
Attachment 6



Dees & Associates, Inc.

Geotechnical Engineers

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February 12, 2015

Project No. SCR-0818.1

NPI FUND II, LLC
% Hamilton Swift Land Use Consultants
500 Chestnut Street, Suite 100
Santa Cruz, California 95060

Subject: Revised Percolation Test Results

Reference: Proposed Mixed-Use Retail and Condominium Project
3800 Portola Drive
APN 032-092-01, 05
Santa Cruz County, California

Dear Mr. Swift:

The percolation rate presented in our letter dated October 2, 2014 represented the raw field data from our test. The percolation rate to be used in design of the retention system should represent the actual infiltration rate of the soil. We have revised our calculations and the actual infiltration rates to be used design are presented below.

PERCOLATION TEST DATA				
TEST BORING NUMBER	BORING DEPTH (ft)	PERCOLATION RATE (INCHES/HR) (MIN/IN)		TEST DATE
1	10.5	.0002	300,000	7/8/14
2	15.0	3.56	16.9	7/8/14
3	15.0	6.19	9.7	7/8/14
4	10.3	.0003	200,000	7/8/14

DEES & ASSOCIATES, INC.

Rebecca L. Boyd

Rebecca L. (Dees) Boyd
Geotechnical Engineer
G.E. 2623



Attachments

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1 to Ifland Engineers

PERCOLATION RATE CALCULATIONS		
Project No.	SCR-0818.1	Percolation Test Method
Project Name:	Portola Drive	Falling Head <input checked="" type="checkbox"/>
Date:	2/12/15	Constant Head <input type="checkbox"/>
Performed By:	BB	
Test No:	1	
Boring Diameter (inches)	6	<div>Design Percolation Rate $\{Q/A \cdot \Delta t\}$</div> <div>0.0002 in/hr</div>
Diameter of Insert Pipe (inches)	3	
Void Ratio of Annulus Fill	0.4	
Measured Flow in Field (in/hr)	0.0339	
Depth of Infiltration Zone (ft)	9.9	
<div>Constant Head Test Method</div>		
Volume of water infiltrated in 1 hour (cf/hr)	0.00	
Surface area of infiltration zone (sf)	0.00	
<div>Falling Head Test Method</div>		
Volume of water infiltrated in 1 hour (cf/hr)	0.0002	
Depth of Infiltration Zone = Average Perc Depth	9.9	
Area of boring (sf)	0.196	
Area of insert pipe (sf)	0.049	
Area of Annulus (sf)	0.147	
Volume of voids (sf)	0.059	
Volume per foot (cf)	0.108	
Correction factor = volume of voids/volume of boring	0.55	

Measured Flow in Field has been adjusted for area and volume.

PERCOLATION RATE CALCULATIONS		
Project No.	SCR-0818.1	Percolation Test Method
Project Name:	Portola Drive	Falling Head <input checked="" type="checkbox"/>
Date:	2/12/15	Constant Head <input type="checkbox"/>
Performed By:	BB	
Test No:	2	
Boring Diameter (inches)	6	Design Percolation Rate (Q/A*Δt) 3.56 in/hr
Diameter of Insert Pipe (inches)	3	
Void Ratio of Annulus Fill	0.4	
Measured Flow in Field (in/hr)	263.9	
Depth of Infiltration Zone (ft)	4.4	
Constant Head Test Method		
Volume of water infiltrated in 1 hour (cf/hr)	0.00	
Surface area of infiltration zone (sf)	0.00	
Falling Head Test Method		
Volume of water infiltrated in 1 hour (cf/hr)	1.31	
Depth of Infiltration Zone = Average Perc Depth	4.4	
Area of boring (sf)	0.196	
Area of insert pipe (sf)	0.049	
Area of Annulus (sf)	0.147	
Volume of voids (sf)	0.059	
Volume per foot (cf)	0.108	
Correction factor = volume of voids/volume of boring	0.55	

Top 10.5 feet of soil has an infiltration rate of .0003 or less and was neglected in the depth of infiltration.

