February 29, 2024 Project No. 22061-10

Mr. Rick Neugebauer
RTN DEVELOPMENT, INC.
27555 Ynez Road, Suite 208
Temecula, CA 92590

Subject: **Alternative Onsite Wastewater Treatment System Recommendations, Proposed Haven Vineyards, Assessor's Parcel Number 927-670-009, Camino Del Vino, Temecula Area, Riverside County, California**

Reference: Dynamic Geotechnical Solutions, 2022, *Onsite Wastewater Treatment System Investigation Report for the Proposed Haven Vineyard Development, APN 927-670-009, Located on Camino Del Vino, City of Temecula, Riverside County, California*, dated June 2, 2022.

In accordance with your request, CW Soils is pleased to present this alternative design for an onsite wastewater treatment system (OWTS) for the proposed Haven Vineyards Winery, Assessor's Parcel Number 927-670-009, located at 41625 Camino Del Vino in the Temecula area of Riverside County, California. We have provided guidelines for the design of an Advanced Treatment Unit (ATU) for onsite wastewater treatment. This evaluation is intended to provide adequate data to satisfy the County of Riverside, Community Health Agency, Department of Environmental Health guidelines.

SITE DESCRIPTION

The subject property consists of slightly hilly terrain. Topographic relief at the subject property is low to moderate. Elevations within a majority of the project area range from approximately 1,450 to 1,370 feet above mean sea level (msl), for a difference of about 80± feet.

PROPOSED DEVELOPMENT

Based on information provided by you, the proposed winery development includes a wine tasting room and production building, complete with onsite wastewater treatment.

SUBSURFACE EXPLORATION AND PERCOLATION TESTING

SUBSURFACE EXPLORATION

As indicated in the referenced report (DGS, 2022), the subsurface exploration consisted of one (1) deep exploratory test hole to a depth of 15 feet, conducted on May 4, 2022. The deep exploratory test hole was excavated to interpret whether groundwater or impermeable soil layers were present. Soils encountered within the deep exploratory test hole were classified and logged using the guidelines of ASTM 2487. The approximate location of the deep exploratory test hole and percolation test locations are shown on Plate 1- Percolation Location Map. The exploratory log can be found in Appendix A.

PERCOLATION TESTING

As indicated in the referenced report (DGS, 2022), a total of four (4) percolation tests were conducted on May 5, 2022 to evaluate the feasibility of utilizing leach fields for onsite wastewater treatment. The percolation tests were performed in general accordance with the reviewing agency guidelines.

The final percolation test readings are summarized in the following table and the test data recorded in the field can be found in Appendix B.

PERCOLATION TEST SUMMARY

TEST NUMBER	TEST HOLE DIAMETER (in)	HOLE DEPTH (ft)	FIELD PERCOLATION RATE (mpi)	*DESIGN PERCOLATION RATE (mpi)	SOIL DESCRIPTION
P-1 (DGS, 2022)	8	4	5	9	Poorly Graded SAND (SP)
P-2 (DGS, 2022)	8	4	4	6	Poorly Graded SAND (SP)
P-3 (DGS, 2022)	8	4	5	9	Poorly Graded SAND (SP)
P-4 (DGS, 2022)	8	4	7	13	Poorly Graded SAND (SP)

* A gravel factor was applied by (DGS, 2022) to determine the design rate.

FINDINGS

SOILS

A general description of the soils observed is provided below:

- Quaternary Pauba Formation (Qpfs): Pauba Formation was encountered from near the surface to the full depth of exploration, 15 feet. These materials consisted of silty SAND and poorly graded SAND which were various shades of brown, dry to damp, loose to medium dense, very fine to fine grained with medium grains and trace coarse grains, and micaceous (DGS, 2022).

GROUNDWATER

Groundwater was not observed during exploration of B-1, excavated to a depth of 15 feet.

PERCOLATION TEST RESULTS

Based on the final measured percolation test design rate of 13 minutes per inch (mpi), an equilibrium saturated hydraulic conductivity of 1.0 gallons per square foot per day was used for subsurface effluent dispersal system design, see Table 1 below.

TABLE 1

Geoflow Application Guidelines for Secondary Treated Effluent

SOIL TYPE	ESTIMATED SOIL PERCOLATION RATE (min/in)	HYDRAULIC CONDUCTIVITY (in/hr)	DESIGN HYDRAULIC LOADING RATE (gal/sf-day)	TOTAL AREA REQUIRED (sf/100 gal/day)
Coarse Sand	<5	>2	1.4	72
Fine Sand	5-10	1.5 - 2	1.2	83
Sandy Loam	10-20	1.0 - 1.5	1.0	100
Loam	20-30	0.75 - 1.0	0.7	143
Clay Loam	30-45	0.5 - 0.75	0.6	167
Silt - Clay Loam	45-60	0.3 - 0.5	0.4	250
Clay - non-swell	60-90	0.2- 0.3	0.2	500
Clay-swell	90 - 120	0.1 - 0.2	0.1	1,000
Poor Clay	> 120	< 0.1	0.075	1,334

Source: Geoflow Wastewater Design, Installation and Installation Guidelines

CONCLUSIONS AND RECOMMENDATIONS

GENERAL

Based on the data presented in this report and using the recommendations herein, it is the judgment of this professional that there is sufficient area on the lot to support a primary and expansion OWTS that will meet the current standards of the Department of Environmental Health and the Regional Water Quality Control Board (RWQCB).

The onsite wastewater system herein is designed to be permanent. However, it should be noted that the proposed septic system will likely be temporary, since it is our understanding that Phase II of the De Portola sewer system is planned to be expanded into the subject property area by EMWD.

Based on the data presented in this report and the testing information accumulated, it is the judgment of this professional that the groundwater table will not encroach within the current allowable limit set forth by County and State requirements, since an advanced shallow system is recommended.

