengths plus 6" for each internal cleanout sweep plus 12" each end
Depth of Gravel Bed (ft) (F) =	0.5	Default is 0.5 ft (6")
Basal Width (ft) =		LLR/SLR
Basal Width beyond Distribution (ft) =		Calculated Basal width minus effective width of distribution
Top of Sand offset (ft) =		Set value per detail
Top of Sand Width (ft) =		Effective width of distribution plus 2x sand offset
Upslope sand depth (U) =		Min sand depth required (in feet)
Downslope sand depth (E) =		Equals min. sand depth + site slope x gravel width (feet/inches)
Upslope sand depth at offset =		Equals upslope sand depth - site slope x 6" sand offset (feet/inches)
Downslope sand depth at offset =		Equals downslope sand depth + site slope x 6" sand offset (feet/inches)
Upslope Correction factor		Lookup value from table below
Downslope Correction factor		Lookup value from table below
Upslope sand width (U) =		(feet/inches)
Downslope sand width (I) =		(feet/inches)
Total Sand Width (ft) (W) =		Equals Top of Sand width (A+1) + upslope width (J) + downslope width (I) (feet/inches)
Top of Sand Length (ft) =		Effective total Length of distribution area plus 2x Top of sand offset
Sand Sideslope Length (ft) (N) =		Avg of upslope and downslope depths of sand * sideslope factor (3:1) (feet/inches)
Total Sand Length (ft) (L) =		Top of Sand length plus 2x sideslope lengths
Upslope Cover Width (ft) (UW) =		***Check Cross Section Detail - should equal J + 5 ft.
Downslope Cover Width (ft) (DW) =		Downslope sand width plus any buffer distance plus 1ft
Required Buffer Area (ft) =		Perimeter drain must be Min 8 ft from nearest lateral and 1 ft from toe of sand mound
Sideslope Cover Length (ft) (SL) =		(Average of upslope and downslope sand depth + gravel depth + topsoil depth) x 3:1 slope
Total Width of Mound (ft) (TW) =		Upslope cover width + downslope cover width + top of sand width
Total Length of Mound (ft) (TL) =		Effective length of the distribution area + (2 x sideslope cover length) + (2 x sand offset)
Dose volume (without drainback) =		Dose volume = total lateral length x 5 x 0.026 gal/ft (assumes 3/4" laterals)
Dose volume (without drainback) =		Dose volume = total lateral length x 5 x 0.04 gal/ft (assumes 1" laterals)
Dose volume (without drainback) =		Dose volume = total lateral length x 5 x 0.07 gal/ft (assumes 1-1/4" laterals)

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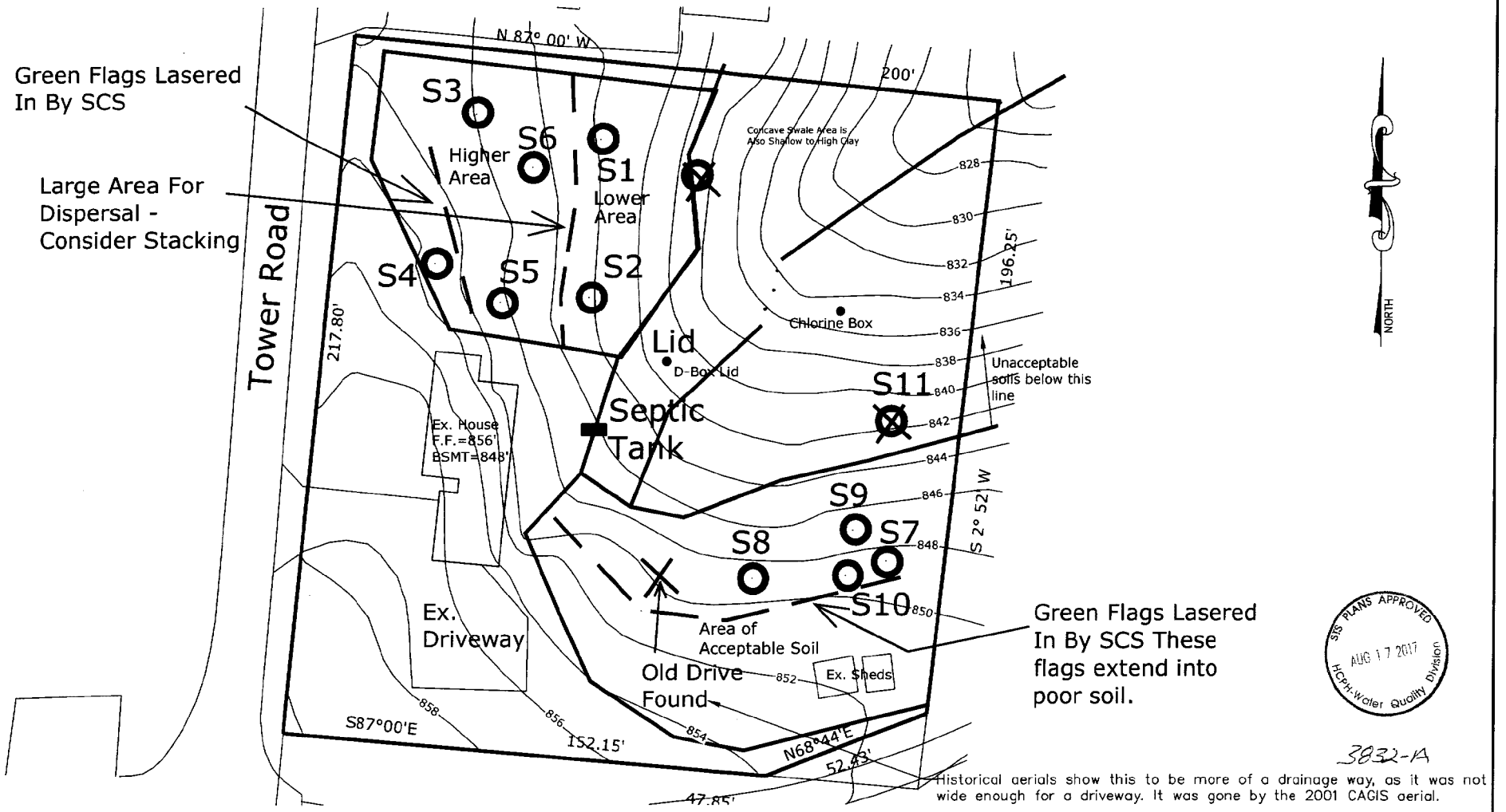
3832-A



