Soil Evaluation Report for WREDCO

Powers Creek East

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Reviewing Agency

Jurisdiction: Grays Harbor County, Washington
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Project Location

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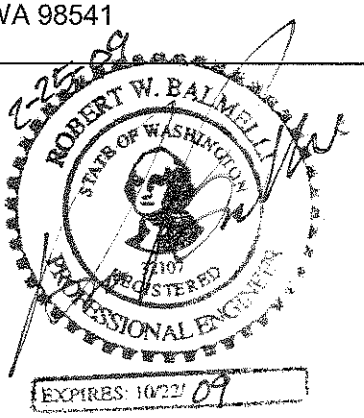

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Purpose

The purpose of this soil evaluation is to determine the type, structure and the depth of suitable soils for onsite septic systems on ten 6± acre buildable lots of a large lot subdivision for Weyerhaeuser Real Estate Development Company.

Scope

On June 17 and June 30, 2008 RB Engineering conducted soil evaluations on 10 lots for Weyerhaeuser Real Estate Development Company located on parent parcel No. 180507210010, Section 7, Township 18N, Range 5W of the Willamette Meridian, Grays Harbor County Washington. The evaluation included excavating and mapping a minimum of 2 and a maximum of 3 soil test pits per proposed lot, analyzing and logging soil properties for suitability of onsite septic systems. Each test pit was marked with a wooden stake, flagged with orange ribbon and given a unique number corresponding with the soil test pit number in Table 2 included in Appendix A of this report.

USDA Soil Analysis

The USDA has mapped soils for this area as Buckpeak silt loam (14), Centralia loam (28), Elochoman silt loam (37) and Zenker silt loam (164). Descriptions of these soils are as follows:

Buckpeak silt loam (14)

Setting

- *Landform:* Slumps
- *Parent material:* Colluvium and residuum weathered from sandstone and siltstone

Properties and Qualities

- *Slope:* 30 to 65 percent
- *Depth to restrictive feature:* 40 to 60 inches to paralithic bedrock
- *Drainage class:* Well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Available water capacity:* High (about 9.1 inches)

Centralia loam (28)

Setting

- *Landform:* Hillslopes
- *Landform position (two-dimensional):* Backslope
- *Parent material:* Residuum weathered from sandstone

Properties and Qualities

- *Slope:* 8 to 30 percent
- *Depth to restrictive feature:* More than 80 inches
- *Drainage class:* Well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Available water capacity:* High (about 10.4 inches)

Elochoman silt loam (37)

Setting

- *Landform:* Hillslopes
- *Landform position (two-dimensional):* Backslope
- *Parent material:* Residuum weathered from sandstone

Properties and Qualities

- *Slope:* 8 to 30 percent
- *Depth to restrictive feature:* More than 80 inches
- *Drainage class:* Well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Available water capacity:* Very high (about 15.5 inches)

Zenker silt loam (164)

Setting

- *Landform:* Hills
- *Landform position (two-dimensional):* Backslope
- *Parent material:* Colluvium derived from sandstone

Properties and Qualities

- *Slope:* 30 to 65 percent
- *Depth to restrictive feature:* More than 80 inches
- *Drainage class:* Well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Available water capacity:* High (about 10.4 inches

Method of Evaluation

Evaluation of the sites were field determined by site topography, desirable building site area, and required setbacks from site features such as proposed buildings, property lines, steep slopes, and wetlands. A minimum of 2 and a maximum of 3 soil test pits were excavated per lot and each test pit was evaluated for determining suitability for an onsite septic disposal area. This evaluation analyzes soil properties by depth, texture, structure, color and evidence of any layer or soil horizon restrictive to downward movement of water. This analysis will determine the type of system best suited for each site. Types of systems are listed and defined on page 6 of this report.

Results

Soils evaluated by RB Engineering are consistent with the USDA soil survey. Refer to Table 2 in Appendix A of this report for a summary of results showing suitable soil depths for the wastewater disposal system and recommended system type for each lot.

Typical Types of Septic Systems

See Figures 1 through 5 in Appendix C for sample details.

Conventional Gravity Distribution Trench
An onsite sewage system that consists of a septic tank and drainfield with gravity distribution of the wastewater/effluent.

Pressure Distribution Trench
An onsite sewage system consisting of a septic tank, a pump or surge tank and drainfield with pressure distribution of the wastewater/effluent.

Pressure Distribution Trench with Treatment
This system is needed when the suitable soil depth is not sufficient to provide the required final treatment needed to properly dispose wastewater within the drainfield. There are several options to provide the required treatment. Each system requiring additional treatment would be evaluated at the time of design for the "best fit" solution.

