



Project No. 1390.001.G

Page No. 1

May 29, 2015

Mr. Bill Marczewski  
Pacific Seafood Group  
16797 SE 130th Avenue  
Clackamas, Oregon 97015

Dear Mr. Marczewski:

**Re: Supplemental Geotechnical Consultation and Field (Pilot) Infiltration Testing Services,  
Proposed Pacific Seafood Greenfield Processing/Distribution Facility Site, 8007 44th Avenue West,  
Mukilteo (Snohomish County), Washington**

In accordance with the request of Mr. Bill Marczewski of Pacific Seafood Group and as required by the City of Mukilteo and/or the Washington State Department of Ecology, we have completed our evaluation of the soil infiltration rate at the above subject proposed Pacific Seafood Greenfield Processing and Distribution Facility development site. The scope of our work was outlined in our formal proposal to Mr. Bill Marczewski dated May 7, 2015. The subject property is located to the east of 44th Avenue West and south of the intersection with 80th Street SW in Mukilteo (Snohomish County), Washington (see Site Vicinity Map, Figure No. 1).

As you are aware, we recently performed a Geotechnical Investigation at the site the results of which were presented in our formal report dated May 1, 2015. The results of our previous geotechnical investigation at the site revealed that the subject property is underlain at a depth of between two (2) to four (4) feet beneath the existing site and/or surface grades by gray to gray-brown, dense, clayey, silty sand with gravel and cobbles and/or glacial till deposits.

### Project Background

We understand that present plans are to develop the subject approximate 5 acre rectangular shaped property with a new processing and distribution facility building. Additionally, we understand that the project will also include construction of new paved parking and access drive areas. Further, we understand that storm water from hard surfaces (i.e., roofs and pavements) is to be collected and disposed of on-site through a suitable storm water infiltration system.

### Infiltration Testing

To evaluate the feasibility of subsurface disposal of stormwater, we were present at the site on May 27, 2015 and performed one (1) pilot field infiltration test within the lower easterly portion of the subject property. The testing consisted of a open pit falling head infiltration test in accordance with the Washington State Department of Ecology Stormwater Management Manual for Western Washington Volume III Hydrologic Analysis and Flow Control BMP's test method dated August 2012.

Specifically, one (1) approximate four (4) feet by four (4) feet pilot infiltration test hole was excavated at the approximate location shown on the attached Pilot Infiltration Test Location Plan, Figure No. 2. The test hole was initially excavated to a depth of approximately three (3) feet below the existing site and/or surface grades. The subgrade soils encountered within the test hole excavated at the site consisted of an approximate 24-inch surficial layer of dark brown topsoil and/or organic fill materials interturn underlain by medium to orangish-brown, wet, loose to medium dense, clayey, silty sand (SM).

Following the excavation of the infiltration test hole, a vertical measuring rod marked in half-inch increments was installed in the center of the pit bottom. Water was then placed into the infiltration test hole with a 3-inch diameter rigid pipe and splash plate to a depth of approximately 12 inches to allow the subgrade soils to saturate over time (approximately 6 hours). Following the required saturation period, the infiltration test hole was again filled with approximately 12 inches of water and the cumulative volume and instantaneous flow rate was monitored and recorded every 15 minutes over a one-hour period. After a one-hour period, the water source was stopped and the rate of infiltration in inches per hour (in/hr) was monitored until the infiltration test hole was empty.

Following the conclusion of the infiltration testing, the infiltration test hole was over-excavated to see if the test water had mounded on a shallow restrictive layer or had continued to infiltrate deep into the subsurface soils.

### Infiltration Testing Results

The results of the field infiltration testing at the site revealed that the ultimate soil infiltration rate of the underlying clayey silty sand subgrade soil was less than 0.3 inches per hour (in/hr). The above field infiltration rate is based on Redmond Geotechnical Services, LLC observations during our supplemental subsurface exploration work at the site and, based on the results of our previous geotechnical investigation and nineteen (19) drilled test boring explorations, may be considered as representative of other locations across and/or beneath the subject property.

Following the completion of the field infiltration testing, the infiltration test hole was advanced to a depth of approximately five (5) feet below the existing site and/or surface grades to check for deep infiltration and/or mounding.

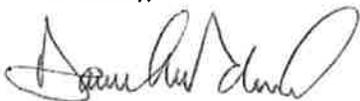
The results of the deeper test hole excavation revealed that the infiltration test site is underlain at a depth of about three and one-half (3.5) feet by dense glacial till. Additionally, no visual evidence of deeper infiltration was observed within the underlying glacial till deposits. As such, mounding of subsurface water at the contact with the dense glacial till deposits should be considered as was evidence by the presence of ponding surface water across the lower northeasterly portion of the subject property.

