



# Trepanier Engineering

Professional Civil Engineering

PRELIMINARY DRAINAGE CALCULATIONS

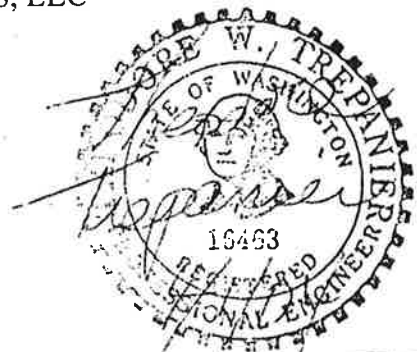
FOR

SHORT PLAT

SOUTHWEST CORNER OF 172<sup>ND</sup> AND 59<sup>TH</sup> AVE.

FOR

PREMIER PACIFIC PROPERTIES, LLC



EXPIRES 8/2/2004

BY

TREPANIER ENGINEERING

1420 HEWITT AVE.

APRIL 5, 2004

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JUL 14 2004

Utilities Div.



## SOUTHERLY LOTS

Area = 9.0 acres, including the southerly lot at 7.7 acres and the adjacent lot at 1.3 acres each for a total of 2.6 acres.

For Preliminary Drainage Calculations, we are assuming the whole site impervious and the Time of Concentration is fixed at five minutes, though in reality it will be longer because of the flat slopes and longer distances.

Rainfall for the site is 6 month at 1.15 inches  
2 year at 1.8 inches  
10year at 2.6 inches  
100year at 3.7 inches

The soils are a Custer Soil with a tabulated infiltration rate of 0.27 in/hr. Using a factor of safety at 2.0 we have input 0.135 in/hr as our infiltration rate. We have used the conservative void ratio of 0.3 but may investigate other materials during final design.

Doing this has resulted in a 400 x 400 drainfield basically centered on the entrance road from 59<sup>th</sup> and into the property. The calculated flow depth is approximately 1.5 feet deep or 18 inches.

## NORTHERLY LOTS

Each of these lots is 1.3 acres in size and once again we will assume 100% impervious and a Time of Concentration of 5 minutes. We will put the infiltration trench in the front of the lot off 172<sup>nd</sup> where the loamy sands exist (Lynnwood Loamy Sand) with an infiltration rate of 2.41 in/hr and with a Safety Factor of 2, resulting in a calculated rate of 1.205 in/hr to be input into the software program.

The water table in the front lot is between 5-6 feet, which should be good for infiltration.

The calculations show an infiltration bed/trench of 100' x 150'.

## **INTRODUCTION**

The site is located in the southwest quadrant of 172<sup>nd</sup> and 59<sup>th</sup> Ave.. The site is flat but generally slopes north to south. The project size is about 11.6 acres in size. The site consists of several small buildings which will be demolished.

## **PLANNED DEVELOPMENT**

The proposal is for a four lot short plat to split the property into four commercial/industrial properties. The proposal, at present, calls for a used car lot in front and Gale Insulation in the lower 7.7 plus acres.

## **EXISTING DRAINAGE CONDITIONS**

The site currently drains north to south into an existing wetland/creek at the south end of the property. The water table is fairly high for Arlington and the upper three feet has fairly dense soils and is not conducive to infiltration.

## **PLANNED DRAINAGE CONDITIONS**

This office was approached by the owners' representative to pursue an infiltration alternative for the various parcels. The soils conditions are better on the northern portion of the property than the southern. Three soils reports/letters are attached to this report that reflects the soils conditions as well as the depth to groundwater. The groundwater tests were run in winter of 2003/2004.

The drainage infiltration trenches will be broken into two separate properties. The first is the northern proposed two lots and the third, will represent the southerly two lots.

In each case, we are proposing to direct the road/asphalt parking drainage to a Stormwater Filter for water quality treatment of the 6 month storm event. Because of the shallow water table in the winter and the need to have a 2.5 foot drop going through the Stormwater Filter, we are proposing to pump this storm event into the infiltration system. At higher flow events, the water will go directly into the infiltration system.

Additionally, the rooftop drainage will go directly into infiltration since the water is assumed clean. The pictured conceptual plan shows a proposed infiltration gallery picture.