Mound
An onsite sewage system consisting of a septic tank, pump chamber and mound disposal component. The mound is composed of coarse sand placed on top of native soils with the wastewater dispersal components placed within the mound.

Estimated System Costs

Table 1 – Estimated Installation Cost by System Type

System Type	Estimated Cost*
Gravity Trench	$ 9,000
Pressure Distribution Trench	$13,000
Pressure Distribution Trench w/Treatment	$18,000
Mound	$19,000

*Estimated system cost does not include septic system design or permit fees

Conclusion

In conclusion, it has been determined that each of the 10 lots evaluated will support an individual onsite septic system. Prior to developing the individual lots, careful consideration and planning of each lot are recommended. The areas evaluated on each lot do not require that the wastewater disposal system be placed at that location. Other areas may be more desirable once a site plan has been developed; soils in the new location can be evaluated at that time. If the owner chooses to pursue the possibility of more suitable soils in a different location, this may allow a more conventional system at less cost to the owner.

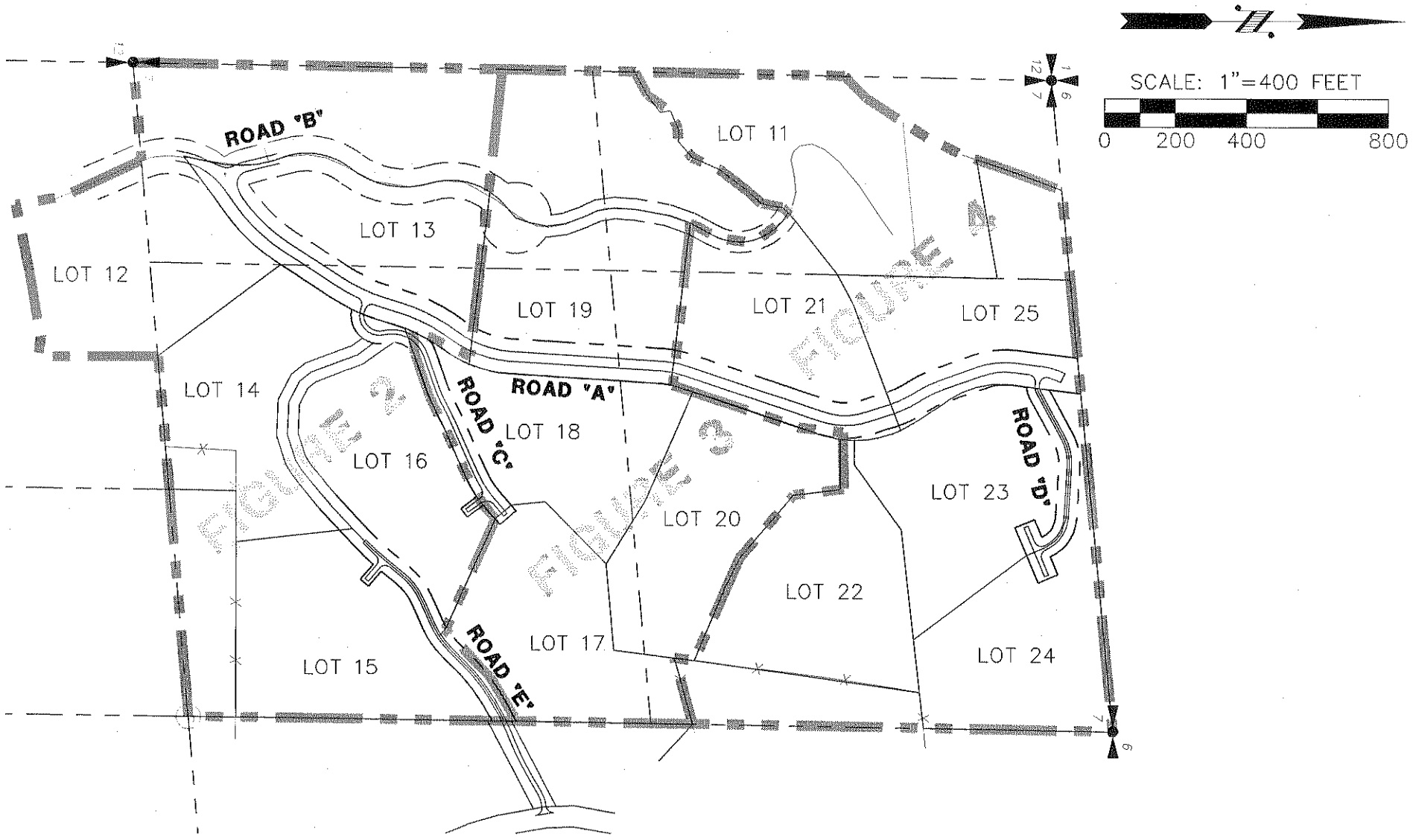
Appendix A
Summary of Results

Table 2 – Recommended system type per lot (where tested)