SEWAGE DISPOSAL DESIGN RECOMMENDATIONS

The proposed advanced sewage disposal system should consist of a Norweco® Singulair® TNT (Total Nitrogen Treatment System) unit of the manufacture's subsurface drip disposal system. Areas for both a primary system and a 100 percent expansion system are required. The following are descriptions of the general design and construction of the wastewater treatment system. Any design aspects not addressed herein should adhere to the Norweco® Singulair® manufacture's subsurface drip disposal system design recommendations.

Septic Tank Capacity: The fixture count totaled 48 units for the proposed improvements. Additionally, calculations based on the California Plumbing Code Appendix H Table 201.1(2), yielded a septic tank capacity of 2,250 gallons. In order to accomplish this, one (1) 1,500 gallon per day system, which is equivalent to 3,400 total gallons, may be utilized. The wine production portion of the project is under a separate permit and is not part of this OWTS.

Allowable Design Percolation Rate: To determine the approximate square footage of each drip dispersal zone, the individual percolation rate test for each area that meet the requirements may be used as a guideline.

Primary System: The proposed system is a 1,500 gallons per day system, with two (2) drip dispersal zones composed of subsurface drip lines.

The minimum drip field absorption area is based upon an equivalent 3,400 gallon capacity and the percolation rate of the proposed drip dispersal zone areas. The dimensions for individual drip dispersal zone areas are based on the Norweco® Singulair® manufacture's subsurface drip disposal system design recommendations.

Spacing, Depth, and Minimum Soil Cover: For drip dispersal zones with a 20 percent slope, a minimum soil cover of 9 inches, but no greater than 12 inches, over the drip lines is required. The maximum emitter longitudinal spacing shall be 2 feet and the maximum spacing between adjacent emitter lines, in an absorption bed configuration, shall be 2 feet.

NUMBER OF DRIP DISPERSAL ZONES: 2							
DESIGN RATE (mpi)	SOIL LOADING RATE GALLONS /FT²/DAY	MIN SQUARE FEET	MIN LINEAR FEET	MIN LINEAR FEET OF DRIP TUBING	NO. OF EMITTERS PER ZONE	NO. OF LATERALS	LENGTH OF EACH DRIP LATERAL LINE FEET
13	1.0	1500	750	375	188	4	94
13	1.0	1500	750	375	188	4	94

100 Percent Expansion System: Sufficient area must be set aside for future construction of a backup system of equal size in the event the primary system fails. The area required for the 100 percent expansion system is equal to that of the primary system area.

ADDITIONAL DESIGN CONSIDERATIONS AND RECOMMENDATIONS

In order to encourage the maximum effectiveness through evaporation and transpiration, the lines should be installed at the recommended depth and as close to the ground surface as possible. Drip dispersal emitter lines shall be designed as a continuous loop circuit with no dead ends. Vacuum release valves shall be installed at the highpoint of the emitter lines. Drip dispersal systems shall be time dosed over a 24 hour period. Demand control doing shall override timed dosing in periods of flow where timed dosing cannot accommodate the excessive flow. All drip dispersal systems shall incorporate a mechanism for backwashing or flushing the drip lines and filters.

The drip dispersal system shall be designed, located and maintained to reduce orifice clogging and root intrusion. The drip dispersal system shall be designed, located and maintained to prevent vehicular traffic over it. In the event that future access to the 100 percent expansion area is compromised by development (i.e., garden walls, etc.), consideration should be given to constructing the expansion system at the same time as the primary system. If the systems are not constructed concurrently, consideration should be given to accessibility of the 100 percent expansion area after all site improvements are constructed.

The excavations should be observed by the soils engineering consultant during the excavation and prior to construction of the wastewater treatment system. The site observations are to verify the design assumptions and the suitability of the exposed soils. Revisions or modifications may be required if unforeseen conditions are exposed during construction, such as any relatively impermeable layers. Revisions may consist of adding additional lines or a redesign of the system that better conforms to the site conditions.

The leach field areas should not be used for horse corrals or other similar uses that would compact the soils. The ground surface over the disposal areas should be planted with appropriate vegetation to allow for the uptake of nutrients from the wastewater.

Property owners should be aware that the proper use and maintenance are vital to extending the effective life of sewage disposal systems. Properly maintained sewage disposal systems can function for many years. However, a rest period of roughly 10 to 15 years is generally needed to promote bacterial decay and provide the area a chance to dry out. After being provided a resting period, the primary system can often be reactivated and alternated with the 100 percent expansion system.

PLAN REVIEW AND CONSTRUCTION SERVICES

This report has been prepared for the exclusive use of **RTN DEVELOPMENT, INC.** and their authorized representative. It is unlikely to contain sufficient information for other parties or other uses. CW Soils should be provided the opportunity to review the final design plans and specifications prior to construction, in order to verify that the recommendations have been properly incorporated into the project plans and specifications. If CW Soils is not accorded the opportunity to review the project plans and specifications, we are not responsibility for misinterpretation of our recommendations.

We recommend that CW Soils be retained to provide soils engineering and engineering geologic services during the grading and foundation excavation phases of work, in order to allow for design changes in the event that the subsurface conditions differ from those anticipated prior to construction.

CW Soils should review any changes in the project and modify the conclusions and recommendations of this report in writing. This report along with the drawings contained within are intended for design input purposes only and are not intended to act as construction drawings or specifications. In the event that conditions during grading or construction operations appear to differ from those indicated in this report, our office should be notified immediately, as appropriate revisions may be required.

REPORT LIMITATIONS

Our services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable soils engineers and geologists, practicing at the time and location this report was prepared. No warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

Soils vary in type, strength, and other engineering properties between points of observation and exploration. Groundwater and moisture conditions can also vary due to natural processes or the works of man on this or adjacent properties. As a result, we do not and cannot have complete knowledge of the subsurface conditions beneath the proposed project. No practical study can completely eliminate uncertainty with regard to the anticipated geologic and soils engineering conditions in connection with a proposed project. The conclusions

and recommendations within this report are based upon the findings at the points of observation and are subject to confirmation by CW Soils based on the conditions revealed during grading and construction operations.