SCS ENGINEERS	SHEET 2
CONSULTING ENGINEERS, INC. 2060 READING ROAD SUITE 200 CINCINNATI, OHIO 45202 PH. (513) 421-5353	SOIL LOCATIONS AND REPLACEMENT AREA 3832 TOWER ROAD - MANGIONE RESIDENCE PARCEL NUMBER: 550-0293-0018-00 HAMILTON COUNTY OHIO - 0.986 ACRES

PROJ. NO.	CADD FILE:	DATE:	SCALE:
27216008.47	MANGIONE SEPTIC V2b	JULY 2017	AS SHOWN

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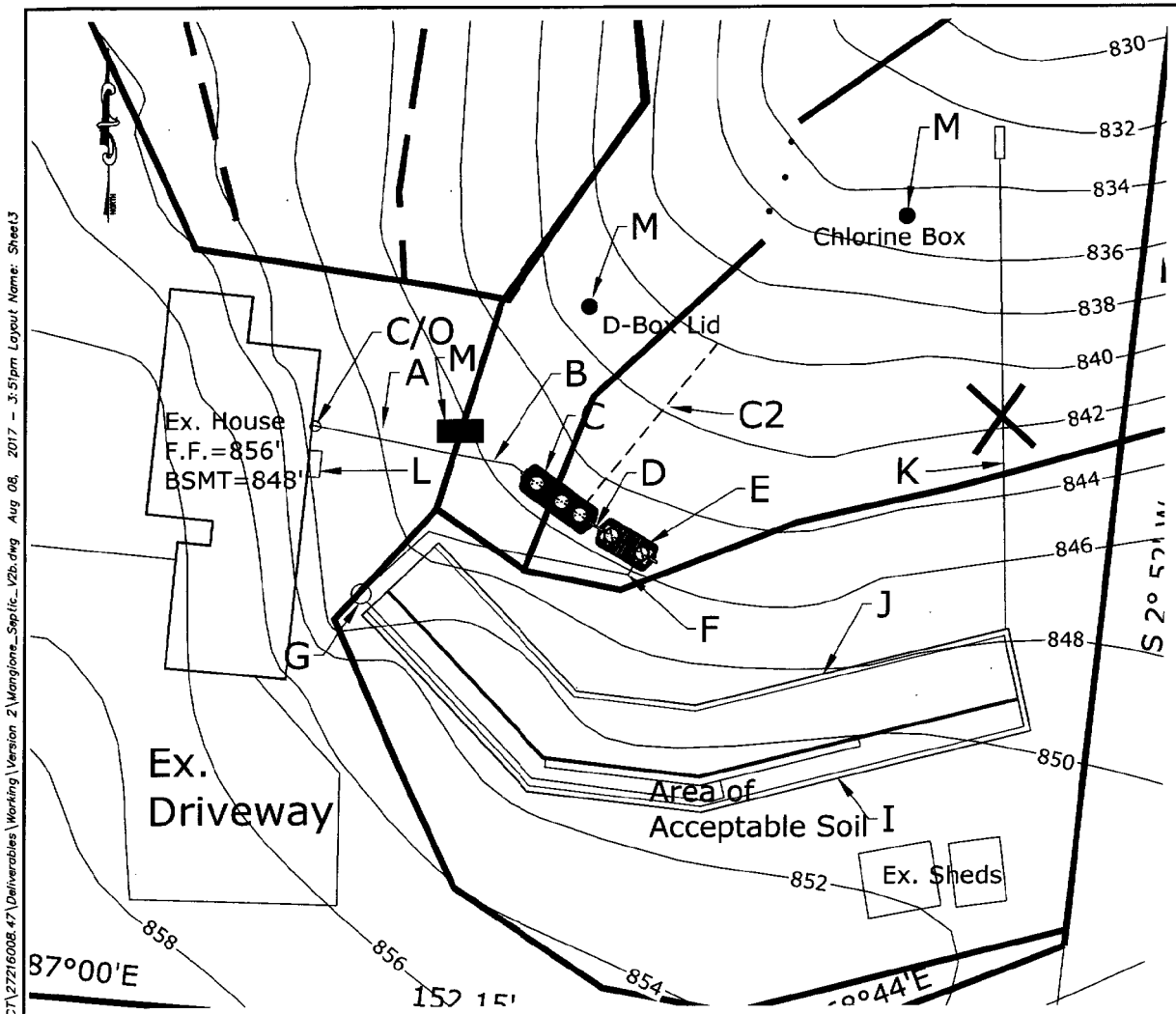