With the high water table, we are proposing to excavate to better soils at or slightly above the water table and replace the materials with clean sand.

Drainage calculations follow for the two systems:

SOUTH

Appended on: 12:02:17 Thursday, April 01, 2004

**LPOOLCOMPUTE [badperctrench] SUMMARY using Puls**

Start of live storage: 100.0000 ft

Event	Match Q (cfs)	Peak Q (cfs)	Peak Stg (ft)	Vol (cf)	Vol (acft)	Time to Empty
other	2.1562	0.5000	100.1684	8081.89	0.1855	40.83
100 year	7.6237	0.5000	101.5496	74378.74	1.7075	81.33

Running C:\\Documents and Settings\\Administrator\\My Documents\\PROJECTS\\GALEINSULATION\\badperctrench Report.pgm on Thursday, April 01, 2004

**Summary Report of all Detention Pond Data**

Event	Precip (in)
other	1.1500
2 year	1.8000
10 year	2.6000
100 year	3.7000

**BASLIST2**

[DEVELOPED] Using [TYPE1A] As [other]  
[DEVELOPED] Using [TYPE1A] As [other]  
[DEVELOPED] Using [TYPE1A] As [100 year]  
[DEVELOPED] Using [TYPE1A] As [100 year]

LSTEND

BasinID	Peak Q (cfs)	Peak T (hrs)	Peak Vol (ac-ft)	Area (ac)	Method/Loss	Raintype
DEVELOPED	2.1562	8.01	0.6868	9.00	SCS/SCS	TYPE1A
DEVELOPED	2.1562	8.01	0.6868	9.00	SCS/SCS	TYPE1A
DEVELOPED	7.6237	8.01	2.6023	9.00	SCS/SCS	TYPE1A
DEVELOPED	7.6237	8.01	2.6023	9.00	SCS/SCS	TYPE1A

**BASLIST [TYPE1A] AS [other] DETAILED**

[DEVELOPED]

LSTEND

**Record Id: DEVELOPED**

<b>Design Method</b>	SCS	<b>Rainfall type</b>	TYPE1A			
<b>Hyd Intv</b>	10.00 min	<b>Peaking Factor</b>	484.00			
		<b>Abstraction Coeff</b>	0.20			
<b>Pervious Area</b>	0.00 ac	<b>DCIA</b>	9.00 ac			
<b>Pervious CN</b>	0.00	<b>DC CN</b>	98.00			
<b>Pervious TC</b>	0.00 min	<b>DC TC</b>	5.00 min			
<b>Directly Connected CN Calc</b>						
<b>Description</b>		<b>SubArea</b>	<b>Sub cn</b>			
lot		9.00 ac	98.00			
DC Compositd CN (AMC 2)			98.00			
<b>Directly Connected TC Calc</b>						
<b>Type</b>	<b>Description</b>	<b>Length</b>	<b>Slope</b>	<b>Coeff</b>	<b>Misc</b>	<b>TT</b>
Fixed	by inspection					5.00 min
Directly Connected TC						5.00min

**HYDLIST SUMMARY**

[100 year out]

**LSTEND**

<b>HydID</b>	<b>Peak Q (cfs)</b>	<b>Peak T (hrs)</b>	<b>Peak Vol (ac-ft)</b>	<b>Cont Area (ac)</b>
100 year out	0.5000	3.83	2.6020	9.0000

**STORLIST**

[trench]

**LSTEND**

**Record Id: trench**

Descrip:	Prototype Record	Increment	0.10 ft
Start El.	100.0000 ft	Max El.	108.0000 ft
Length	400.0000 ft	Width	400.0000 ft
Catch	30.0000	Consider Bottom Only	

**Record Id: badperc**

Descrip:	Prototype Structure	Increment	0.10 ft
Start El.	100.0000 ft	Max El.	105.0000 ft
Infiltration rate	0.1350 in/hr	WP Multiplier	1.00

**NORTH**  
**THORNBERRY LOTS- 172<sup>ND</sup> AND 59<sup>TH</sup> AVE**  
**JOB NO. APRIL 01, 2004**

**LPOOLCOMPUTE [DUMMYNODE] SUMMARY using Puls**

Start of live storage: 100.0000 ft

Event	Match Q (cfs)	Peak Q (cfs)	Peak Stg (ft)	Vol (cf)	Vol (acft)	Time to Empty
100 year	2,2024	0.4184	101.6384	7372.91	0.1693	26.50