This report was prepared with the understanding that it is the responsibility of the owner, to ensure that the conclusions and recommendations contained herein are brought to the attention of the other project consultants and are incorporated into the plans and specifications. The owners' contractor should implement the recommendations in this report and notify the owner as well as our office if they consider any of the recommendations presented herein to be unsafe or unsuitable.

Respectfully submitted,

CW Soils

Chad E. Welke, CEG 2378
President

I, Chad E. Welke, am duly registered in the State of California and hereby attest that I have personally prepared this report, assume full professional responsibility for its validity, and for any errors or omissions herein.

Distribution: (1) Addressee (email)

Attachments: Appendix A – Referenced Percolation Report *(Rear of Text)*
Appendix B – Percolation Test Results *(Rear of Text)*
Plate 1 – Percolation Location Map *(Rear of Text)*

APPENDIX A

REFERENCED PERCOLATION REPORT

DYNAMIC GEOTECHNICAL SOLUTIONS

Geotechnical • Environmental • Materials Testing

ONSITE WASTEWATER TREATMENT SYSTEM INVESTIGATION REPORT FOR THE PROPOSED HAVEN VINEYARD DEVELOPMENT, APN 927-670-009, LOCATED ON CAMINO DEL VINO, CITY OF TEMECULA, RIVERSIDE COUNTY, CALIFORNIA

Dated: June 2, 2022
Project No. D21-1119-20

Prepared For:

HAMEL CONTRACTING, INC.
26431 Jefferson Avenue, Suite A
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June 2, 2022 Project No. D21-1119-20

HAMEL CONTRACTING, INC.
26431 Jefferson Avenue, Suite A
Murrieta, California 92562

Subject: ***Onsite Wastewater Treatment System Investigation Report for the Proposed Haven Vineyard Development, APN 927-670-009, Located on Camino del Vino, City of Temecula, Riverside County, California.***

1.0 INTRODUCTION

Dynamic Geotechnical Solutions (DGS) is pleased to present this onsite wastewater treatment system investigation report for the proposed Haven Vineyard development, APN 927-670-009, located on Camino Del Vino, City of Temecula, Riverside County, California. The purpose of our study was to determine the preliminary percolation rates and physical characteristics of the subsurface soils existing within the subject property, per the requirements of the Riverside County Regional Water Quality Control Board (RCRWQCB) for Onsite Wastewater Treatment Systems (OWTS).

2.0 PROPERTY LOCATION AND DESCRIPTION

The subject site is rectangular in shape and is located on Camino Del Vino. The site is bounded on the north by Camino Del Vino, on the west is a single-family residence, on the east are two commercial developments (bed and breakfast and a winery), and on the south by a vacant parcel. The general location and configuration of the site is shown on the Site Location Map (Figure 1).

The subject site is currently vacant and consists of grapevines. Onsite surface elevations range from approximately 1,540 feet above mean sea level (msl) at the south easterly property line to approximately 1,370 feet above (msl) at the north westerly property line. Surface drainage appears to flow from the southeast to the northwest across the property.

3.0 PROPOSED CONSTRUCTION

Discussions with Hamel Contracting, indicate that a commercial winery building is proposed with associated driveway, detached office, and landscape and hardscape areas.

4.0 SUBSURFACE EXPLORATION AND PERCOLATION TESTING

4.1 Field Exploration

On May 4, 2022, four (4) percolation test borings, were excavated at the subject site to a depth of four (4) feet and are numbered PB-1 through PB-4. Borings PB-1 through PB-4 were excavated to the approximate depth of the proposed onsite wastewater treatment system, with percolation testing performed on the boring bottom. Boring B-1 was excavated to a depth of 15 feet during the geotechnical investigation to document the subsurface profile and show required groundwater clearance per Riverside County Department of Environmental Health requirements. All borings were logged and aided in the geologic mapping of the test area.

Prior to the subsurface work, an underground utilities clearance was obtained from Underground Service Alert of Southern California. At the conclusion of the subsurface exploration and testing, all percolation borings were backfilled with existing materials with some compactive effort. Minor settlement of the backfill soils may occur over

time. The boring logs are presented in Appendix B and the locations are indicated on the onsite sewage disposal system map (Plate 1).

4.2 Percolation Testing

Shallow percolation tests within the excavated test trenches (PT-1 through PT-4) were performed on May 5, 2022. The tests were performed as per the referenced Riverside County Department of Environmental Health's Local Agency Management Program for Onsite Wastewater Treatment Systems manual. An 8-inch diameter, 14-inch-deep test hole was excavated in each test trench. A 3-inch diameter perforated pipe was placed in each and the annular space between the pipe and hole was packed with ¾" gravel. Each test hole was presoaked the day prior to percolation testing. For the standard percolation test, the drop in water level, in inches, was measured and recorded at 30-minute intervals over a period of at least 6 hours. For soils passing the sandy soil criteria test, the drop in water level, in inches, was measured and recorded at 10-minute intervals over a period of 1 hour. The results of the percolation tests are presented in Table 1, in Section 5.3. The percolation test data sheets are presented in Appendix C.

5.0 FINDINGS

5.1 Earth Materials

Based on our review of available geological and geotechnical literature, current field mapping, and exploratory borings conducted at the site, it is our understanding that the site is primarily underlain by Pauba Formation. This unit is described below and presented in greater detail within the exploratory trench logs (Appendix B). The approximate locations of the observed geologic units are depicted on the Onsite Sewage Disposal Map (Plate 1).

- **Pauba Formation (Qpfs)** – Pauba Formation was encountered at the surface in all borings to depths up to 15 feet. These materials consisted of silty sand which were various shades of brown, dry to damp, loose to medium dense, very fine to fine grained with medium grains and trace coarse grains, and micaceous.

5.2 Groundwater

Groundwater was not encountered in any of the exploratory trenches listed in this percolation report, to a maximum depth of 15.0 feet.

A review of the California Department of Water Resources, Water Data Library online database indicates the presence of groundwater less than 1 mile away from the general site area at approximately 419 feet below the existing ground surface according to historical records from the location at an elevation of approximately 1,483 feet above mean sea level (Well ID: Station 335174N1170339W001).