Lot No.	Test Pit #	Soil Type	Suitable Soil Depth	Recommended System Type
10	41	4	> 54"	Gravity/Pressure Distribution
	42	4	> 48"	
	43	4	> 58"	
12	39	4	> 38"	Pressure Distribution
	40	4	> 34"	
13	4	5	48"	Pressure Distribution with Gravelless Chambers
	5	5	33"	
	6	5	34"	
14	36	5	24"	Mound/ Pressure Distribution with Gravelless Chambers
	37	5	26"	
	38	5	> 42"	
15	1	5	>67"	Gravity/Pressure Distribution
	2	5	>70"	
	3	5	>67"	
16	10	4	> 66"	Gravity/Pressure Distribution
	11	4	>52"	
	12	4	> 52"	
17	7	4	30"	Mound/ Pressure Distribution with Gravelless Chambers
	8	4	24"	
	9	4	> 36"	

18	13	4	> 48"	Pressure Distribution
	14	4	> 52"	
	15	4	40"	
19	16	5	24"	Mound/ Pressure Distribution with Gravelless Chambers
	17	5	40"	
	18	5	> 48"	
20	19	5	> 46"	Gravity/Pressure Distribution
	20	5	> 60"	
	21	5	> 60"	
21	22	4	> 60"	Pressure Distribution
	23	4	> 44"	
	24	4	> 48"	
22	25	4	> 58"	Pressure Distribution
	26	4	> 50"	
	27	4	29"	
23	31	5	26"	Mound/Pressure Distribution with Gravelless Chambers
	32	5	36"	
	33	5	>40"	
24	28	5	> 48"	Gravity/Pressure Distribution
	29	5	> 53"	
	30	5	> 54"	
25	34	5	36"	Pressure Distribution with Gravelless Chambers
	35	5	36"	

Appendix B
Map of Test Pit Locations



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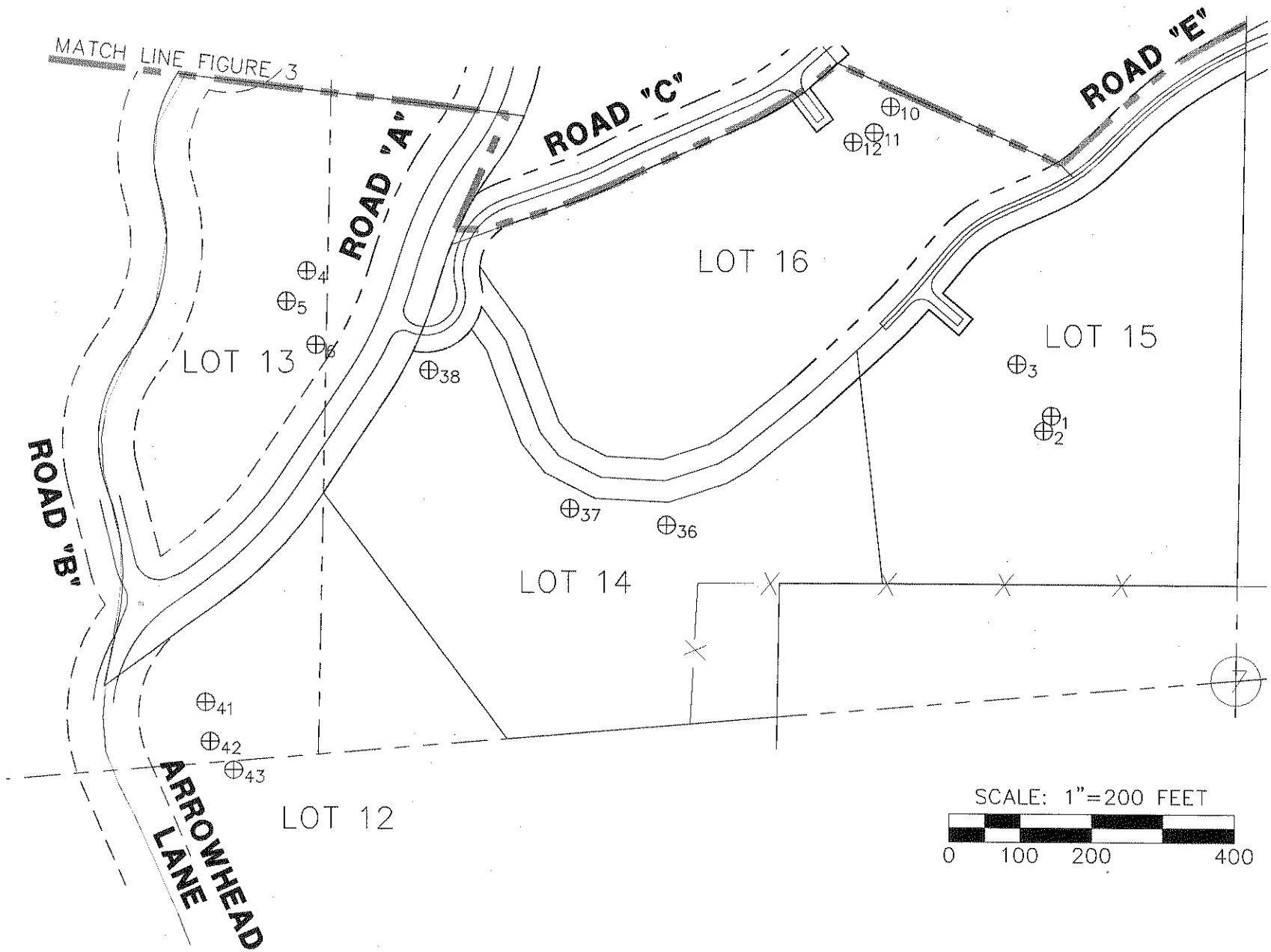
KEY MAP