A -Existing Building Sewer.

B - New 4 inch Sch 40 PVC pipe with minimum 1% grade. A cleanout will be installed at the point where sewer pipe exits the foundation. No pipe elbows greater than 45° will be used.

C - Infiltrator IM-1530, 1530 gallon dual compartment Septic Tank.
C2 - Tank cavity drain for Infiltrator Septic and Dosing Tanks. See Sheet 4 for Detail.

D - 4 inch Sch 40 PVC pipe, extending from new Septic Tank (C) to new Dosing Tank (E) with minimum 1% grade.

E - Infiltrator IM-1060, 1060 gallon single compartment dosing tank with Barnes STEPSS512 (0.5 HP) pump.

F - 1.5 inch Schedule 40 PVC force main.

G - Trap with Air release valve. See Sheet 4 for detail

H - Mound - see Sheets 5 & 6 for details. Row of Orange Flags set at centerline of mound.

I - 12" wide x 14" minimum depth Interceptor drain in gravel sloped 1/16" per foot to outlet. Gravel to the surface. Depth will be about 21.5 inches at the connection to the outlet line.

J - 12" wide x 14" minimum depth perimeter drain in gravel sloped 1/16 in. per foot to outlet. Depth will be about 21.5 inches at the connection to the outlet line.

K- Perimeter and interceptor drain outlet line must be solid walled rigid pipe; Portion with <12" cover must be 4" Sch 40 PVC, Minimum of last 10' must be 4" Sch 40 PVC w/ Animal Guard at outlet; 6" min. freeboard. Sloped minimum 1/8" per foot to outlet.

L- Control Panel RJR CIN-1

M- Approximate location of existing original septic tank, distribution box, and chlorine box. Components shall be abandoned per OAC 3701-29-21, and in conformance with HCPH permitting and reporting requirements.

FIELD LASERED FLAG PLACEMENTS TO BE CONSIDERED MORE ACCURATE THAN CAGIS CONTOURS

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NOTE:
ALL PIPE (WITH THE EXCEPTION OF INTERCEPTOR AND PERIMETER DRAIN PIPES) SHALL BE SCHEDULE 40 PVC MEETING ASTM D1785