### **Conclusions and Recommendations**

Based on the results of our recent pilot infiltration test at the site as well as the results of our previous geotechnical investigation and nineteen (19) test boring explorations across the subject property, we are generally of the opinion that the subject site is unsuitable for stormwater infiltration due to mounding on the near surface dense glacial till deposits found at depths of between two (2) to four (4) feet beneath the existing site and/or surface grades. Although site soil conditions and localized infiltration rates may vary with time and/or with changes in site utilization, the presence of the relatively shallow dense glacial till deposits found beneath the subject site as well as the presence of ponding surface water suggest that infiltration rates greater than 0.3 inches per hour are unlikely. As such, due to the presence of an existing stormwater detention pond located to the east of the subject property, we recommend that consideration be given to utilizing the existing stormwater detention basin for disposal of stormwater from the proposed Pacific Seafood Greenfield Processing and Distribution Facility site.

We appreciate this opportunity to be of service to you at this time and trust that the above information is suitable to your present needs. Should you have any questions regarding the above information or if you require any additional information and/or assistance with this project, please do not hesitate to call.

Sincerely,



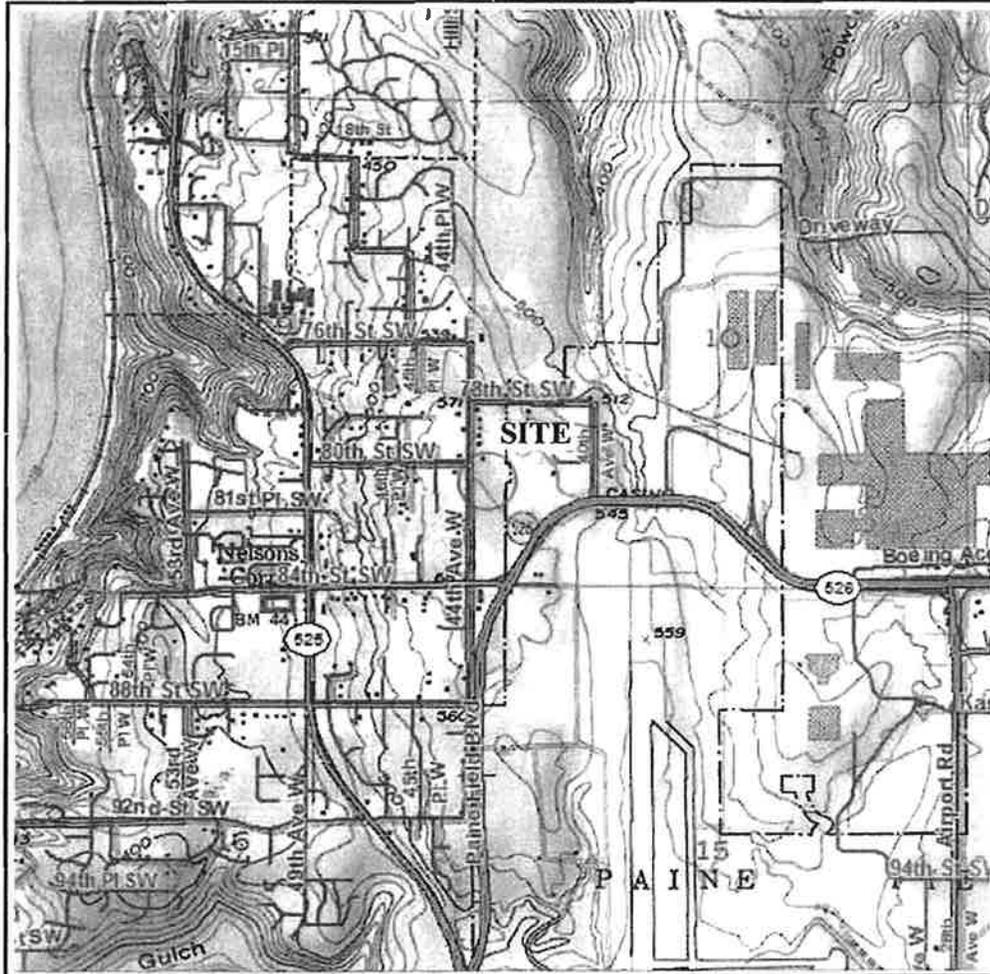
Daniel M. Redmond, P.E., G.E.  
President/Principal Engineer



EXPIRES. 3-22-17

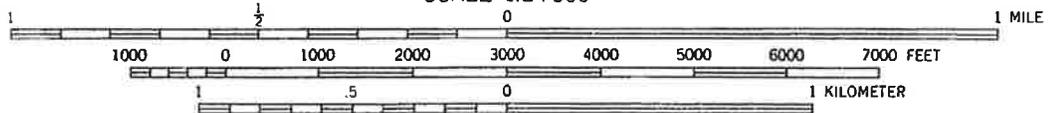
### Attachments:

- Figure No. 1 - Site Vicinity Map
- Figure No. 2 - Pilot Infiltration Test Location Plan
- Figure No. 3 - Key to Exploratory Test Log
- Figure No. 4 - Log of Test Pit



MUKILTEO QUADRANGLE  
 WASHINGTON  
 7.5 MINUTE SERIES (TOPOGRAPHIC)

SCALE 1:24 000

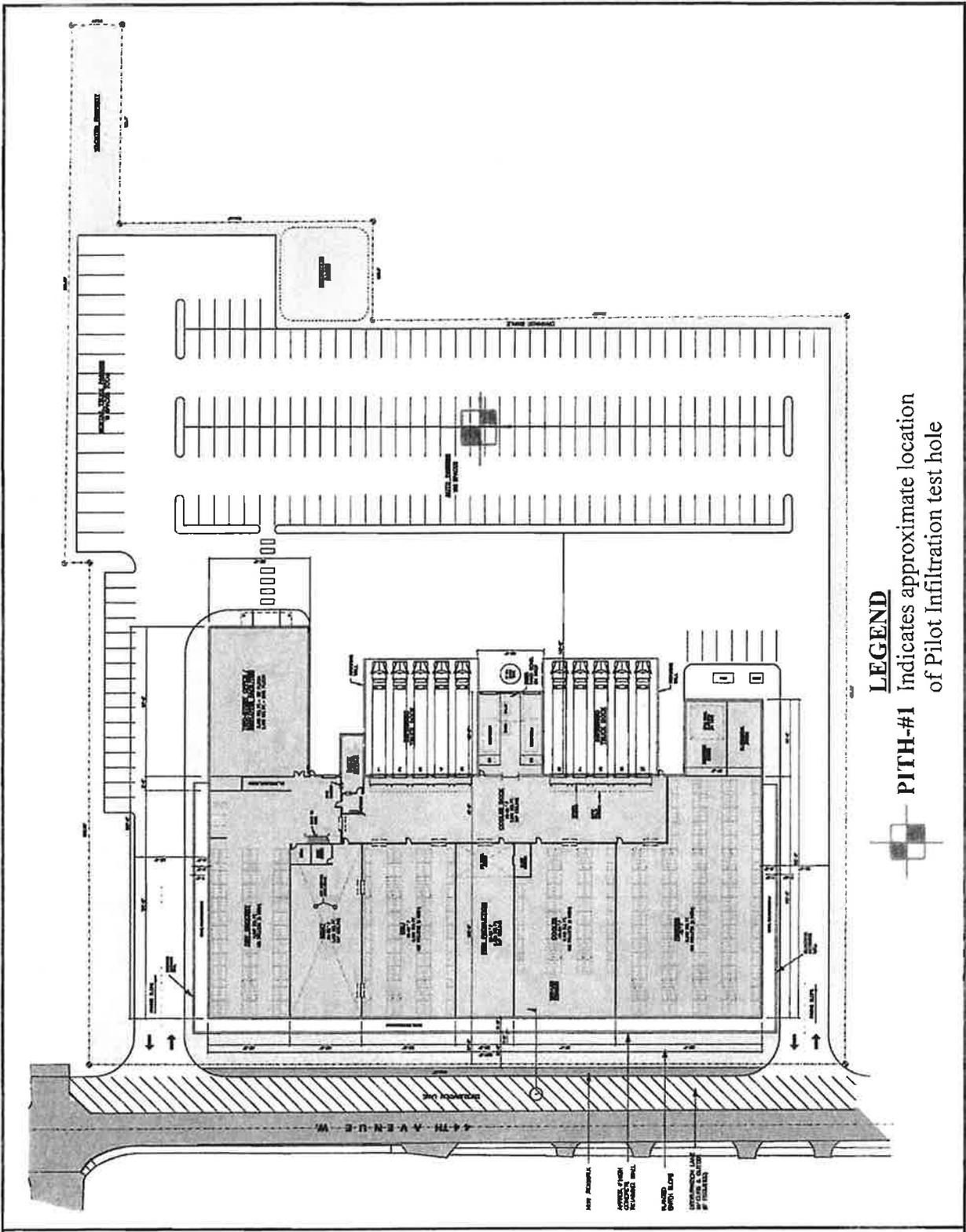


CONTOUR INTERVAL 20 FEET  
 NATIONAL GEODETIC VERTICAL DATUM OF 1929  
 DEPTH CURVES AND SOUNDINGS IN FEET—DATUM IS MEAN LOWER LOW WATER