POWERS CREEK EAST

JOB NUMBER 08025A

DRAWING NAME 08025A_STPM

FIGURE 1



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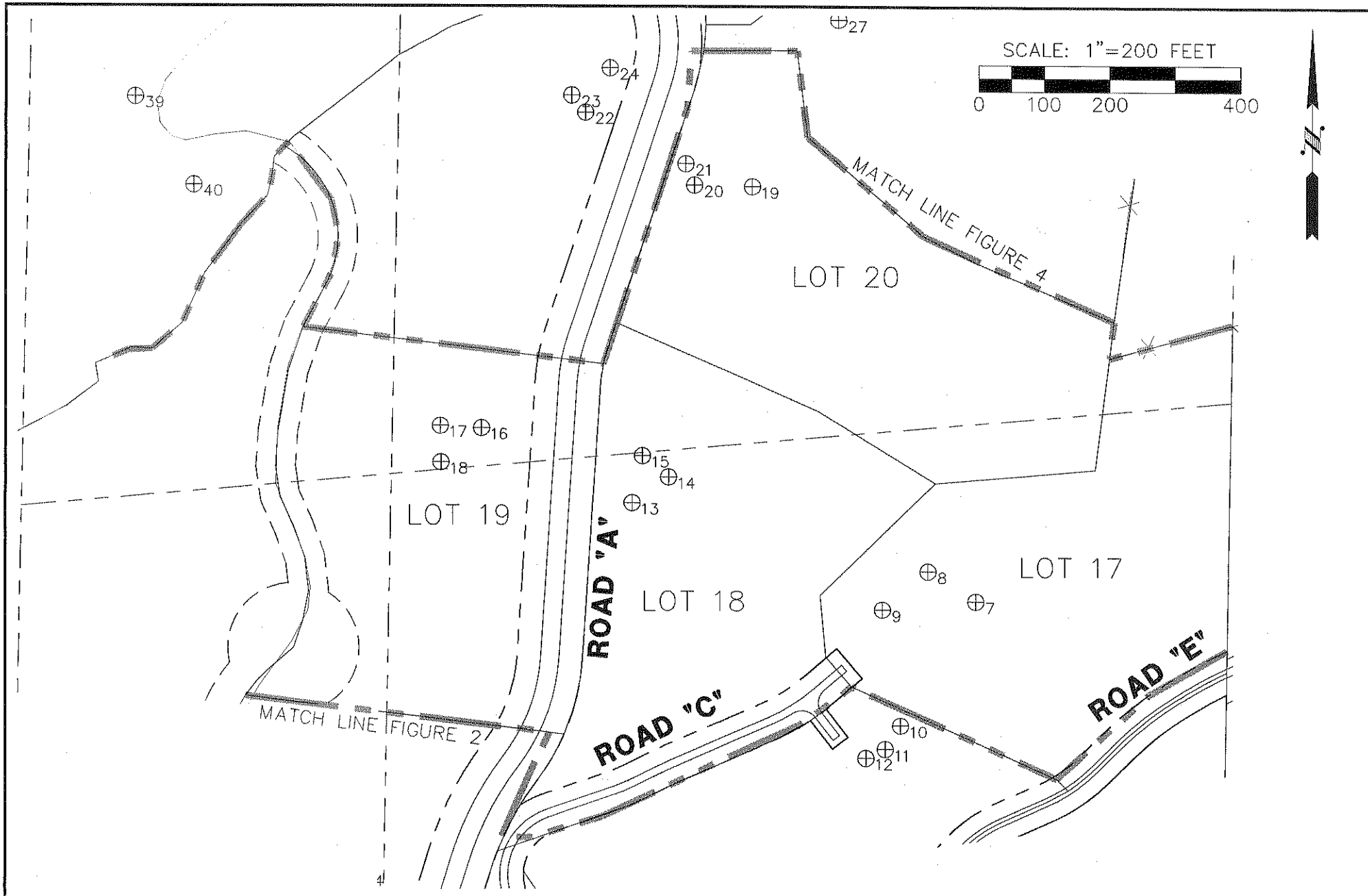
SOIL TEST PIT MAP