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SHEET 3
SEPTIC SYSTEM LAYOUT AND COMPONENTS

3832 TOWER ROAD - MANGIONE RESIDENCE
PARCEL NUMBER: 550-0293-0018-00
HAMILTON COUNTY OHIO - 0.986 ACRES

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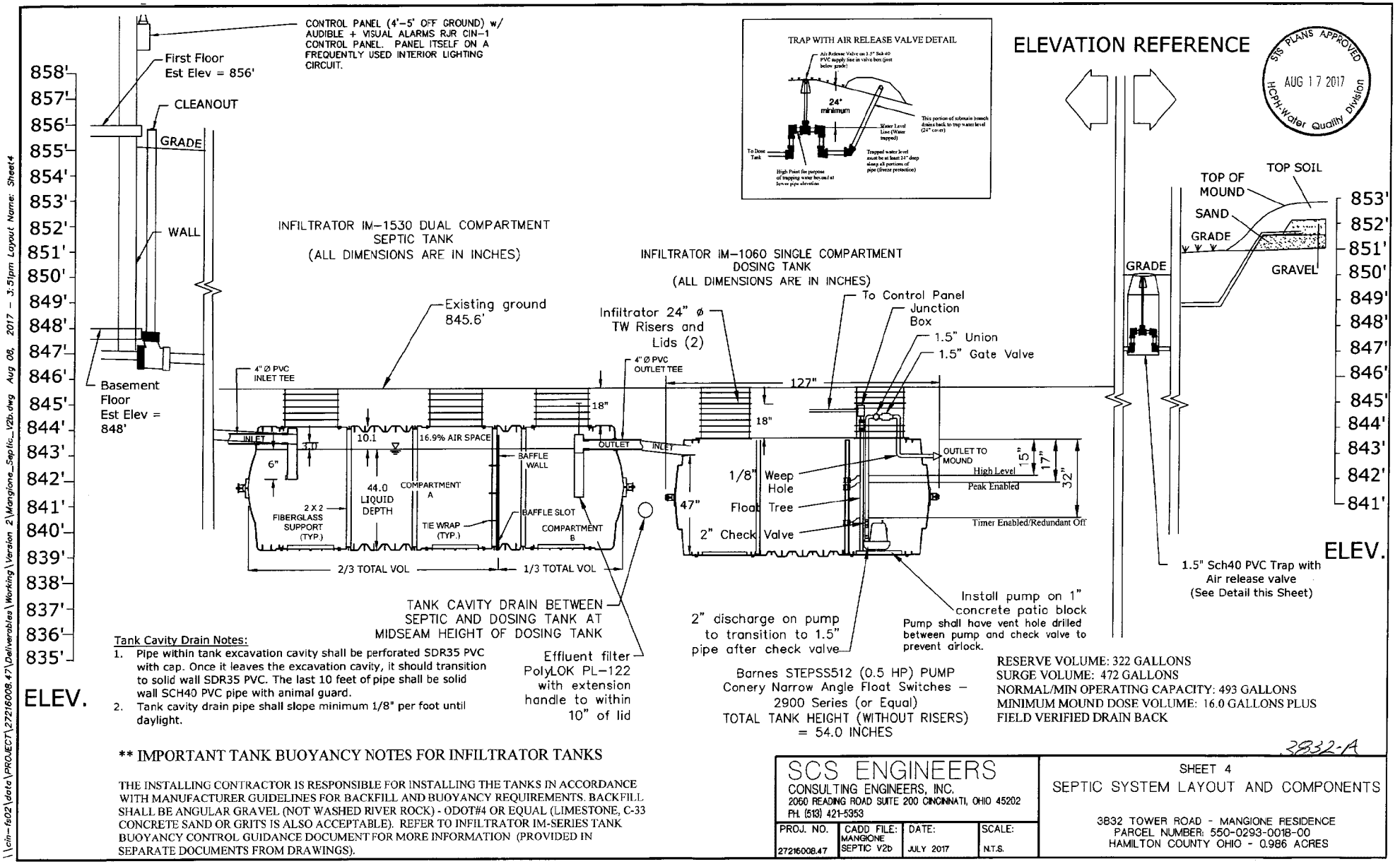

Tank Cavity Drain Notes:

1. Pipe within tank excavation cavity shall be perforated SDR35 PVC with cap. Once it leaves the excavation cavity, it should transition to solid wall SDR35 PVC. The last 10 feet of pipe shall be solid wall SCH40 PVC pipe with animal guard.
2. Tank cavity drain pipe shall slope minimum 1/8" per foot until dadaylight.

** IMPORTANT TANK BUOYANCY NOTES FOR INFILTRATOR TANKS

THE INSTALLING CONTRACTOR IS RESPONSIBLE FOR INSTALLING THE TANKS IN ACCORDANCE WITH MANUFACTURER GUIDELINES FOR BACKFILL AND BUOYANCY REQUIREMENTS. BACKFILL SHALL BE ANGULAR GRAVEL (NOT WASHED RIVER ROCK) - ODOT#4 OR EQUAL (LIMESTONE, C-33 CONCRETE SAND OR GRITS IS ALSO ACCEPTABLE). REFER TO INFILTRATOR IM-SERIES TANK BUOYANCY CONTROL GUIDANCE DOCUMENT FOR MORE INFORMATION (PROVIDED IN SEPARATE DOCUMENTS FROM DRAWINGS).

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SHEET 4
SEPTIC SYSTEM LAYOUT AND COMPONENTS

3832 TOWER ROAD - MANGIONE RESIDENCE
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HAMILTON COUNTY OHIO - 0.986 ACRES