**Summary Report of all Detention Pond Data**

Event	Precip (in)
other	1.1500
2 year	1.8000
10 year	2.6000
100 year	3.7000

**BASLIST2**

[THORNBERRYLOTS] Using [TYPE1A] As [100 year]

[THORNBERRYLOTS] Using [TYPE1A] As [100 year]

**LSTEND**

BasinID	Peak Q (cfs)	Peak T (hrs)	Peak Vol (ac-cf)	Area (ac)	Method/Loss	Raintype
THORNBERRYLOTS	2.2024	8.01	0.7518	2.60	SCS/SCS	TYPE1A
THORNBERRYLOTS	2.2024	8.01	0.7518	2.60	SCS/SCS	TYPE1A

**BASLIST [TYPE1A] AS [100 year] DETAILED**

[THORNBERRYLOTS]

**LSTEND**

**Record Id: THORNBERRYLOTS**

Design Method	SCS	Rainfall type	TYPE1A
Hyd Intv	10.00 min	Peaking Factor	484.00
		Abstraction Coeff	0.20
Pervious Area	0.00 ac	DCIA	2.60 ac
Pervious CN	0.00	DC CN	98.00
Pervious TC	0.00 min	DC TC	5.00 min

Directly Connected CN Calc						
Description	SubArea	Sub cn				
THORNBERRYLOTS	2.60 ac	98.00				
DC Compositd CN (AMC 2)		98.00				

Directly Connected TC Calc						
Type	Description	Length	Slope	Coeff	Misc	TT
Fixed	BY INSPECTION					5.00 min
Directly Connected TC						5.00min

**HYDLIST SUMMARY**

[100 year out]

LSTEND

HydID	Peak Q (cfs)	Peak T (hrs)	Peak Vol (ac-ft)	Cont Area (ac)
100 year out	0.4184	5.67	0.7517	2.6000

**STORLIST**

[INFILBED]

LSTEND

**Record Id: INFILBED**

Descrip:	Prototype Record Increment 0.10 ft		
Start El.	100.0000 ft	Max El.	108.0000 ft
Length	100.0000 ft	Width	150.0000 ft
Catch	30.0000	Consider Bottom Only	

**DISCHLIST**

[perctrench]

LSTEND

**Record Id: perctrench**

Descrip:	Prototype Structure Increment 0.10 ft		
Start El.	100.0000 ft	Max El.	105.0000 ft
Infiltration rate	1.2050 in/hr	WP Multiplier	1.00



# Western Geotechnical Consultants, Inc.

4183 Saltsprings Dr., Ferndale, WA 98248  
Phone/FAX (360)380-2507

RECEIVED

FEB 12 2004

THOMCO CONST., INC.

February 6, 2004

Thomco Construction, Inc.  
13700 44<sup>th</sup> St. NE  
Lake Stevens, WA. 98258  
Attn: Edmund Thomas

**Re: Seasonal High Water Table Determination – Initial Report  
Cornehl Property  
Thomco Commercial & Light Industrial Site  
Snohomish Co., WA**

Western Geotechnical Consultants, Inc. is pleased to present the results of our monitoring of 7 piezometers installed at the above referenced property. On January 29, 2004 a geotechnical engineer from our firm installed the 7 piezometers in excavated test pits. Subsurface soil and groundwater conditions were evaluated and logged at that time and a report was issued February 5, 2004. A description of soil and groundwater conditions encountered and the logs of test pits are included in that report. The piezometer locations are shown on the attached Site Plan, Figure 1. The purpose of the piezometer installation was to obtain ground water level readings throughout the winter months to determine the seasonal high ground water levels. This report provides the results of our initial water level readings and the results of our periodic readings will be documented in subsequent interim reports. The initial water level readings are summarized below. The last column in the table will indicate the seasonal high water table for each piezometer site.