POWERS CREEK EAST

JOB NUMBER
08025A

DRAWING NAME
08025A_STPM

FIGURE
2



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SOIL TEST PIT MAP

POWERS CREEK EAST

JOB NUMBER
08025A

DRAWING NAME
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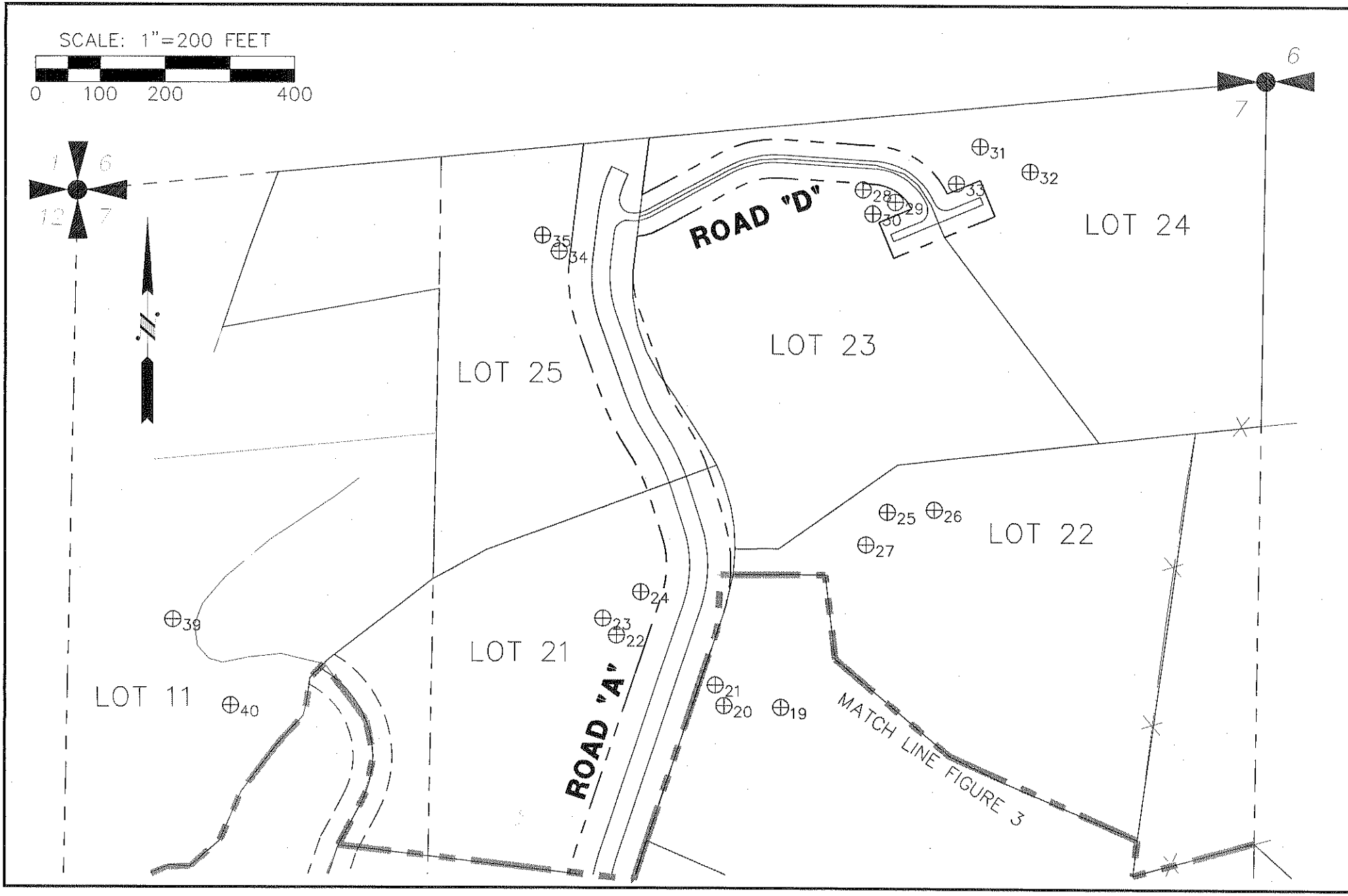
FIGURE
3