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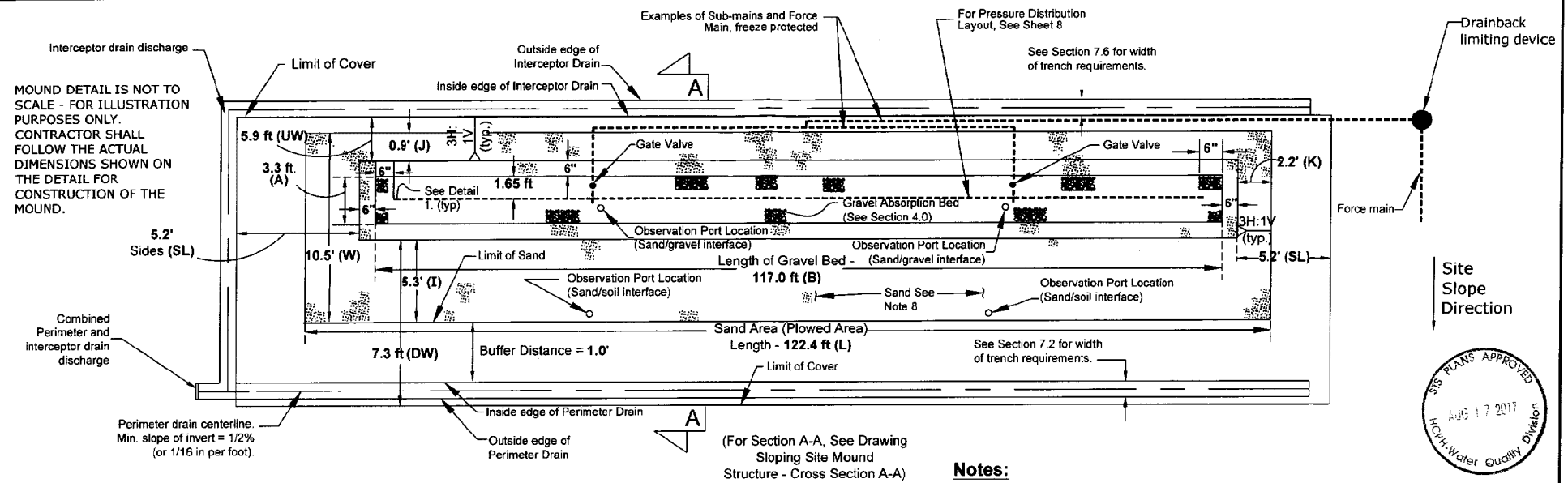

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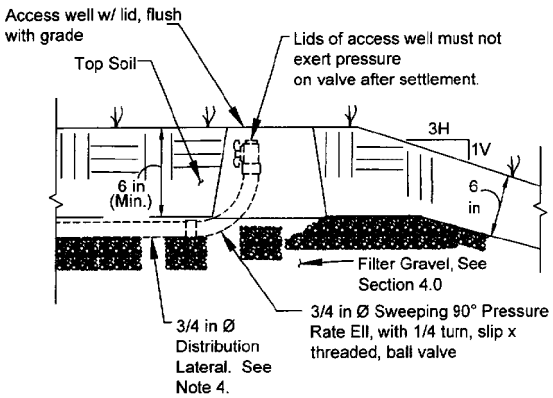
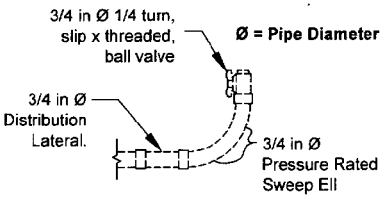
Notes:

1) Observation ports to be installed per Section 10.11. Also see Observation Port Detail (i.e., fabrication detail) on Sheet 7.
2) See Approved Plan for dimensions of various mound components.
3) Buffer area to be protected (area between basal/sand area and interceptor or perimeter drains). Compaction, excavation, or plowing in this area is NOT permitted.
4) Orifices are set at the 6 O'Clock position (down) except first and last orifice on the laterals which face up. See Sheet 7 for the Pressure Distribution layout detail.
5) Interceptor Drain and Perimeter Drain share a common discharge line.
6) Interceptor Drains do not share a trench with pressure mains. Isolation distance is 3' minimum. If they must cross as part of an approved plan, then the drain is hard piped to 5' on either side of the pressure main and backfilled with tamped dirt. Interceptor drain maintains 6' from any distribution lateral. Perimeter Drain maintains 8' from any distribution lateral. Both drain types maintain at least 12" from any basal area sand fill.
7) Sub-main(s) are to be sloped at a minimum of 1% (1/8 in per ft) to promote drainage back towards the force main after dosage completion.
8) Sand type complies with Section 4 (Table 4.2). Sand thickness is dependent on Approved Plan. Minimum sand thickness is based on the highest contour elevation on upslope side of the basal area under the gravel area. Top of sand area is to be level.



Detail 1 - Lateral Cleanout
(No Scale)

Sloping Site Mound & Modified Mound Structure - General Plan
(No Scale)



Lateral Cleanout Setup
(No Scale)