**SITE VICINITY MAP**  
**PACIFIC SEAFOODS**  
**DISTRIBUTION FACILITY**

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Figure No. 1



**LEGEND**  
 PITH-#1 Indicates approximate location of Pilot Infiltration test hole

**PILOT INFILTRATION TEST LOCATION PLAN**

PRIMARY DIVISIONS			GROUP SYMBOL	SECONDARY DIVISIONS	
COARSE GRAINED SOILS MORE THAN HALF OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVELS MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS (LESS THAN 5% FINES)	GW	Well graded gravels, gravel-sand mixtures, little or no fines.	
		GRAVEL WITH FINES	GP	Poorly graded gravels or gravel-sand mixtures, little or no fines.	
			GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines.	
		SANDS MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS (LESS THAN 5% FINES)	GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines.
	SANDS WITH FINES		SW	Well graded sands, gravelly sands, little or no fines.	
			SP	Poorly graded sands or gravelly sands, little or no fines.	
			SM	Silty sands, sand-silt mixtures, non-plastic fines.	
	FINE GRAINED SOILS MORE THAN HALF OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT IS LESS THAN 50%	SILTS AND CLAYS LIQUID LIMIT IS GREATER THAN 50%	SC	Clayey sands, sand-clay mixtures, plastic fines.
ML				Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.	
CL				Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.	
SILTS AND CLAYS LIQUID LIMIT IS GREATER THAN 50%		SILTS AND CLAYS LIQUID LIMIT IS GREATER THAN 50%	SILTS AND CLAYS LIQUID LIMIT IS GREATER THAN 50%	OL	Organic silts and organic silty clays of low plasticity.
				MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
				CH	Inorganic clays of high plasticity, fat clays.
				OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils.	

**DEFINITION OF TERMS**

SILTS AND CLAYS	U.S. STANDARD SERIES SIEVE			CLEAR SQUARE SIEVE OPENINGS			COBBLES	BOULDERS
	200	40	10	4	3/4"	3"		
	SAND			GRAVEL				
	FINE	MEDIUM	COARSE	FINE	COARSE			

**GRAIN SIZES**

SANDS, GRAVELS AND NON-PLASTIC SILTS	BLOWS/FOOT <sup>†</sup>
VERY LOOSE	0 - 4
LOOSE	4 - 10
MEDIUM DENSE	10 - 30
DENSE	30 - 50
VERY DENSE	OVER 50

CLAYS AND PLASTIC SILTS	STRENGTH <sup>‡</sup>	BLOWS/FOOT <sup>†</sup>
VERY SOFT	0 - 1/4	0 - 2
SOFT	1/4 - 1/2	2 - 4
FIRM	1/2 - 1	4 - 8
STIFF	1 - 2	8 - 16
VERY STIFF	2 - 4	16 - 32
HARD	OVER 4	OVER 32

**RELATIVE DENSITY**

<sup>†</sup>Number of blows of 140 pound hammer falling 30 inches to drive a 2 inch O.D. (1-3/8 inch I.D.) split spoon (ASTM D-1586).

<sup>‡</sup>Unconfined compressive strength in tons/sq. ft. as determined by laboratory testing or approximated by the standard penetration test (ASTM D-1586), pocket penetrometer, torvane, or visual observation.

**CONSISTENCY**



**REDMOND  
GEOTECHNICAL  
SERVICES**

PO Box 20547 • PORTLAND, OREGON 97294

**KEY TO EXPLORATORY TEST PIT LOGS  
Unified Soil Classification System (ASTM D-2487)**

PACIFIC SEAFOOD DISTRIBUTION FACILITY  
Mukilteo, Washington

PROJECT NO.	DATE
1390.001.G	May 29, 2015

Figure 3

BACKHOE COMPANY: Olson & Olson

BUCKET SIZE: 30 inches

DATE: 5/27/15

DEPTH (FEET)	BAG SAMPLE	DENSITY TEST	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	SOIL CLASS. (U.S.C.S.)	SOIL DESCRIPTION
						TEST PIT NO. PITH-#1
5					ML	FILL/TOPSOIL: Dark brown, wet, soft, highly organic, sandy and clayey SILT with bark chips
					SM	NATIVE GROUND: Medium to orangish-brown, wet, loose to medium dense, clayey, silty SAND with occasional gravel (Highly Weathered Glacial Drift)
					SM	Gray to gray-brown, very moist, medium dense to dense, clayey, silty SAND with gravel and cobbles (Glacial Till)
10						Total Depth: 5.0 feet
15						

TEST PIT NO.						ELEVATION										
5																
10																
15																

**LOG OF TEST PITS**

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PACIFIC SEAFOODS SITE

FIGURE NO. 4

REDMOND GEOTECHNICAL SERVICES