PERCOLATION RATE CALCULATIONS		
Project No.	SCR-0818.1	Percolation Test Method
Project Name:	Portola Drive	Falling Head <input checked="" type="checkbox"/>
Date:	2/12/15	Constant Head <input type="checkbox"/>
Performed By:	BB	
Test No:	3	
Boring Diameter (inches)	6	<div>Design Percolation Rate (Q/A*Δt)</div> <div>6.19 in/hr</div>
Diameter of Insert Pipe (inches)	5	
Void Ratio of Annulus Fill	0.4	
Measured Flow in Field (in/hr)	458.6	
Depth of Infiltration Zone (ft)	4.4	
Constant Head Test Method		
Volume of water infiltrated in 1 hour (cf/hr)	0.00	
Surface area of infiltration zone (sf)	0.00	
Falling Head Test Method		
Volume of water infiltrated in 1 hour (cf/hr)	2.27	
Depth of Infiltration Zone = Average Perc Depth	4.4	
Area of boring (sf)	0.196	
Area of insert pipe (sf)	0.049	
Area of Annulus (sf)	0.147	
Volume of voids (sf)	0.059	
Volume per foot (cf)	0.108	
Correction factor = volume of voids/volume of boring	0.55	

PERCOLATION RATE CALCULATIONS		
Project No.	SCR-0818.1	Percolation Test Method
Project Name:	Portola Drive	Falling Head <input checked="" type="checkbox"/>
Date:	2/12/15	Constant Head <input type="checkbox"/>
Performed By:	BB	
Test No:	4	
Boring Diameter (inches)	6	<div>Design Percolation Rate (Q/A*Δt)</div> <div>0.0003 in/hr</div>
Diameter of Insert Pipe (inches)	3	
Void Ratio of Annulus Fill	0.4	
Measured Flow in Field (in/hr)	0.0432	
Depth of Infiltration Zone (ft)	9.4	
Constant Head Test Method		
Volume of water infiltrated in 1 hour (cf/hr)	0.00	
Surface area of infiltration zone (sf)	0.00	
Falling Head Test Method		
Volume of water infiltrated in 1 hour (cf/hr)	0.0002	
Depth of Infiltration Zone = Average Perc Depth	9.4	
Area of boring (sf)	0.196	
Area of insert pipe (sf)	0.049	
Area of Annulus (sf)	0.147	
Volume of voids (sf)	0.059	
Volume per foot (cf)	0.108	
Correction factor = volume of voids/volume of boring		0.55



Dees & Associates, Inc.
Geotechnical Engineers

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Phone: 831 427-1770

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June 29, 2015

Project No. SCR-0818.1

NPI FUND II, LLC
% Hamilton Swift Land Use Consultants
500 Chestnut Street, Suite 100
Santa Cruz, California 95060

Subject: Proposed Retention System

Reference: 3800 Portola Drive
APN 032-092-01, 05
Santa Cruz County, California

Dear Mr. Swift:

The soil at the site transition from thinly bedded silty sand, clayey, sand, silt, clay and gravel to well graded sand with varying amounts of gravel around 10 feet below grade. The transition to the sand with gravel was observed in a sample retrieved 10 to 11.5 feet below grade in Boring 1. The contact to the sand with gravel was estimated to be 11 to 12 feet below grade in Borings 2 and 3 based on the effect on the auger during drilling. The augers chatter and bounce when drilling gravelly soils.

The 10 feet deep test holes did not penetrate into the sandy gravelly soils and therefore had a slow infiltration rate. The 15 feet deep test holes did penetrate into the sandy gravelly soils and had a suitable infiltration rate. Although our test hole was performed at a depth of 15 feet, the same soil exists at shallower depths and the infiltration rate at 15 feet is suitable to use at shallower depths.

Because the top of the sandy gravelly layer varies across the site from 10 to 12 feet in depth, our firm will be on-site to observe the base of the retention system and verify the bottom of the trench exposes the sandy gravelly soil. The trench will be deepened as necessary to penetrate the sandy gravelly soils.

DEES & ASSOCIATES, INC.

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