<u>Piezo. No.</u>	<u>Depth of Piezometer (feet)</u>	<u>Date Piezo. Read</u>	<u>Date Piezo. Read<sup>2</sup></u>	<u>Date Piezo. Read</u>	<u>Date Piezo. Read</u>	<u>Seasonal High Water Level<sup>3</sup></u>
		1/29/04 <sup>1</sup>	2/4/04			
1	8.0	7.0	5.91			
2	7.0	4.0	3.45			
3	7.2	3.8	3.24			
4	7.5	6.0	5.17			
5	4.8	2.0	2.45			
6	6.0	4.0	2.56			
7	6.5	6.0	4.17			

- <sup>1</sup> Reading taken at time of field investigation  
<sup>2</sup> Data to be collected  
<sup>3</sup> To be determined

Seasonal High Water Table Determination  
Windemere Real Estate Site  
NW Corner of 8<sup>th</sup> St. & State St.  
Marysville, Washington  
December 16, 2002

Western Geotechnical Consultants, Inc.

(Page 2 of 2)

We appreciate the opportunity to be of assistance to you on this project. If you have any questions regarding the contents of this report, or if we can be of further assistance, please contact our office.

Sincerely,

**Western Geotechnical Consultants, Inc.**



Theodore A. Hammer, P.E.  
Geotechnical Engineer

Attachment: Figure 1, Site Plan Sketch

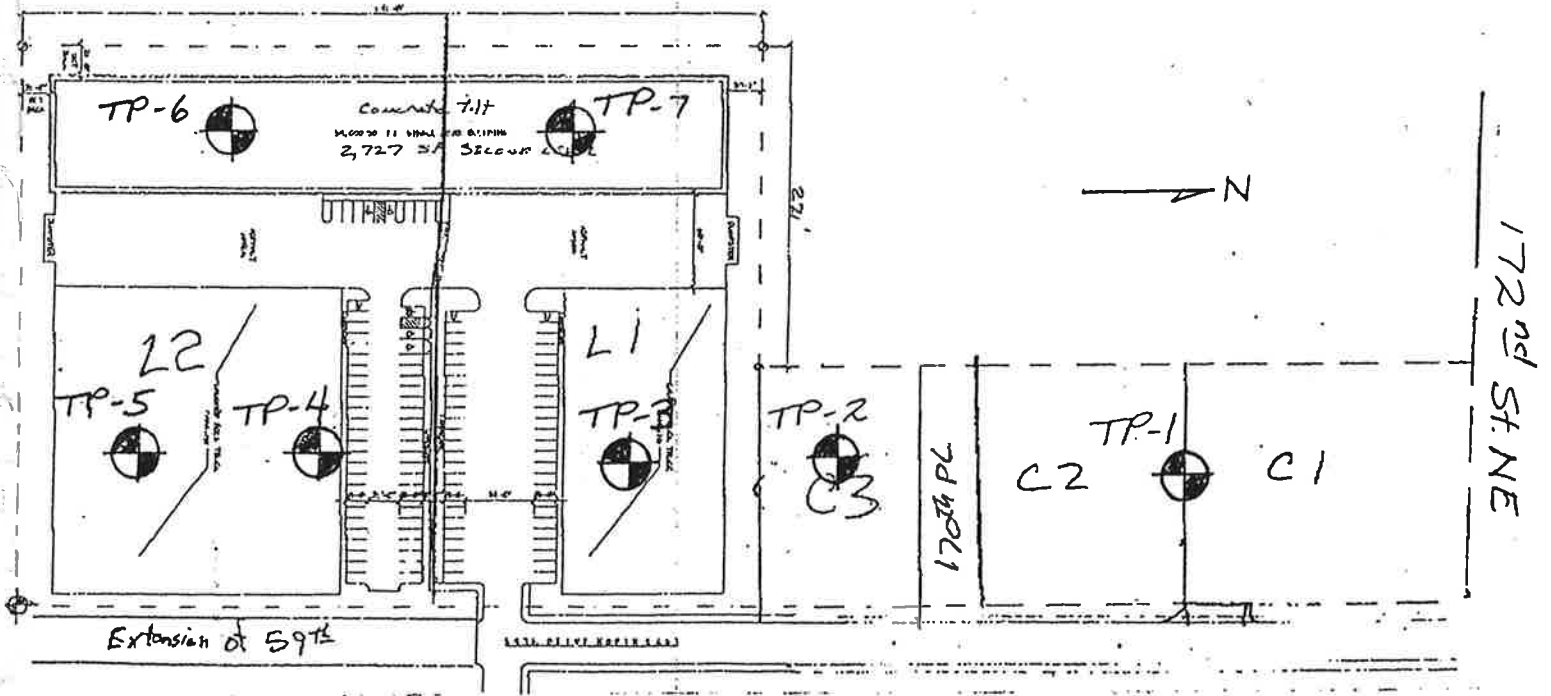
Cc: Gary Parkinson Architects

File:04-14-2

Geotechnical Investigation  
Thomco Construction, Inc. - Cornehl Property  
SW of Intersection of 172<sup>nd</sup> St. NE and 67<sup>th</sup> Ave. NE  
Snohomish Co., WA  
February 5, 2004

WESTERN GEOTECHNICAL CONSULTANTS, INC.  
#04 14 1

**Figure 1**  
**Site Plan & Test Pit Locations**  
**Cornel Property**  
**Thomco Commercial & Light Industrial Site**  
**Snohomish Co., WA**



# Western Geotechnical Consultants, Inc.

4183 Saltspings Dr., Ferndale, WA 98248  
Phone/FAX (360)380-2507

February 5, 2004

Thomco Construction, Inc.  
13700 – 44<sup>th</sup> St. NE  
Lake Stevens, WA 98258  
ATTN: Mr. Edmund Thomas

**Re: Report – Geotechnical Investigation  
Cornehl Property  
Thomco Commercial & Light Industrial Site  
SW of Intersection of 172<sup>nd</sup> St. NE and 67<sup>th</sup> Ave. NE  
Snohomish County, WA**

Western Geotechnical Consultants, Inc. is pleased to present the results of our geotechnical engineering investigation conducted at the above referenced property. On January 29, 2004 a geotechnical engineer from our firm oversaw the excavation of 7 test pits at the approximate locations shown on the attached Site Plan, Figure 1. Our site investigation was supplemented with subsurface soil and groundwater information developed by Cascade Surveying and Engineering, Inc. and a site plan with a proposed 59,000 square foot concrete tilt-up building footprint (2 phases), developed by Gary Parkinson Architects, dated October 15, 2003.

