**SEWAGE TREATMENT SYSTEM (STS) DESIGN FOR Moundview Park** 3130 Newtown Road, Cincinnati, OH, 45244 Par# 501-0008-0127-00 16.345 Acres

Designed By: SCS ENGINEERS 2060 Reading Road, #200 Cincinnati OH 45202 513-826-4174 Design date: May 2023 Site Visited in May 2023

# Design Details:

Septic effluent to a dosing tank to a sand mound with perimeter drains around all four sides. The Village of Newtown will place a Deed restriction on the parcels to keep them from being separated, since the septic spans two parcels.

#### Design Rationale:

This replacement system design is for a Small Flow Onsite Treatment System (SFOTS) that consists of a park and a former residence that is now rental out for events. The projected equalized flow rate was calculated at 200 GPD. The peak flow should not be reached on a routine basis. Average flows of 120 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 20" and flow restrictive layer of high clay at greater than 50" from the ground's surface. Conditions require an 18" Vertical Separation Distance with 8" In Situ Soil. Since the site has 20" of in situ soil, the mound will contain a minimum of 6" of sand [per OAC 3701-29-15 Appendix B (III)(c)] the restrictive conditions are satisfied.

Sand mound minimum design length and width are calculated based on the selected from tables in the Ohio Administrative Code. The Soil Loading rate for this sandy loam with strong granular structure is 0.6 GPD/sq.ft for septic effluent. The Linear Loading Rate for this loam with moderate sub-angular blocky structure with an infiltrative distance of 20" and 2% slope is 3.8 GPD/Ln. Ft.

Sand Mound Minimum Design Length is therefore 200 GPD divided by 3.8 specified in OAC 3701-29-06(G)(3). Gal.Per Ln. Ft = 52.6 feet long. Total mound dimensions including soil cover are 17.8 feet wide by 66.2 feet long. For complete mound dimensions, see calculation sheet provided separately.

# 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 or designer for guidance before proceeding.

Roth MultiTank Installation Manual: http://ow.ly/YUycr

Champion Pumps: http://www.championpump.com/

Hamilton County Installation Manual: http://ow.lv/YUlW30dOkV6

Conery Narrow Angle Floats: http://ow.ly/uyE830gFitn

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 worst soil conditions under the soil absorption system. The loading rate was 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

#### **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:

\$58,500 - 78,000 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.