5.3 Percolation Testing Results

The Percolation testing rates for the areas tested are presented in the following table:

Table 1 – Percolation Test Summary

TEST LOCATION AND NO.	*TEST DEPTH (ft)*	*FIELD PERCOLATION RATE (min./inch)*	*DESIGN PERCOLATION RATE (min./inch)*	*SOIL DESCRIPTION (USCS)*
PB-1	4.0	5.22	9.00	Poorly Graded SAND (SP)
PB-2	4.0	3.48	6.00	Poorly Graded SAND (SP)
PB-3	4.0	5.11	8.81	Poorly Graded SAND (SP)
PB-4	4.0	7.27	12.53	Poorly Graded SAND (SP)

A gravel correction reduction factor of 0.58 is applied to the field percolation rate to determine the design percolation rate, based on the following calculations (from Riverside Co. Soil Percolation Test Report Standards, page A-13):

Gravel Correction Factor = $[1+P(C^2-1)] / C^2$; $C = r_2 / r_1$ where r_2 = radius of hole and r_1 = radius of pipe; P=% of voids (gravel void). Water from full can "B' is poured into can "A" with gravel to top of can

Height of Missing Water of Can "B" = 4.1"/ Height of Can "A' with Gravel = 8.0" → **0.51 gravel void**=P
8" Diam. Boring/3" Diam. Perforated Pipe → **2.67** = C
Gravel Correction Factor = $[1+.51(2.67^2 - 1)] / 2.67^2$ → **0.58**

Leach Line Calculations

Based on current design recommendations in the RCDEH Technical Manual for onsite sewage systems, DGS has evaluated design requirements for the single-family residence in Riverside County, California. Presented below is our design based on the current RCDEH Technical Manual.

Commercial development – 48 fixture count
2,250 gallons of septic tank capacity (Uniform Plumbing Code (UPC) Table K-2)

Design MPI = 12.53 min/in → 0.30 ft^2/gal (Determined from Table 3.1 of the referenced RCDEH LAMP)

0.30 ft^2/gal x 2,250 gallons = 675 ft^2 of absorption area
675 ft^2 / 3 ft = 225 ft of total pipe length (**228 ft of total pipe length for design purposes**)

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 General

Based on the data presented in this report, it is the judgment of DGS that there are favorable soil conditions for percolation and there is sufficient area on site for an individual onsite wastewater disposal system, consisting of a primary system area and a 100% expansion system area that will meet the current codes and standards of the RCDEH and the Regional Water Quality Control Board (RWQCB) requirements. Based on the data presented in this report and the testing information accumulated, it is also the judgment of DGS that the groundwater present at the site is within the allowable clearance from the bottom of the proposed leach fields, as set forth by Riverside County and California State requirements.

- Based on the data presented in this report and using the recommendations set forth, it is the judgement of this professional that there is sufficient area on each lot to support a primary and expansion OWTS that will meet the current standards of the Department of Environmental Health and the Regional Water Board.
- The designed system shall be located in natural undisturbed soil at the depth of the tests performed.
- The natural occurring body of minerals and organic matter at the proposed wastewater disposal area contains earthen materials having more that 50% of its volume composed of particles smaller than 0.08 inches (2mm) in size.
- Based on the da presented in this report and the testing information accumulated it is the judgment of this professional that the groundwater table will no encroach within the current allowable limits set forth in Chapter 11 of the Riverside County LAMP

6.2 Leach Field System Sewage Disposal Design Recommendations

It is recommended that the proposed sewage disposal system consist of four leach lines of 45 feet of length each for the primary system. The expansion system area shall consist of an identical amount of leach line.

Areas for both a primary system and a 100 percent expansion system are required for the subject site, as indicated on the enclosed maps. The portion of the site to be utilized for the proposed leach field system provides sufficient area for both a primary system and a 100% expansion system area. Septic tanks should be located upslope from the leach fields to provide gravity flow from the septic tank to the leach lines. A description of the general design and construction of sewage disposal systems is provided in the following sections.

- Septic Tank Capacity — Per the RCDEH, the minimum septic tank capacity is determined by the proposed number of fixtures utilizing UPC Table 702.1.

- Design Percolation Rate — The individual percolation rate test results for the area tested that meet the requirements of the RCDEH, in conjunction with the septic tank capacity for the proposed design, may be used as a guideline to determine the approximate square footage of leaching absorption area required for proposed sewage disposal systems in the area.

- Primary System — Primary system should consist of at least a 2,250-gallon septic tank, for 48 proposed fixtures, and leach field composed of subsurface leach lines constructed within trenches excavated into either natural ground or cut areas only. The effective portions of leach field trenches are not permitted in proposed fill. The required minimum leach field absorption area is based upon the septic tank capacity, the estimated effluent produced and the percolation rate of the proposed leach field area. The dimensions for leach field absorption areas are based on the total trench bottom area only, and do not include the area between the leach line trenches. The total linear footage of leach lines required is determined by dividing the required leach field area by the trench bottom area, which is based on trench width and the amount of gravel to be placed underneath the leach lines. The maximum individual line length permitted is 100 feet.

Design Rate (ft^2/gal)	Absorption Area (ft^2)	No. of Lines	Length of Each Line (ft)	Trench Bottom Area (ft^2)	Amount of Gravel Below Leach Lines (ft)	Total Length of Lines (ft)
0.30	675	4	57	3	1	228

- Trench Width, Depth, and Minimum Soil Cover — Per RCDEH requirements for leach field areas with no slope, a minimum soil cover of 1 foot over the lines is required. Leach line trenches should be excavated to a depth of approximately, depending on amount of gravel specified, 3 feet below the ground surface in order to provide a minimum 1 feet of soil cover. The individual leach line trenches should also be excavated along ground contours of approximately equal elevation to maintain a relatively uniform trench depth. Leach line trench width shall be 36 inches, with a minimum center line to center line spacing of 7 feet per RCDEH LAMP.

- 100 Percent Expansion System — Per the RCDEH, sufficient area must be set aside for future construction of a backup system of equal size to the primary system leach field area in the event the primary system fails. The leach field area required for the 100 percent expansion system is identical to that of the primary system.