ALL SECTION NOTATIONS REFERENCE THE HAMILTON COUNTY INSTALLER'S MANUAL

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SHEET 5
SLOPING SITE MOUND & MODIFIED MOUND GENERAL PLAN

3832 TOWER ROAD - MANGIONE RESIDENCE
PARCEL NUMBER: 550-0293-0018-00
HAMILTON COUNTY OHIO - 0.986 ACRES

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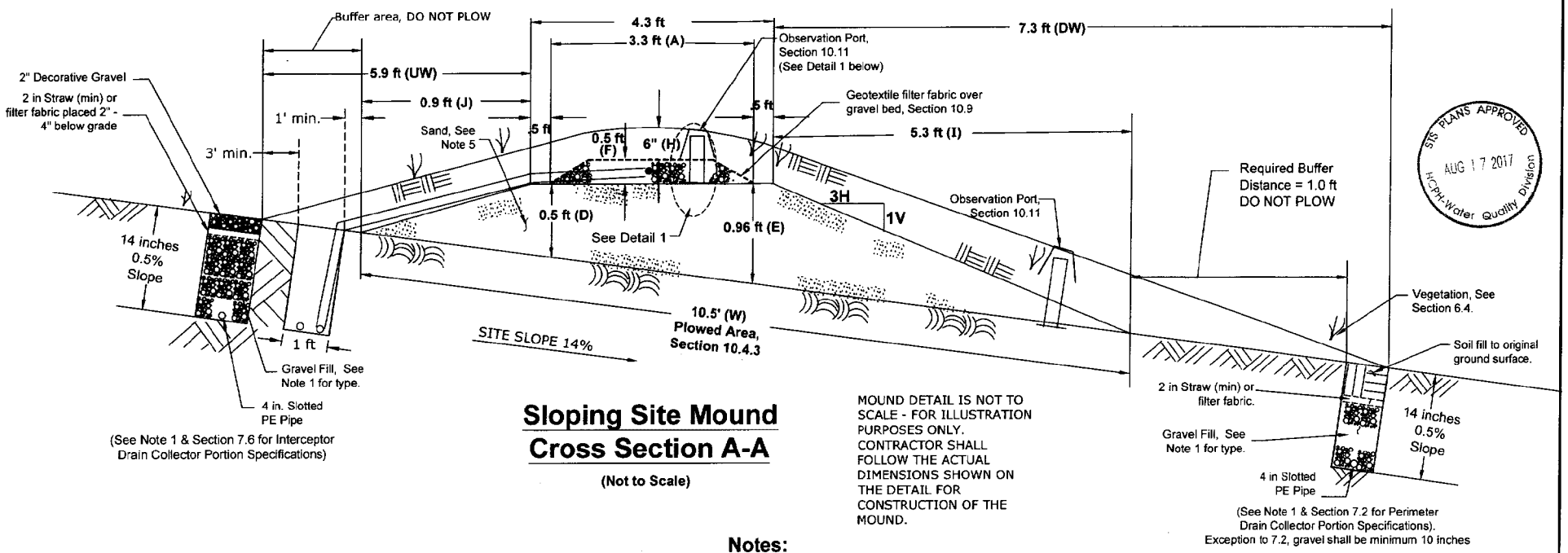
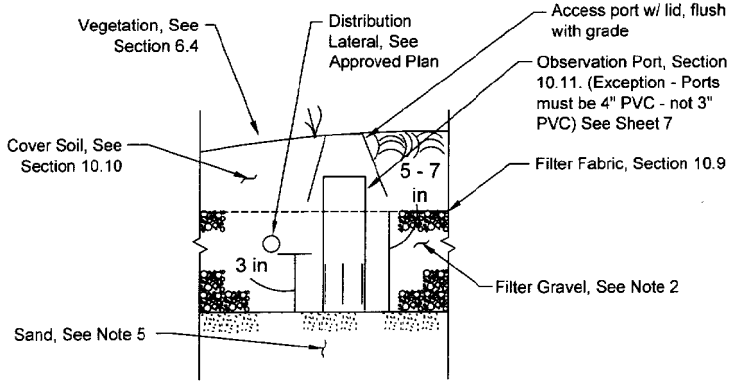


Sloping Site Mound
Cross Section A-A

(Not to Scale)

MOUND DETAIL IS NOT TO SCALE - FOR ILLUSTRATION PURPOSES ONLY. CONTRACTOR SHALL FOLLOW THE ACTUAL DIMENSIONS SHOWN ON THE DETAIL FOR CONSTRUCTION OF THE MOUND.



Detail 1
(No Scale)

Notes:

1) The required aggregate backfill varies with the width of the excavated trench, See Section 7.2 & 7.6 for requirements. For aggregate specifications, See Section(s) 4.5, 4.6 or 4.7. If aggregate specified in Section 4.7 is used, then the requirements of Section 4.9 apply. This section requires special marking to allow for confirmation of pipe invert slope.
2) The specified aggregate(s) in this component are summarized in Table 4.1. See Sections 4.5, 4.6 or 4.7 for individual aggregate type specifications.
3) The sub-mains and force main must be sloped to allow drainback to the point where two (2) feet of cover over the mains is maintained. The minimum slope of the force main and sub-mains for drainback is 1% (1/8 inch per foot). The mains must not penetrate the basal area.
4) The thickness of gravel above the lateral depends upon the orientation of the orifices. If the orifices are required to be at the 6 O'Clock position (Down), the laterals are to be installed flat. The gravel thickness is to be such that the distribution lateral is covered, but no more than 1 inch below the surface of the gravel. If the orifices are required to be at the 12 O'Clock position (Up), the laterals are to be installed at a minimum slope of 0.83% (1 in per 10 ft) sloping back (draining back) to the manifold. The thickness of gravel over the top of the lateral will vary, but the minimum thickness below the manifold (lowest point) is 3 inches.
5) Sand type complies with Section 4 (Table 4.2). Sand thickness is dependent on Approved Plan. Minimum sand thickness is based on the highest contour elevation on upslope side of basal under the gravel area. Top of sand area is to be level.