The site is made up of two rectangular portions, one to be developed as three commercial lots and the other to be developed with a 2-story concrete tilt-up building and two light industrial lots (see Figure 1). Stormwater generated on the site will be controlled with detention/infiltration facilities if favorable site conditions are present. The purpose of our investigation was to characterize and evaluate subsurface soil and groundwater conditions at the site with respect to stormwater control, foundation design for the proposed concrete tilt-up building, and other geotechnical issues affecting the proposed development.

The specific scope of our investigation for the site included the following services:

- Excavating a total of 7 test pits at the site to obtain representative subsurface soil and groundwater information and to obtain soil samples to characterize the site. Piezometers were installed in all of the test pits for future groundwater monitoring.
- Developing tabulated logs for each test pit as to the thickness and depth of each soil unit and describing the soils encountered in accordance with the Unified Soil Classification System (USCS).
- Performing field and laboratory testing, as required, for use in our engineering evaluation of the site.

(Page 2 of 16)

- Preparing an engineering report including a summary of work performed, a description of the subsurface conditions encountered, and our recommendations for:
  - Stormwater detention design parameter information.
  - General site development criteria including stripping and grubbing recommendations.
  - Cutting and structural fill criteria including the suitability of on site materials for use as structural fill.
  - Drainage considerations.
  - Recommendations for groundwater monitoring.

### Site Conditions

#### Surface Conditions

The site is an irregular shaped parcel composed of 2 rectangular pieces (see Figure 1). The property is relatively flat pasture land that is for the most part grass covered. The property is approximately 9.68 acres in size with the three commercial sites occupying 2.75 acres of the property and the two light industrial sites and concrete tilt up building occupying the remainder of the site.