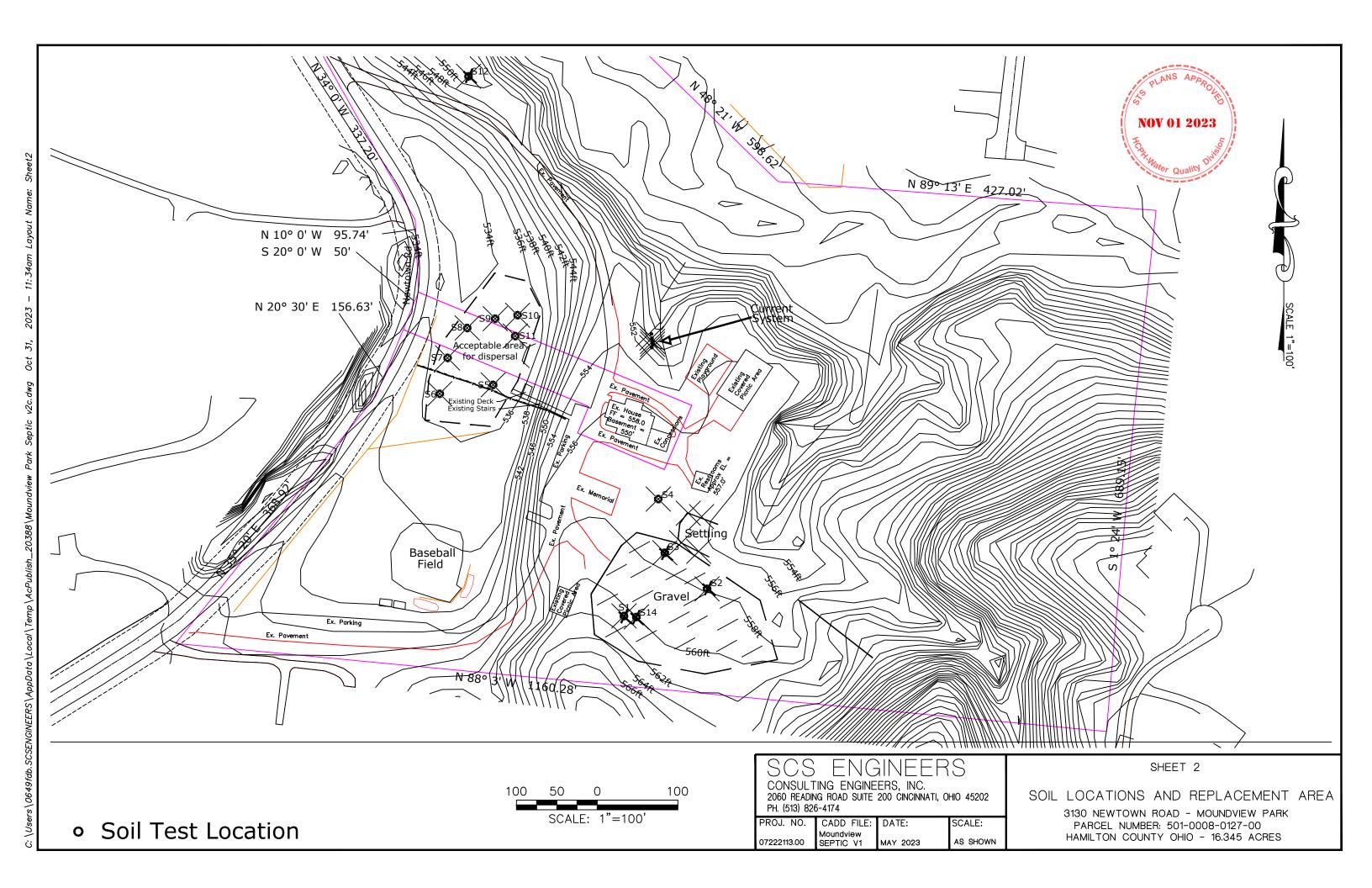


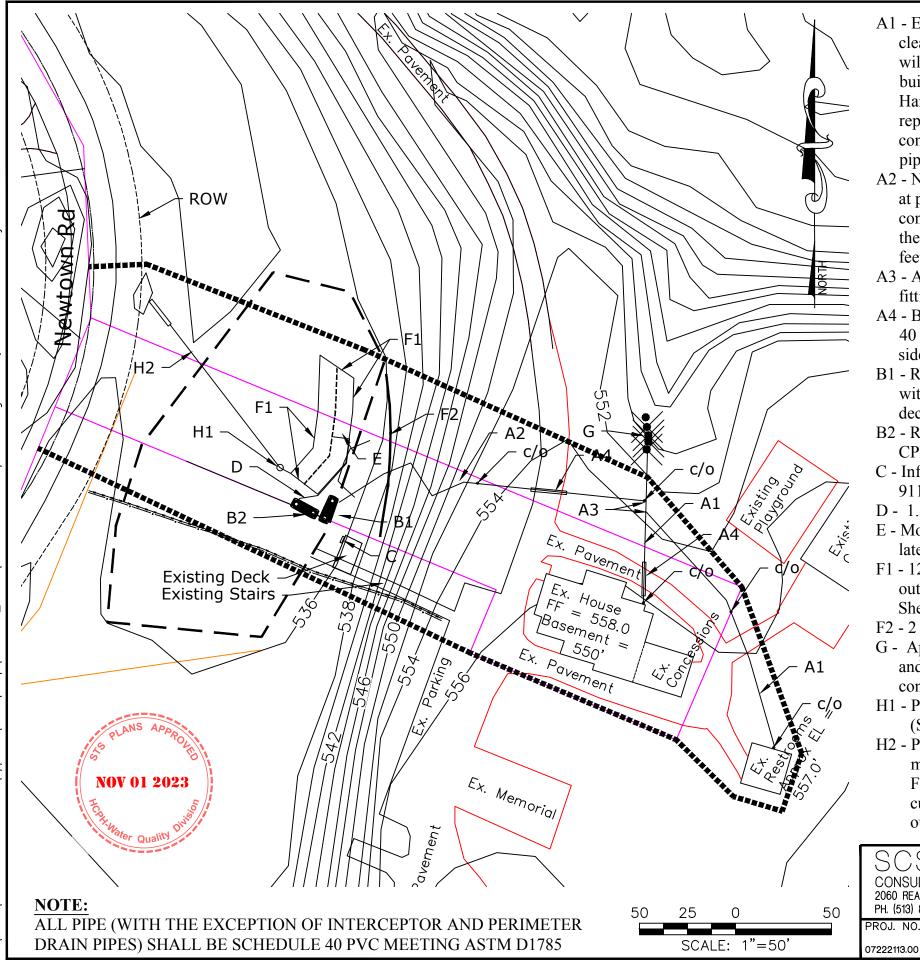
CONSULTING ENGINEERS, INC. 2060 READING ROAD SUITE 200 CINCINNATI, OHIO 45202 PH. (513) 826-4174