7.0 OTHER DESIGN CONSIDERATIONS AND RECOMMENDATIONS

7.1 Leach Line Disposal Field– Other Considerations

- A minimum horizontal distance of 5 feet between disposal field and the property line is required.
- A minimum horizontal distance of 8 feet is required between the disposal field and any structure, including porches, steps, breezeways, roofed patios, carports, covered walks and similar structures.
- A minimum horizontal distance of 4 feet is required between disposal fields.
- A minimum horizontal distance of 5 feet is required between the disposal field and domestic water service line.
- A minimum horizontal distance of 15 feet is required between the disposal field and drainage course that is found on the property.
- The disposal field must have a minimum horizontal distance of 15 feet from daylight (side of slope).

The disposal field should be installed at the recommended depth and as close to the ground surface as possible to encourage the maximum loss of sewage effluent through evaporation and transpiration. As noted above, leach lines should also be installed within trenches excavated along ground contours of equal elevation to maintain a relatively uniform trench depth. Furthermore, the minimum center-to-center spacing between the leach line trenches is 7 feet for 36-inch wide trenches plus an additional foot of spacing is required for an additional foot of gravel.

Backfill materials placed over the leach lines should not be compacted but slightly mounded to allow for settlement and to minimize infiltration of surface water. In addition, cobbles and boulders should be removed from the backfill soils and not placed directly over the perforated pipe, to prevent collapse or crushing of the pipe.

The design recommendations of the septic tank and leach line onsite wastewater treatment system is only applicable to being constructed in relatively flat ground of less than 5% slope. Minimum cover over lines and minimum depth of percolation tests required change according to the slope of natural ground and if installed in any slope greater than 5%, this analysis and design are not applicable.

Consideration should be given to construction of the 100 percent expansion system in the future, should it become necessary, with respect to accessibility after all site improvements are constructed. If future access to the 100 percent expansion area is compromised by construction of the residences or other land use (e.g., garden walls, etc.), consideration should be given to constructing the 100 percent expansion system at the same time as the primary system.

The leach line trenches should be observed by the geotechnical consultant during and after excavation, but before placing perforated pipe. This is to verify the suitability of the exposed soils or to make any necessary revisions if any unforeseen conditions are encountered or exposed, such as hard shallow rock. Revisions could include adding additional lines or a redesign of the system that conforms to the site conditions.

The disposal field areas should not be used for recreation, or other uses, which would compact the ground surface. In addition, the ground surfaces over the disposal fields should be seeded or sodded to mitigate erosion.

The owners are advised that proper use and maintenance of the sewage disposal system are critical to maintain a useful design life. The use of excessive water, introduction of detergents and chemicals and ground food waste from garbage disposals can cause premature system failures and necessitate construction of the 100 percent expansion system or reconstruction of the primary system. Properly maintained sewage disposal systems can function for many years; however, a period of rest after about 10 to 15 years is generally required to promote bacterial decay and a chance to dry up. After this resting period, the primary system can sometimes be reactivated and alternated with the 100 percent expansion system.

8.0 INVESTIGATION LIMITATIONS

This report is based upon information provided by the client, a limited number of subsurface excavations, field observations and percolation tests to which we applied various methods of analysis and interpretation. The materials encountered and tested in the field on the project site are believed representative of the project area, and the conclusions and recommendations contained herein are presented on that basis. However, soil materials can vary in characteristics between points of exploration, both laterally and vertically, and those variations could affect the conclusions, recommendations, and performance of possible future developments on the site. Fluctuations in the level of groundwater may occur due to variations in rainfall, irrigation, and the other factors not in evidence at the time measurements were made. If this occurs, the changed conditions must be evaluated by the project geotechnical engineer and engineering geologist and design(s) adjusted as required or alternate design(s) recommended.

This report is issued with the understanding that it is the responsibility of the owner, or of his/her representative, to ensure that the information and recommendations contained herein are brought to the attention of the project engineer and incorporated into the plans, and the necessary steps are taken to see that the contractor and/or subcontractor properly implements the recommendations in the field.

The conclusions and opinions contained in this report are based on the results of the described geotechnical evaluations and represent our professional judgment. The findings, conclusions and recommendations contained in this report are to be considered tentative only and subject to confirmation by the undersigned during the construction process, should a future development be considered on the site. Without this confirmation, this report is to be considered incomplete and DGS or the undersigned professionals assume no responsibility for its use.

The conclusions and opinions contained in this report are valid up to a period of 2 years from the date of this report. Changes in the conditions of a property can and do occur with the passage of time, whether they be because of natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate codes or standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated, wholly or partially, by changes outside our control. Therefore, if any of the above mentioned situations occur, an update of this report should be completed.

This report has not been prepared for use by parties or projects other than those named or designated above. It may not contain sufficient information for other parties or other purposes.

Closure

Our services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by engineers and geologists practicing in this or other localities. The contents of this report are professional opinions and as such, are not to be considered a guarantee or warranty.

The opportunity to be of continuing service is appreciated. Should you have any questions regarding the content of this report, or should you require additional information, please do not hesitate to contact this office at your earliest convenience.

Respectfully submitted,

DYNAMIC GEOTECHNICAL SOLUTIONS, INC.