#### Subsurface Conditions

Subsurface soil and groundwater conditions at the site were explored on January 29, 2004 using a rubber tire mounted, 4-wheel drive John Deer 310-D backhoe with a 1-1/2-wide bucket. A total of 7 test pits were excavated to a maximum depth of 8.0 feet. The locations of the test pits are shown on the attached Site Plan, Figure 1. A Geotechnical Engineer from our office continuously logged and classified the soils encountered in the test pits using the Unified Soils Classification System (USCS), and the obtained representative soil samples for further analyses and testing. Edited, tabulated test pit logs are included with this report along with a USCS Chart explaining soil descriptions. The test pits were loosely backfilled upon completion of the explorations.

Our subsurface investigation revealed a relatively similar subsurface soil profile across the property. The subsurface profile consists of about a foot of sandy organic rich SILT to silty SAND and roots (OL/SM by USCS) (topsoil), which is underlain by 1/2 to 2 feet of slightly silty fine to medium SAND (SP/SM by USCS). This soil unit is underlain by fine to medium SAND and gravelly fine to coarse SAND (SP by USCS).

The USDA "Soil Conservation Service (SCS) "Soil Survey of Snohomish County Area, Washington" has mapped Norma loam across the site. Norma loam is very deep poorly drained soil located in depressional areas on outwash plains and till plains. Norma soils are classified in Hydrologic Group D. The near surface soils encountered in our test pits are consistent with the SCS soil description loam.

### Groundwater

Groundwater seepage was encountered in all of the test pits at depths ranging from 2 to 7-feet at the time of our investigation (January 29, 2004). Piezometers were installed in all of the test pits and on 02/04/04 the water table was measured through the piezometers at 2.45' to 5.91' below the ground surface (see test pit logs). The water table will be monitored throughout the winter season to determine the depth of the seasonal high water table. Water level measurements will be documented under separate report.

## **Conclusions and Recommendations**

### General

The plan is to develop the site with a 1 to 2 story tilt-up concrete building and develop 2 light industrial properties and 3 commercial sales sites (see Figure 1). Stormwater control facilities are planned for the southeast segment of the property. Our investigation focused on obtaining soil and groundwater information across the site to aid in stormwater control facility design, foundation design, and general site development. Conventional shallow spread and continuous footings will provide adequate support for the proposed concrete building as detailed below.

### Infiltration

The SCS has classified the site soils as belonging to Hydrologic Group D. We recommend that the piezometers be monitored over the winter to define the seasonal high water table and to determine if adequate separation can be maintained to allow for infiltration of stormwater.

### Foundation Support for the Concrete Tilt-up Building

Based on the results of our geotechnical investigation, the site is suitable for foundation support using conventional shallow spread footings founded on compact, undisturbed native, non-organic sandy and/or slightly silty sandy soils (SP and SP/SM by USCS), or on structural fill (defined below in General Development Recommendations). Bearing soil that is disturbed during foundation excavation should be re-compacted or removed and replaced with structural fill. Wall footings and column footings should have minimum dimensions of 18 and 24 inches, respectively. All footings should be founded a minimum of 18 inches below the lowest adjacent final grade for frost protection.

All footings supported on the properly prepared, compact native non-organic soils (SP and SP/SM by USCS), or imported structural fill, may be proportioned using a net allowable bearing pressure of 2,000 pounds per square foot (PSF). The term net allowable bearing pressure refers to the pressure that can be imposed on the soil at foundation level due to the total of all dead plus live loads, exclusive of the weight of the footing or any backfill placed above the footing.

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This bearing pressure may be increased by a value of one-third for transient wind or seismic loading. If significant structural fill will be used to raise grade, the allowable bearing pressure could possibly be increased, subject to re-evaluation by a geotechnical engineer

Inspection of the foundation excavations by a geotechnical engineer should be performed prior to forming for footings. This is necessary to verify that foundation soils remain in a stiff to very stiff state throughout the foundation level, and to verify that foundation soil is in an undisturbed state.

Settlement of spread footing foundations depends on the foundation size and bearing pressure as well as the strength and compressibility characteristics of the underlying bearing soils.

Assuming construction is accomplished as recommended above and for the loads anticipated, we estimate total settlement of the foundation should be less than about one inch and differential settlement between two adjacent load bearing components should be less than about half the total settlement estimate. Most of the settlement should take place relatively rapidly during construction as loads are applied. We recommend that footing excavations be observed by a geotechnical engineer to confirm that our design assumptions are met.