PROJ. NO. CADD FILE: DATE: SCALE: Moundview 07222113.00 N.T.S. MAY 2023 SEPTIC V1

SHFFT 1

GENERAL NOTES AND DESIGN BASIS





- A1 Existing 4 inch Schedule 40 PVC Sewer pipe with minimum 1% grade and cleanouts at house where building sewer crosses foundation wall. NOTE: Installer will need to verify existing building sewer location and pipe material to determine if building sewer needs to be replaced. Sewer camera video will need to be provided to Hamilton County for verification. If building sewer from detached restroom is replaced, it is likely to cross a waterline to the drinking fountain. Crossing must comply with OAC 3701-29-06 (G)(3)(d) for minimum vertical separation of the pipes and pipe sleeving requirements.
- A2 New 4 inch Schedule 40 PVC Sewer pipe with minimum 1% grade and cleanouts at point where new building sewer begins. If building sewer is being replaced completely, then cleanouts need to be installed at point where building sewer crosses the foundation of existing house and existing restroom facility. And cleanouts at 75 feet and every 100 feet thereafter.
- A3 All connections between separate building sewers must be made with "WYE" fittings.
- A4 Building sewers crossing under existing pavement must be encased in 6" Schedule 40 PVC pipe or 6" SDR35 pipe and extend 5 feet beyond edge of pavement on both sides (where possible).
- B1 ROTH RMT-1500 1500 gallon (working capacity) dual compartment septic tank with PolyLOK PL-122 effluent filter. Must maintain minimum 10 feet from existing
- B2 ROTH RMT-1060 1060 gallon single compartment dosing tank with Champion CPE4-12 (0.4 HP) pump
- C Infiltrator AquaWorx IPC-SCB Simplex Control Panel and Zoeller APAK 91104-0001 Alarm Panel with electrical disconnect for Perimeter Sump.
- D 1.5 inch Schedule 40 PVC force main.
- E Mound see Sheets 5, 6 & 7 for details. Row of orange flags set at centerline of lateral.
- F1 12" wide x 24" minimum depth Perimeter drain in gravel sloped 1/16" per foot to outlet. Depth will be about 30.25 inches at the connection to the outlet line. See Sheet 6 for Detail information.
- F2 2 foot wide by 6-inches high diversion berm
- G Approximate location of existing original ATU and associated equipment. ATU and associated equipment shall be abandoned per OAC 3701-29-21, and in conformance with HCPH permitting and reporting requirements.
- H1 Perimeter drain sump Consolidated Treatment Systems 146 gallon pump basin (See Sheet 9)
- H2 Perimeter drain sump discharge 1.5" SCH40 PVC. Forcemain within level trench, minimum 24" deep, and drill weephole where forcemain loses 24" of cover. Forcemain to daylight no closer than 10 ft of the right of way near the existing culvert with 6" min. freeboard. Gravel bed 24" wide shall extend from discharge outlet near to existing culvert stopping at ROW.