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SOIL TEST PIT MAP

POWERS CREEK EAST

JOB NUMBER 08025A

DRAWING NAME 08025A_STPM

FIGURE 4

Appendix C
Septic System Profiles and Sample Site Plans

Figure 1
Typical trench construction (gravity or pressure distribution) using gravelless chamber

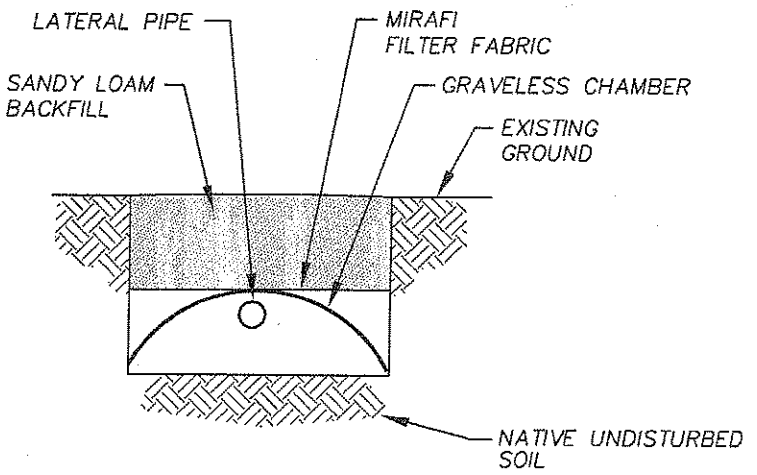


Figure 2
Typical trench construction (gravity or pressure distribution) using drainrock