Jonathan Levario, PG 9879
Project Geologist

AR/JL

Distribution: (2) Addressee

Attachments: Figure 1 – Site Location Map
Appendix A – Percolation Test Results
Plate 1 – Onsite Sewage Disposal Map *(In Pocket)*

APPENDIX A

PERCOLATION TEST RESULTS

Project:	Haven Vineyard	Job No.:	D21-1119-20	
Test Hole No.:	PB-1	Date Excavated:	5/4/2022	
Depth of Test Hole:	4.0'	Soil Classification:	SM	
Check for Sandy Soil Criteria By:		Date of Perc Test:	5/5/2022	Diameter: 8"

SANDY SOIL CRITERIA TEST

TIME	Time Interval (Minutes)	Initial Water Level (Inches)	Final Water Level (Inches)	Change In Water Level (Inches)

PRESOAK PERIOD

	Date/Time	Interval	Amount of Water Used
Start	5/4/22 9:20	HH:MM	All 5 Gallons
Stop	5/5/22 5:44	20:24	

TEST PERIOD

Time	Time Interval (min.)	Total Elasped Time (min.)	Initial Water Level (inches)	Final Water Level (inches)	Change In Water Level (Inches)	Field Percolation Rate (minutes/inch)
5:52	30	30	6	1/4	5 3/4	5.22
6:22						
6:23	30	61	6	3/8	5 5/8	5.33
6:53						
6:54	30	92	6	1/4	5 3/4	5.22
7:24						
7:25	30	123	6	1/8	5 7/8	5.11
7:55						
7:56	30	154	6	1/4	5 3/4	5.22
8:26						
8:27	30	185	6	1/4	5 3/4	5.22
8:57						
8:58	30	216	6	1/4	5 3/4	5.22
9:28						
9:29	30	247	6	1/8	5 7/8	5.11
9:59						
10:00	30	278	6	1/4	5 3/4	5.22
10:30						
10:31	30	309	6	1/4	5 3/4	5.22
11:01						
11:02	30	340	6	1/4	5 3/4	5.22
11:32						
11:33	30	371	6	1/4	5 3/4	5.22
12:03						

Project:	Haven Vineyard	Job No.:	D21-1119-20	
Test Hole No.:	PB-2	Date Excavated:	5/4/2022	
Depth of Test Hole:	4.0'	Soil Classification:	SM	
Check for Sandy Soil Criteria By:	JW	Date of Perc Test:	5/5/2022	Diameter: 8"

SANDY SOIL CRITERIA TEST

TIME	Time Interval (Minutes)	Initial Water Level (Inches)	Final Water Level (Inches)	Change In Water Level (Inches)
5:55	15	6	0	> 6
6:10				
6:11	17	6	0	> 6
6:28				

PRESOAK PERIOD

	Date/Time	Interval	Amount of Water Used
Start	5/4/22 9:30	HH:MM	All 5 Gallons
Stop	5/5/22 5:46	20:16	

TEST PERIOD

Time	Time Interval (min.)	Total Elasped Time (min.)	Initial Water Level (inches)	Final Water Level (inches)	Change In Water Level (Inches)	Field Percolation Rate (minutes/inch)
7:11	10	10	6	2 1/4	3 3/4	2.67
7:21						
7:22	10	21	6	3	3	3.33
7:32						
7:35	10	34	6	3 1/8	2 7/8	3.48
7:45						
7:47	10	46	6	3 1/8	2 7/8	3.48
7:57						
7:58	10	57	6	3 1/8	2 7/8	3.48
8:08						
8:09	10	68	6	3 1/8	2 7/8	3.48
8:19						

Project:	Haven Vineyard		Job No.:	D21-1119-20	
Test Hole No.:	PB-3		Date Excavated:	5/4/2022	
Depth of Test Hole:	4.0'		Soil Classification:	SM	
Check for Sandy Soil Criteria By:	JW		Date of Perc Test:	5/5/2022	Diameter: 8"

SANDY SOIL CRITERIA TEST

TIME	Time Interval (Minutes)	Initial Water Level (Inches)	Final Water Level (Inches)	Change In Water Level (Inches)
5:56	25	6	0	> 6
6:21				
6:25	25	6	1/4	5 3/4
6:50				

PRESOAK PERIOD

	Date/Time	Interval	Amount of Water Used
Start	5/4/22 9:40	HH:MM	All 5 Gallons
Stop	5/5/22 5:48	20:08	

TEST PERIOD

Time	Time Interval (min.)	Total Elasped Time (min.)	Initial Water Level (inches)	Final Water Level (inches)	Change In Water Level (Inches)	Field Percolation Rate (minutes/inch)
7:00	30	30	6	0	> 6	< 5
7:30						
7:31	30	61	6	0	> 6	< 5
8:01						
8:02	30	92	6	0	> 6	< 5
8:32						
8:33	30	123	6	0	> 6	< 5
9:03						
9:04	30	154	6	0	> 6	< 5
9:34						
9:35	30	185	6	1/8	5 7/8	5.11
10:05						
10:06	30	216	6	1/8	5 7/8	5.11
10:36						
10:37	30	247	6	1/8	5 7/8	5.11
11:07						
11:08	30	278	6	1/8	5 7/8	5.11
11:38						
11:39	30	309	6	1/8	5 7/8	5.11
12:09						
12:10	30	340	6	1/8	5 7/8	5.11
12:40						
12:41	30	371	6	1/8	5 7/8	5.11
13:11						

Project:	Haven Vineyard	Job No.:	D21-1119-20
Test Hole No.:	PB-4	Date Excavated:	5/4/2022
Depth of Test Hole:	4.0'	Soil Classification:	SM
Check for Sandy Soil Criteria By:		Date of Perc Test:	5/5/2022 Diameter: 8"