AS SHOWN

# CONSULTING ENGINEERS, INC. 2060 READING ROAD SUITE 200 CINCINNATI, OHIO 45202 PH. (513) 826-4174 CADD FILE: DATE: SCALE:

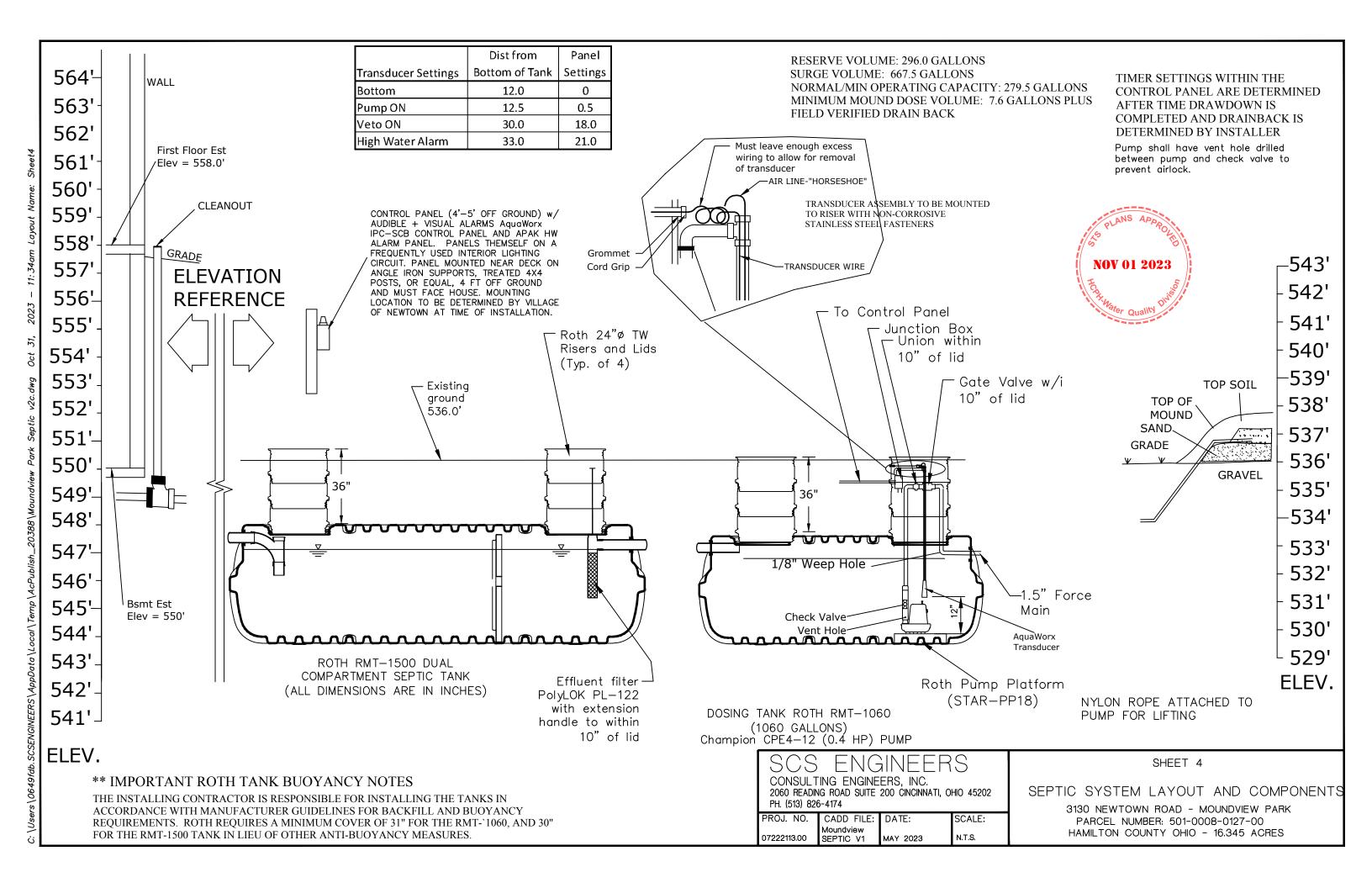
MAY 2023

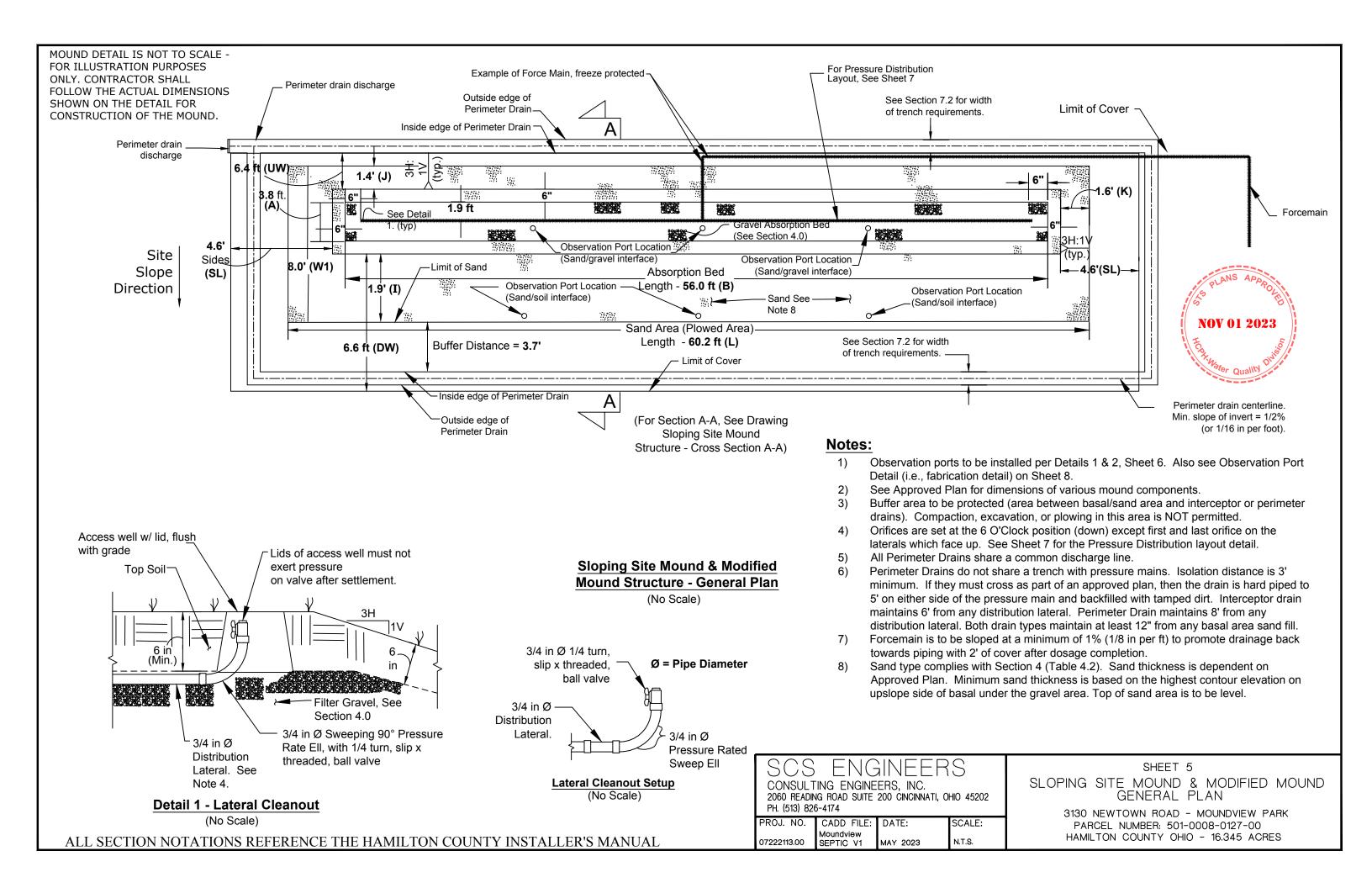
Moundview

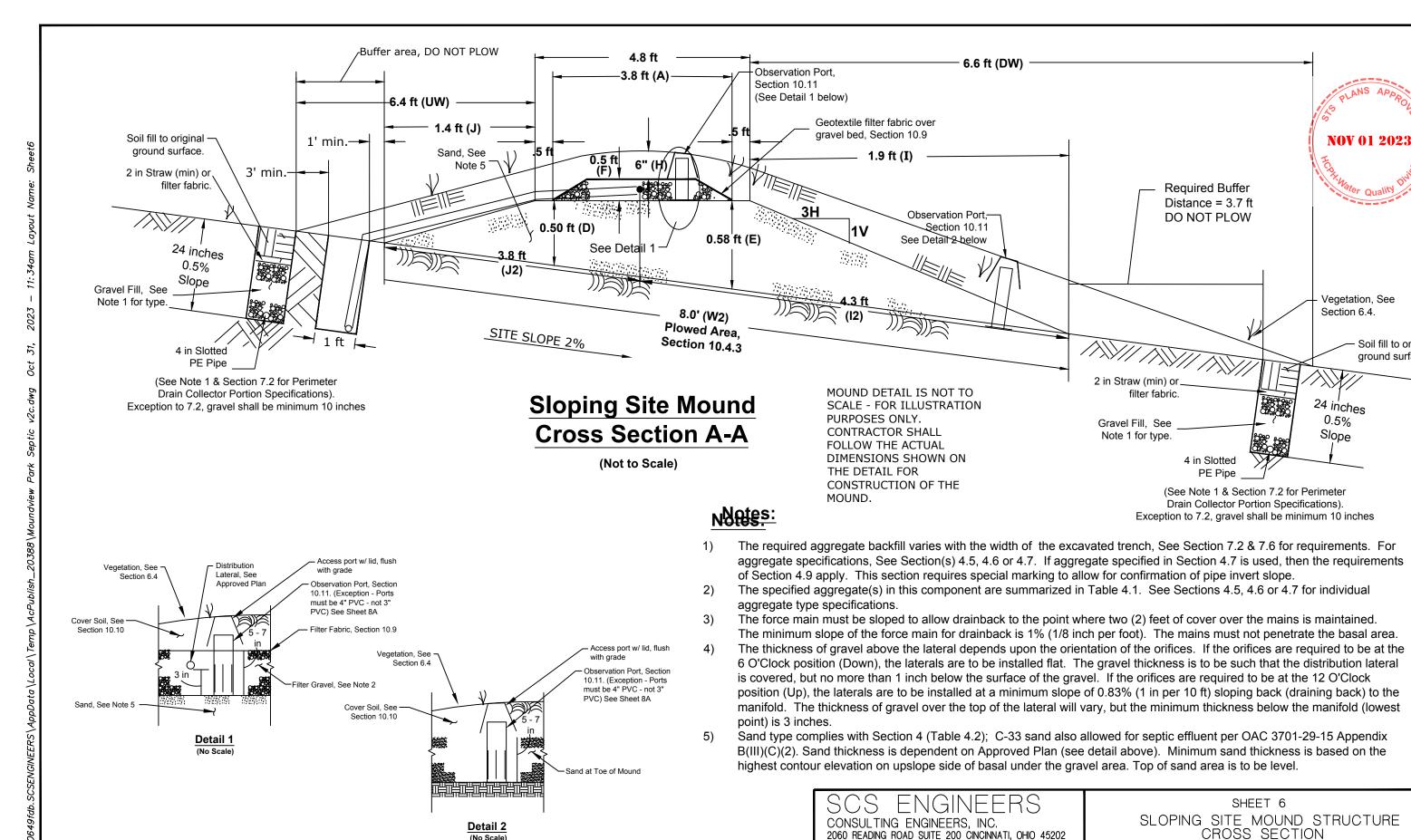
SEPTIC V1

SHEET 3

SEPTIC SYSTEM LAYOUT AND COMPONENTS







PH. (513) 826-4174

07222113.00

CADD FILE: DATE:

MAY 2023

Moundview

SEPTIC V1

SCALE:

N.T.S.