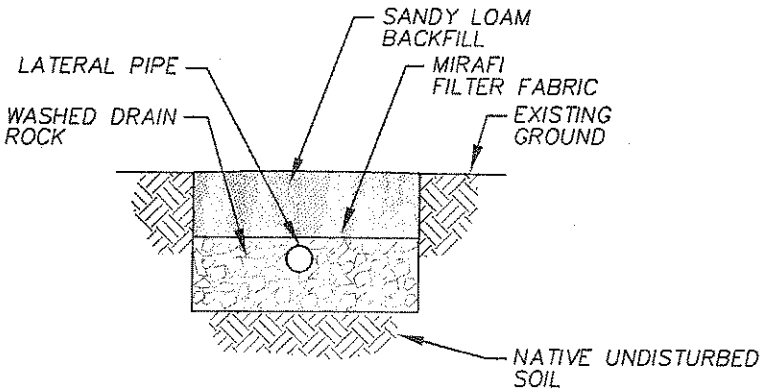


Figure 3
Typical layout of a trench system

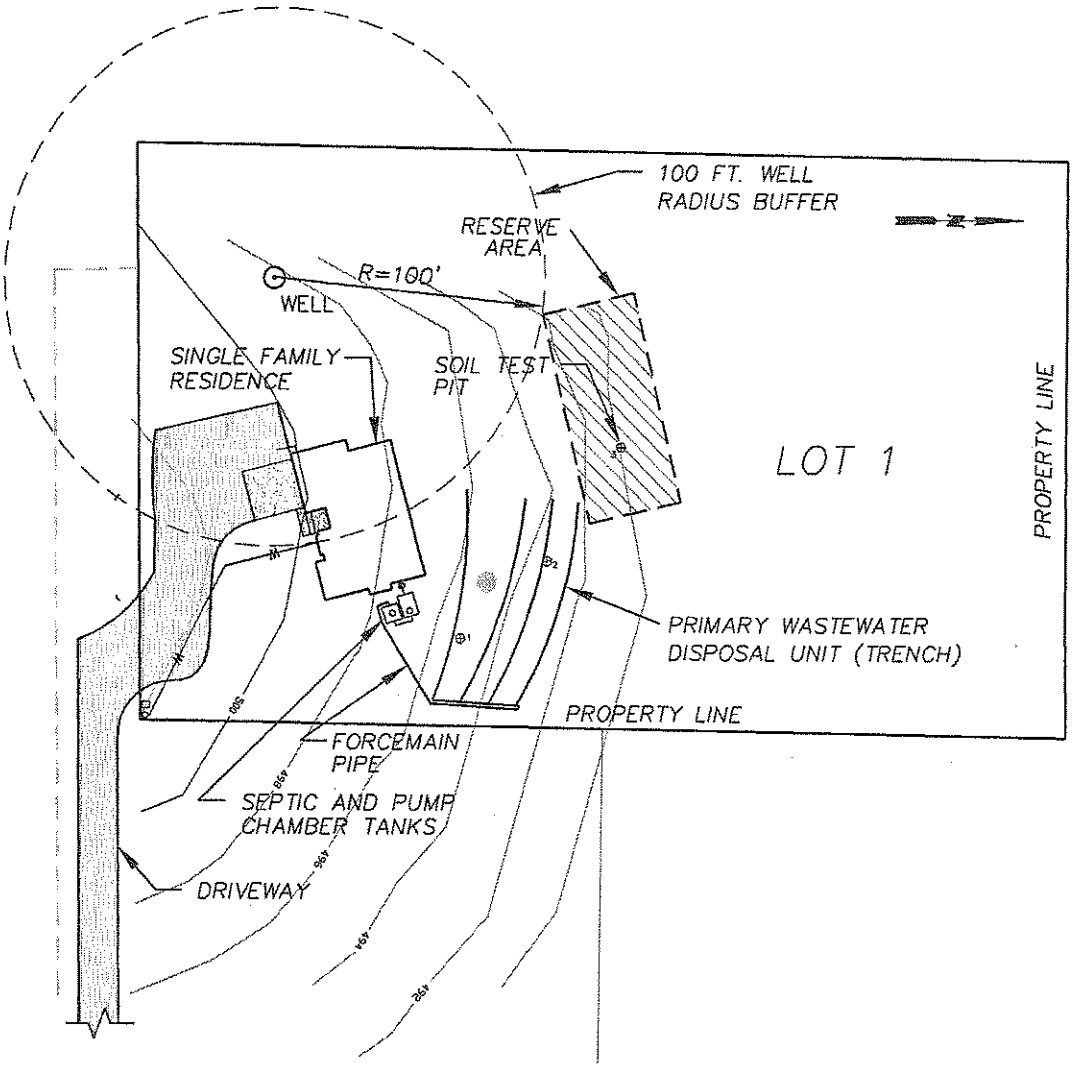


Figure 4
Typical cross-section of a mound system

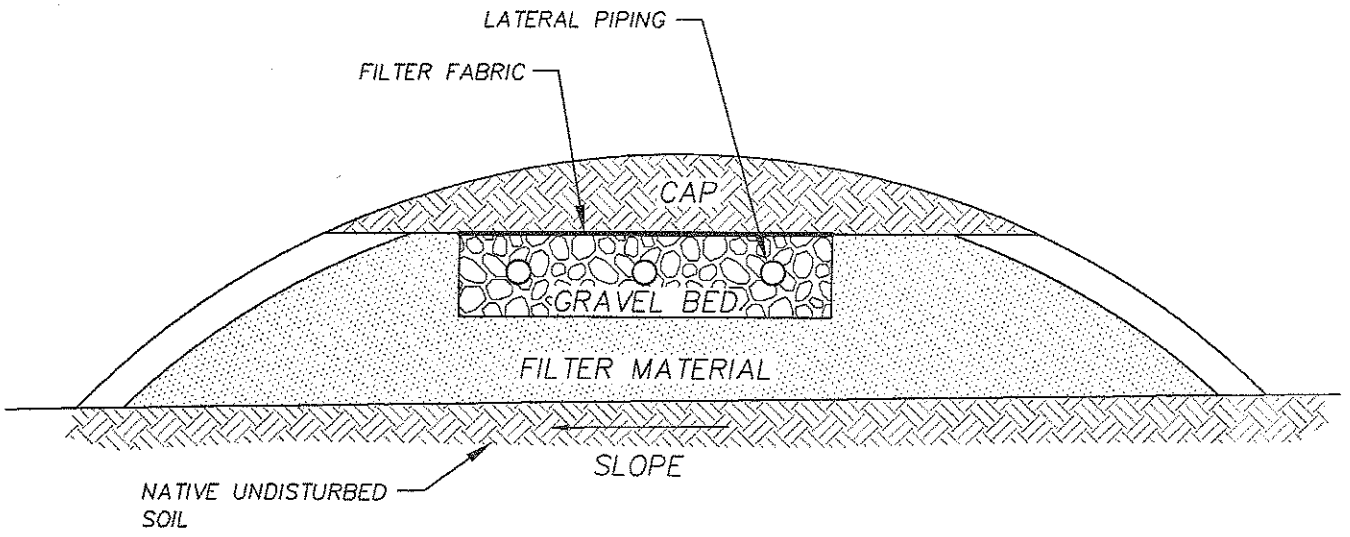
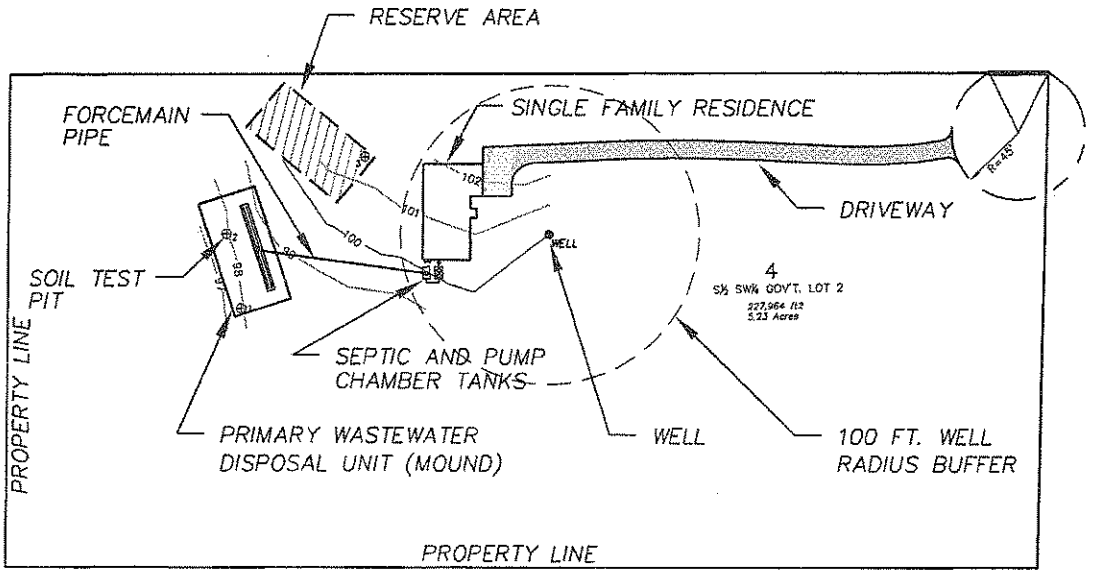


Figure 5
Typical layout of a mound system



Appendix D
Table of Septic System Setbacks

Table IV
Minimum Horizontal Separations

Items Requiring Setback	From edge of soil dispersal component and reserve area	From sewage tank and distribution box	From building sewer, and nonperforated distribution pipe
Well or suction line	100 ft.	50 ft.	50 ft.
Public drinking water well	100 ft.	100 ft.	100 ft.
Public drinking water spring measured from the ordinary high-water mark	200 ft.	200 ft.	100 ft.
Spring or surface water used as drinking water source measured from the ordinary high-water mark[1]	100 ft.	50 ft.	50 ft.
Pressurized water supply line	10 ft.	10 ft.	10 ft.
Decommissioned well (decommissioned in accordance with chapter 173-160 WAC)	10 ft.	N/A	N/A
Surface water measured from the ordinary high-water mark	100 ft.	50 ft.	10 ft.
Building foundation/in-ground swimming pool	10 ft.	5 ft.	2 ft.
Property or easement line	5 ft.	5 ft.	N/A
Interceptor/curtain drains/foundation drains/drainage ditches			
Down-gradient[2]:	30 ft.	5 ft.	N/A
Up-gradient[2]:	10 ft.	N/A	N/A
Other site features that may allow effluent to surface			
Down-gradient[2]:	30 ft.	5 ft.	N/A
Up-gradient[2]:	10 ft.	N/A	N/A
Down-gradient cuts or banks with at least 5 ft. of original, undisturbed soil above a restrictive layer due to a structural or textural change	25 ft.	N/A	N/A
Down-gradient cuts or banks with less than 5 ft. of original, undisturbed soil above a restrictive layer due to a structural or textural change	50 ft.	N/A	N/A
Other adjacent soil dispersal components/subsurface storm water infiltration systems	10 ft.	N/A	N/A

[1]If surface water is used as a public drinking water supply, the designer shall locate the OSS outside of the required source water protection area.

[2]The item is down-gradient when liquid will flow toward it upon encountering a water table or a restrictive layer. The item is up-gradient when liquid will flow away from it upon encountering a water table or restrictive layer.