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SHEET 6
SLOPING SITE MOUND STRUCTURE
CROSS SECTION A-A

3832 TOWER ROAD - MANGIONE RESIDENCE
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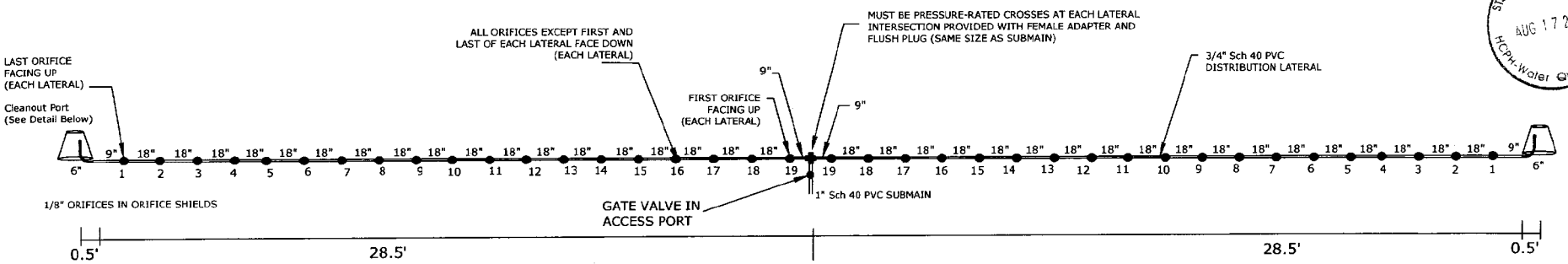
TYPICAL LATERAL SET LAYOUT

(ONLY ONE (1) PRESSURE DISTRIBUTION LATERAL SET SHOWN FOR CLARITY)

ONE OF TWO LATERAL SETS SHOWN



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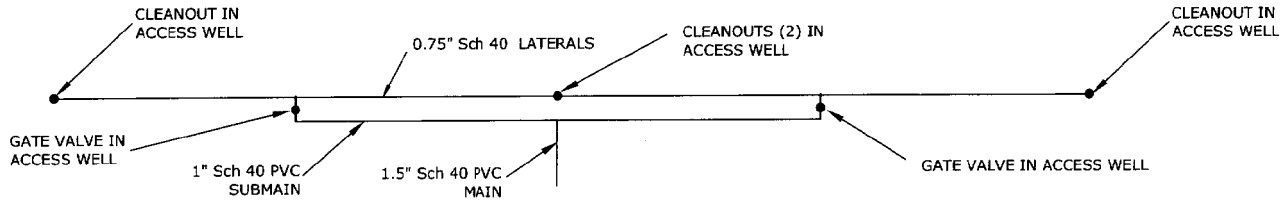
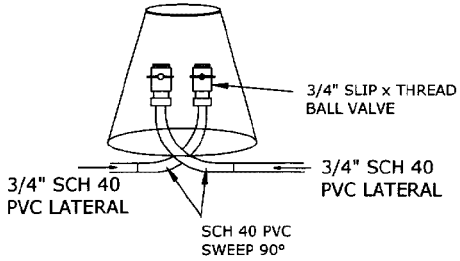
OBSERVATION PORTS
2 AT SAND/BASAL INTERFACE AT TOE OF MOUND
2 AT SAND AND GRAVEL INTERFACE WHERE LATERAL MEETS SUBMAIN

NOTE:
ALL PIPE SHALL BE SCHEDULE 40 PVC MEETING ASTM D1785. ALL FITTINGS AND GATE VALVES SHALL BE PRESSURE-RATED MEETING ASTM D2466.

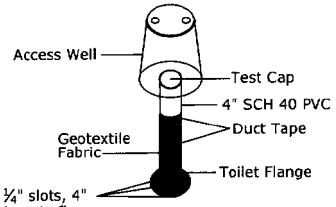


CLEANOUT PORTS AT INSIDE ENDS OF LATERALS



Detail is for illustration purposes. Cleanout ports may be aligned side by side within the enclosure.

Observation Port Detail (4)



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SHEET 7

PRESSURE DISTRIBUTION DETAIL

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HAMILTON COUNTY OHIO - 0.986 ACRES

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Pump Selection for a Pressurized System - Single Family Residence Project

Mangione Septic / 3832 Tower Road

Parameters

Discharge Assembly Size	2.00	inches
Transport Length	137	feet
Transport Pipe Class	40	
Transport Line Size	1.50	inches
Distributing Valve Model	None	
Max Elevation Lift	13	feet
Manifold Length	30	feet
Manifold Pipe Class	40	
Manifold Pipe Size	1.00	inches
Number of Laterals per Cell	4	
Lateral Length	25.4	feet
Lateral Pipe Class	40	
Lateral Pipe Size	0.75	inches
Orifice Size	1/8	inches
Orifice Spacing	1.5	feet
Residual Head	5	feet
Flow Meter	None	inches
'Add-on' Friction Losses	5	feet