Soil fill to original

ground surface.

3130 NEWTOWN ROAD - MOUNDVIEW PARK

HAMILTON COUNTY OHIO - 16.345 ACRES

PARCEL NUMBER: 501-0008-0127-00

ALL SECTION NOTATIONS REFERENCE THE HAMILTON COUNTY INSTALLER'S MANUAL

# Pump Selection for a Pressurized System - Commerical Project

Moundview Park / 3130 Newtown Road

#### Parameters

Discharge Assembly Size	1.50	inches
Transport Length	60	feet
Transport Pipe Class	40	
Transport Line Size	1.50	inches
Distributing Valve Model	None	
Max Elevation Lift	7	feet
Manifold Length	0	feet
Manifold Pipe Class	40	
Manifold Pipe Size	1.00	inches
Number of Laterals per Cell	2	
Lateral Length	27	feet
Lateral Pipe Class	40	
Lateral Pipe Size	0.75	inches
Orifice Size	1/8	inches
Orifice Spacing	1.5001	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	36	
Total Flow Rate per Zone	15.9	gpm
Number of Laterals per Zone	2	
% Flow Differential 1st/Last Orifice	9.6	%
Transport Velocity	2.5	fps

#### Frictional Head Losses

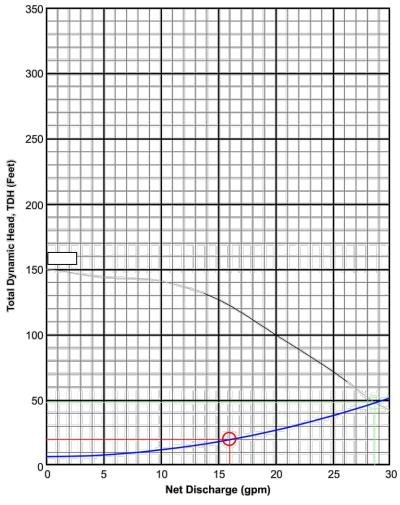
Loss through Discharge	8.0	feet
Loss in Transport	0.9	feet
Loss through Valve	0.0	feet
Loss in Manifold	0.0	feet
Loss in Laterals	1.2	feet
Loss through Flowmeter	0.0	feet
'Add-on' Friction Losses	5.0	feet

# Pipe Volumes

Vol of Transport Line	6.3	gals
Vol of Manifold	0.0	gals
Vol of Laterals per Zone	1.5	gals
Total Volume	7.8	gals

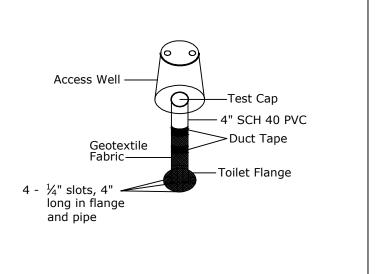
#### Minimum Pump Requirements

Design Flow Rate	15.9	gpm
Total Dynamic Head	19.9	feet



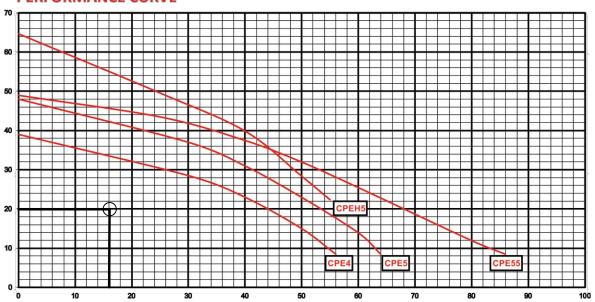


# Observation Port Detail (6)





## PERFORMANCE CURVE



Champion CPE4-12 (0.4 HP) PUMP CURVE

# SCS ENGINEERS

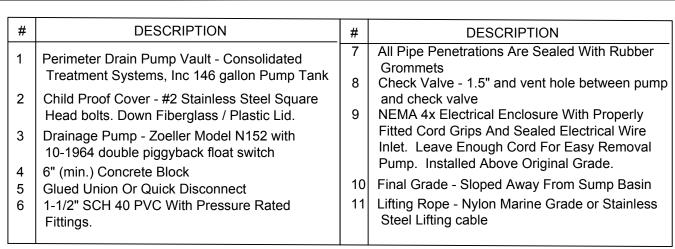
CONSULTING ENGINEERS, INC. 2060 READING ROAD SUITE 200 CINCINNATI, OHIO 45202 PH. (513) 826-4174