SANDY SOIL CRITERIA TEST

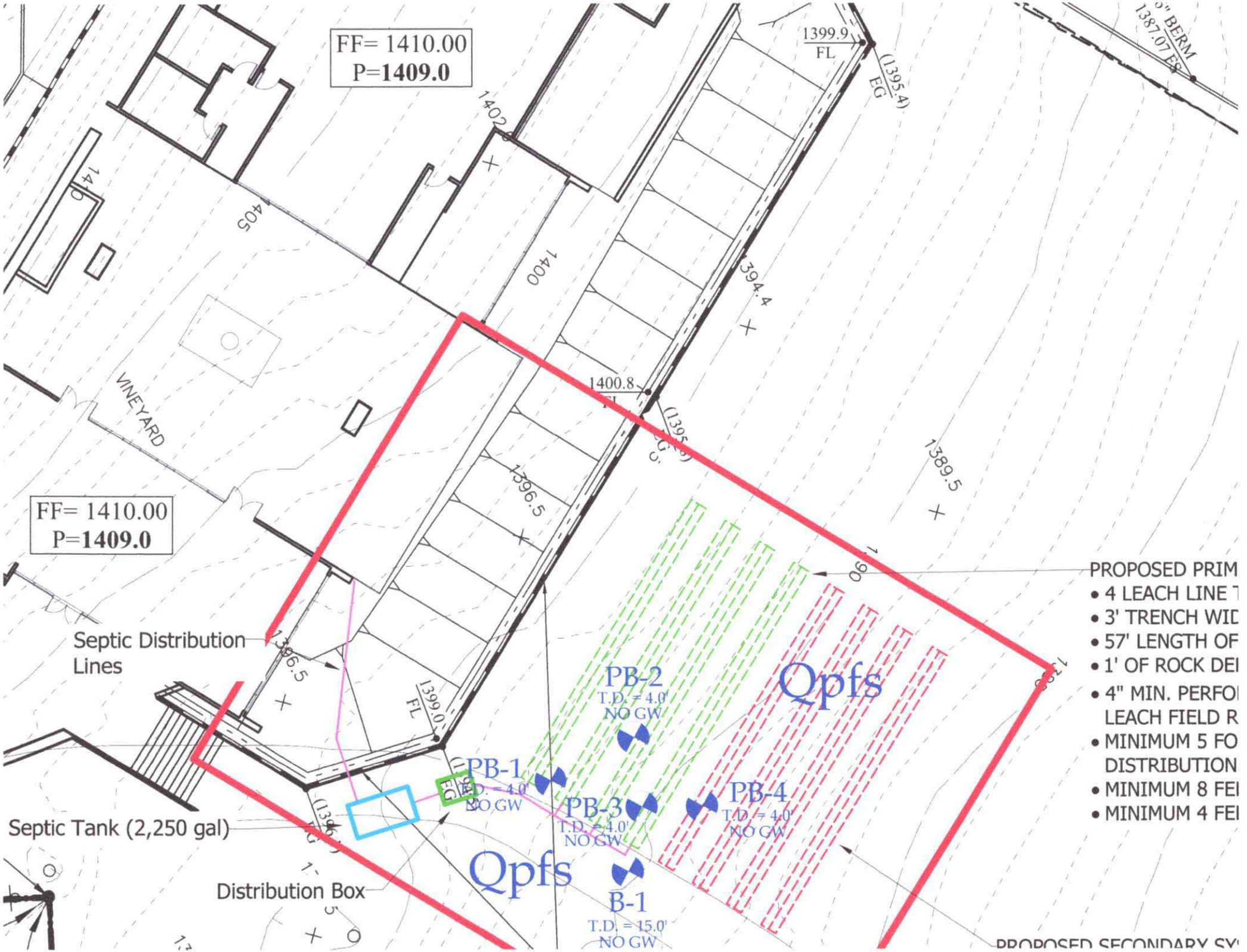
TIME	Time Interval (Minutes)	Initial Water Level (Inches)	Final Water Level (Inches)	Change In Water Level (Inches)

PRESOAK PERIOD

	Date/Time	Interval	Amount of Water Used
Start	5/4/22 9:50	HH:MM	All 5 Gallons
Stop	5/5/22 5:50	20:00	

TEST PERIOD

Time	Time Interval (min.)	Total Elasped Time (min.)	Initial Water Level (inches)	Final Water Level (inches)	Change In Water Level (Inches)	Field Percolation Rate (minutes/inch)
6:01	30	30	6	1 5/8	4 3/8	6.86
6:31						
6:32	30	61	6	1 7/8	4 1/8	7.27
7:02						
7:03	30	92	6	2	4	7.50
7:33						
7:34	30	123	6	2	4	7.50
8:04						
8:05	30	154	6	2	4	7.50
8:35						
8:36	30	185	6	2	4	7.50
9:06						
9:07	30	216	6	2	4	7.50
9:37						
9:38	30	247	6	2	4	7.50
10:08						
10:09	30	278	6	1 7/8	4 1/8	7.27
10:39						
10:40	30	309	6	1 7/8	4 1/8	7.27
11:10						
11:11	30	340	6	1 7/8	4 1/8	7.27
11:41						
11:42	30	371	6	1 7/8	4 1/8	7.27
12:12						


FF= 1410.00
P=1409.0
FF= 1410.00
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1399.9
FL
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EG
1387.07 FG
" BERM
1402
1405
1400
1394.4
1400.8
1389.5
1396.5
VINEYARD
Septic Distribution Lines
Septic Tank (2,250 gal)
Distribution Box
PB-1
T.D. = 4.0'
NO GW
PB-2
T.D. = 4.0'
NO GW
PB-3
T.D. = 4.0'
NO GW
PB-4
T.D. = 4.0'
NO GW
B-1
T.D. = 15.0'
NO GW
Qpfs
Qpfs
PROPOSED PRIM
• 4 LEACH LINE T
• 3' TRENCH WID
• 57' LENGTH OF
• 1' OF ROCK DEI
• 4" MIN. PERFO
LEACH FIELD R
• MINIMUM 5 FO
DISTRIBUTION
• MINIMUM 8 FEI
• MINIMUM 4 FEI
PROPOSED SECONDARY SY

APPENDIX B

PERCOLATION TEST RESULTS

Project:	Haven Vineyard	Job No.:	D21-1119-20	
Test Hole No.:	PB-1	Date Excavated:	5/4/2022	
Depth of Test Hole:	4.0'	Soil Classification:	SM	
Check for Sandy Soil Criteria By:		Date of Perc Test:	5/5/2022	Diameter: 8"

SANDY SOIL CRITERIA TEST

TIME	Time Interval (Minutes)	Initial Water Level (Inches)	Final Water Level (Inches)	Change In Water Level (Inches)

PRESOAK PERIOD

	Date/Time	Interval	Amount of Water Used
Start	5/4/22 9:20	HH:MM	All 5 Gallons
Stop	5/5/22 5:44	20:24	