Calculations

Minimum Flow Rate per Orifice	0.43	gpm
Number of Orifices per Zone	68	
Total Flow Rate per Zone	30.1	gpm
Number of Laterals per Zone	4	
% Flow Differential 1st/Last Orifice	8.1	%
Transport Velocity	4.8	fps

Frictional Head Losses

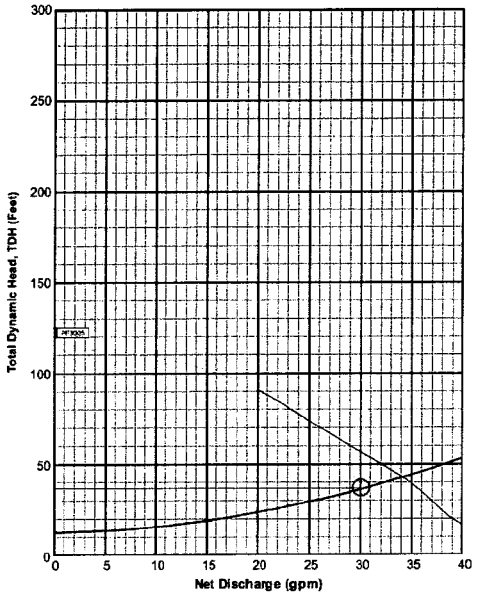
Loss through Discharge	1.8	feet
Loss in Transport	7.2	feet
Loss through Valve	0.0	feet
Loss in Manifold	3.5	feet
Loss in Laterals	1.0	feet
Loss through Flowmeter	0.0	feet
'Add-on' Friction Losses	5.0	feet

Pipe Volumes

Vol of Transport Line	14.5	gals
Vol of Manifold	1.3	gals
Vol of Laterals per Zone	2.8	gals
Total Volume	18.6	gals

Minimum Pump Requirements

Design Flow Rate	30.1	gpm
Total Dynamic Head	36.6	feet



Orenco Systems® Incorporated

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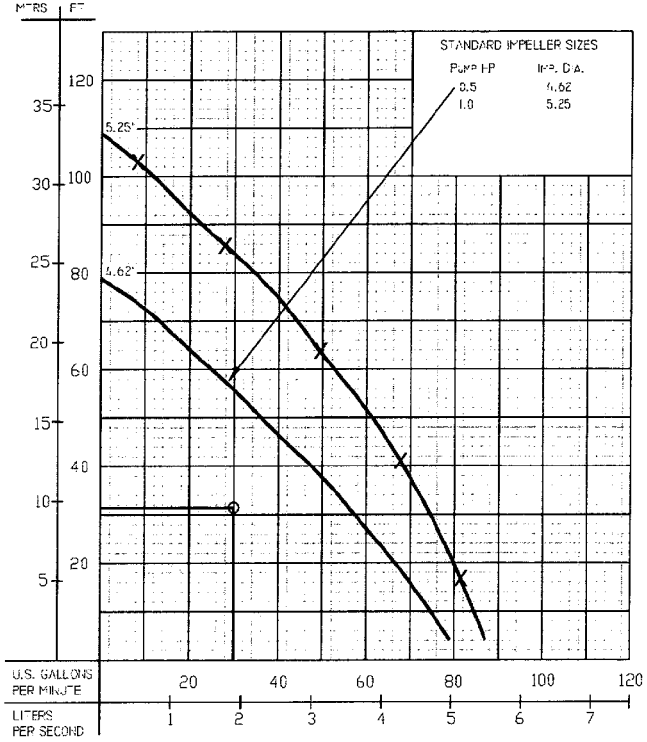
Submersible Effluent Pumps



Testing is performed with water, specific gravity 1.0 @ 68° F @ (20°C), other fluids may vary performance

CRANE PUMPS & SYSTEMS

A Crane Co. Company

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SECTION 3A
PAGE 3
DATE 12/07

SCS PLANS APPROVED
AUG 17 2017
HCPH Water Quality Division

Barnes STEPSS512 (0.5 HP) PUMP CURVE

3832-A

SCS ENGINEERS
CONSULTING ENGINEERS, INC.
2060 READING ROAD SUITE 200 CINCINNATI, OHIO 45202
PH. (513) 421-5353

PROJ. NO.	CADD FILE:	DATE:	SCALE:
27216008.47	MANGIONE SEPTIC V2b	JULY 2017	N.T.S.

SHEET 8

PUMP SELECT INFORMATION

3832 TOWER ROAD - MANGIONE RESIDENCE
PARCEL NUMBER: 550-0293-0018-00
HAMILTON COUNTY OHIO - 0.986 ACRES

\\cin-fs02\data\PROJECT\27216008.47\Deliverables\Working\Version 2\Mangione_Septic_V2b.dwg Aug 08, 2017 - 3:52pm Layout Name: Sheet8