PROJ. NO. CADD FILE:

07222113.00 SEPTIC V1

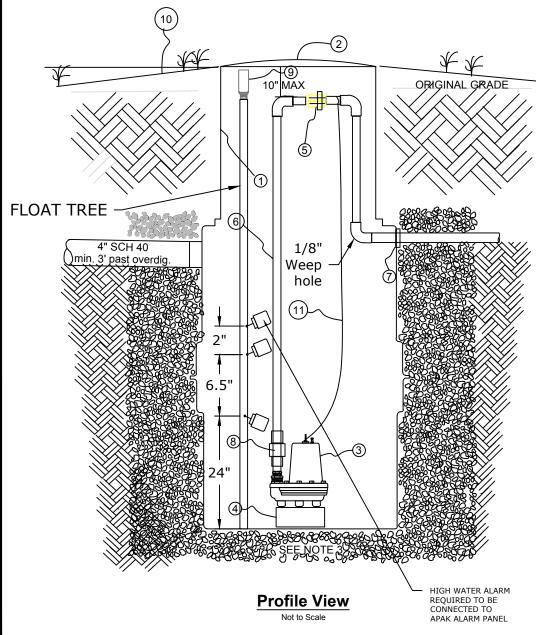
DATE: MAY 2023 SCALE: N.T.S. SHEET 8

PUMP SELECT INFORMATION



# **Drainage Enhancement**

Sump Sections 7.4 - 7.5



Ex. Grade

Splash block to drainage swale

1.5" PVC SCH 40

Drain Discharge

Line

DEMAND PUMP-DOWN VOLUME: 21.7 GALLONS PLUS FIELD MEASURED DRAINBACK.

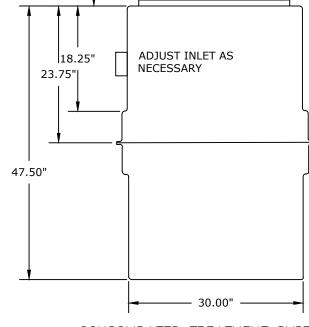
NORMAL/MIN OPERATING CAPACITY: 73.5 GALLONS

DISTANCE BETWEEN ON/OFF FLOATS WILL HAVE TO BE FIELD ADJUSTED AFTER DRAINBACK VOLUME IS DETERMINED.

#### Notes:

- 1 The 'ON' Switch For The Pump Is To Be Min.Of 6" Below the Invert Of The Inlet Pipe.
- 2 Multiple Drain Tiles Are To Be Connected Together Outside Of The Sump. Only One Penetration Should Be Made Into The Basin.
- 3 Electrical Wiring And Connections To Be Made Per Local and National Electric Codes.
- 4 Pump floats are Zoeller double-piggyback wide angle floats (#10-1964)
- 5 Alarm panel for HWA shall be Zoeller APAK Model 91104-0001 with supplied mechanical float switch. See Sheet 3 for mounting location.





25.00"

R16.00" R15.00"

R17.00"

R12.00"

CONSOLIDATED TREATMENT SYSTEMS
146 GALLON PUMP TANK
MODEL AN5075
(OR APPROVED EQUAL)

SCS ENGINEERS
CONSULTING ENGINEERS, INC.

2060 READING ENGINEERS, INC. 2060 READING ROAD SUITE 200 CINCINNATI, OHIO 45202 PH. (513) 826-4174

PROJ. NO. CADD FILE:

Moundview
07222113.00 SEPTIC V1

DATE: SCALE: MAY 2023 N.T.S.

SHEET 9
PERIMETER DRAIN PUMP BASIN