TEST PERIOD

Time	Time Interval (min.)	Total Elasped Time (min.)	Initial Water Level (inches)	Final Water Level (inches)	Change In Water Level (Inches)	Field Percolation Rate (minutes/inch)
5:52	30	30	6	1/4	5 3/4	5.22
6:22						
6:23	30	61	6	3/8	5 5/8	5.33
6:53						
6:54	30	92	6	1/4	5 3/4	5.22
7:24						
7:25	30	123	6	1/8	5 7/8	5.11
7:55						
7:56	30	154	6	1/4	5 3/4	5.22
8:26						
8:27	30	185	6	1/4	5 3/4	5.22
8:57						
8:58	30	216	6	1/4	5 3/4	5.22
9:28						
9:29	30	247	6	1/8	5 7/8	5.11
9:59						
10:00	30	278	6	1/4	5 3/4	5.22
10:30						
10:31	30	309	6	1/4	5 3/4	5.22
11:01						
11:02	30	340	6	1/4	5 3/4	5.22
11:32						
11:33	30	371	6	1/4	5 3/4	5.22
12:03						

Project:	Haven Vineyard	Job No.:	D21-1119-20	
Test Hole No.:	PB-2	Date Excavated:	5/4/2022	
Depth of Test Hole:	4.0'	Soil Classification:	SM	
Check for Sandy Soil Criteria By:	JW	Date of Perc Test:	5/5/2022	Diameter: 8"

SANDY SOIL CRITERIA TEST

TIME	Time Interval (Minutes)	Initial Water Level (Inches)	Final Water Level (Inches)	Change In Water Level (Inches)
5:55	15	6	0	> 6
6:10				
6:11	17	6	0	> 6
6:28				

PRESOAK PERIOD

	Date/Time	Interval	Amount of Water Used
Start	5/4/22 9:30	HH:MM	All 5 Gallons
Stop	5/5/22 5:46	20:16	

TEST PERIOD

Time	Time Interval (min.)	Total Elasped Time (min.)	Initial Water Level (inches)	Final Water Level (inches)	Change In Water Level (Inches)	Field Percolation Rate (minutes/inch)
7:11	10	10	6	2 1/4	3 3/4	2.67
7:21						
7:22	10	21	6	3	3	3.33
7:32						
7:35	10	34	6	3 1/8	2 7/8	3.48
7:45						
7:47	10	46	6	3 1/8	2 7/8	3.48
7:57						
7:58	10	57	6	3 1/8	2 7/8	3.48
8:08						
8:09	10	68	6	3 1/8	2 7/8	3.48
8:19						

Project:	Haven Vineyard		Job No.:	D21-1119-20	
Test Hole No.:	PB-3		Date Excavated:	5/4/2022	
Depth of Test Hole:	4.0'		Soil Classification:	SM	
Check for Sandy Soil Criteria By:	JW		Date of Perc Test:	5/5/2022	Diameter: 8"

SANDY SOIL CRITERIA TEST

TIME	Time Interval (Minutes)	Initial Water Level (Inches)	Final Water Level (Inches)	Change In Water Level (Inches)
5:56	25	6	0	> 6
6:21				
6:25	25	6	1/4	5 3/4
6:50				

PRESOAK PERIOD

	Date/Time	Interval	Amount of Water Used
Start	5/4/22 9:40	HH:MM	All 5 Gallons
Stop	5/5/22 5:48	20:08	

TEST PERIOD

Time	Time Interval (min.)	Total Elasped Time (min.)	Initial Water Level (inches)	Final Water Level (inches)	Change In Water Level (Inches)	Field Percolation Rate (minutes/inch)
7:00	30	30	6	0	> 6	< 5
7:30						
7:31	30	61	6	0	> 6	< 5
8:01						
8:02	30	92	6	0	> 6	< 5
8:32						
8:33	30	123	6	0	> 6	< 5
9:03						
9:04	30	154	6	0	> 6	< 5
9:34						
9:35	30	185	6	1/8	5 7/8	5.11
10:05						
10:06	30	216	6	1/8	5 7/8	5.11
10:36						
10:37	30	247	6	1/8	5 7/8	5.11
11:07						
11:08	30	278	6	1/8	5 7/8	5.11
11:38						
11:39	30	309	6	1/8	5 7/8	5.11
12:09						
12:10	30	340	6	1/8	5 7/8	5.11
12:40						
12:41	30	371	6	1/8	5 7/8	5.11
13:11						

Project:	Haven Vineyard	Job No.:	D21-1119-20
Test Hole No.:	PB-4	Date Excavated:	5/4/2022
Depth of Test Hole:	4.0'	Soil Classification:	SM
Check for Sandy Soil Criteria By:		Date of Perc Test:	5/5/2022 Diameter: 8"

SANDY SOIL CRITERIA TEST

TIME	Time Interval (Minutes)	Initial Water Level (Inches)	Final Water Level (Inches)	Change In Water Level (Inches)

PRESOAK PERIOD

	Date/Time	Interval	Amount of Water Used
Start	5/4/22 9:50	HH:MM	All 5 Gallons
Stop	5/5/22 5:50	20:00	

TEST PERIOD

Time	Time Interval (min.)	Total Elasped Time (min.)	Initial Water Level (inches)	Final Water Level (inches)	Change In Water Level (Inches)	Field Percolation Rate (minutes/inch)
6:01	30	30	6	1 5/8	4 3/8	6.86
6:31						
6:32	30	61	6	1 7/8	4 1/8	7.27
7:02						
7:03	30	92	6	2	4	7.50
7:33						
7:34	30	123	6	2	4	7.50
8:04						
8:05	30	154	6	2	4	7.50
8:35						
8:36	30	185	6	2	4	7.50
9:06						
9:07	30	216	6	2	4	7.50
9:37						
9:38	30	247	6	2	4	7.50
10:08						
10:09	30	278	6	1 7/8	4 1/8	7.27
10:39						
10:40	30	309	6	1 7/8	4 1/8	7.27
11:10						
11:11	30	340	6	1 7/8	4 1/8	7.27
11:41						
11:42	30	371	6	1 7/8	4 1/8	7.27
12:12						