#### General Development Recommendations

Based on our site investigation, we conclude the site will be suitable for the type of development planned from a geotechnical standpoint, provided our recommendations are followed and good construction practices are used. Conventional shallow spread footing should provide adequate foundation support for the proposed concrete tilt-up building and we anticipate that buildings on the commercial and light industrial properties can be supported on shallow footings provided the foundation loads are relatively small. If relatively heavy foundation loads are planned for any of the sites, once building loads and locations are known, we recommend that a site specific geotechnical boring investigations or additional test pits be excavated to provide information for development of foundation recommendations for heavy structures.

Site Preparation: All topsoil, organics, soft material, and any other deleterious materials must be striped away from the areas to be occupied by the proposed structures and associated development improvements which are defined as those areas that will support buildings, parking lots, etc. Based on the results of our subsurface investigation we estimate that the stripping depth will be about 1 foot. It should be verified that all organic or other unsuitable materials are removed during striping of the site.

(Page 5 of 16)

The soils below the stripping depth should exhibit no significant shrinkage or swelling with seasonal changes in moisture content. However, the silty sandy soils near the surface are moisture sensitive and could soften when wet and become disturbed by construction equipment. Therefore, earthwork operations will be easier and less costly if performed during the dry season.

Structural Fill and Compaction: It is possible that structural fill will be required to raise grade. Structural fill is defined as fill supporting buildings, sidewalks, driveways, etc. All structural fill used to replace unsuitable soils or to raise the site grade should be placed and compacted on a horizontal subgrade surface. Structural fill should extend beyond the edge of building foundations a distance equal to the thickness of the fill beneath the foundation.

In general, the suitability of a soil for use as compacted structural fill depends on the gradation and moisture content of the soil when it is placed. As the quantity of fines (that portion finer than the No. 200 sieve) increases, the soils become increasingly sensitive to small changes in moisture content and adequate compaction becomes more difficult to achieve. Soils containing more than about 5% fines cannot be consistently compacted to a dense, non-yielding condition when the water content is much greater than optimum. Optimum moisture content is the moisture content that results in the greatest dry density.

The on-site sandy and gravelly soils located below 2 to 3 feet will make acceptable structural fill and the overlying silty sand soils could be used as structural fill provided the moisture content is carefully controlled. If for any reason it is necessary to use import structural fill, the structural fill should consist of relatively clean sandy GRAVEL with less than 5% fines (GW by Unified Soils Classification System (USCS)).

Fill should be placed in maximum 8- to 10-inch loose, horizontal lifts and be thoroughly compacted. Under all building foundations, structural fill should be compacted to a minimum of 95% of maximum dry density as determined by the ASTM D-1557 test procedure. Under parking lots and drive areas, the structural fill should be compacted to a minimum of 92%, except for the top 2-feet, which should meet the minimum of 95% criteria.



(Page 6 of 16)

**Floor Slab Support:** We have assumed that the concrete tilt-up building will have an earth supported floor slab. Preparation of the building areas in a manner described in the previous sections of this report should provide an adequate base for the floor slab support. We recommend that all earth-supported floor slabs be underlain by a minimum of four inches of sand or clean crushed gravel, which will act as a capillary break to prevent moisture wicking to the slab. A vapor barrier, consisting of polyethylene sheeting, may be placed below the floor slab.

If a vapor barrier is used, it should be covered with a thin layer of clean sand or crushed gravel to protect it during concrete placement and to aid in concrete curing. After the sand or crushed gravel layer is placed, it should be maintained in a relatively dry condition.

**Drainage and Grading Considerations:** We recommend that footing drains be placed around the perimeter of building foundations. The drains should be placed below the base of all foundations. The drains typically consist of a 4-inch diameter perforated pipe surrounded by washed rock.

The footing drains should discharge to the storm drainage system for the property. Roof drainage should be discharged by separate tightline and not be introduced into the footing drain system. The ground surface around buildings should be graded so that storm water runoff is directed away from buildings and foundations.

**Groundwater Monitoring:** We recommend that the piezometers installed in the test pits be monitored throughout the winter months so as to determine the seasonal high water table on the property. Western Geotechnical Consultants, Inc. will be pleased to provide groundwater monitoring services for the project.

### **Erosion Control**

Erosion control during construction of the proposed development can be accomplished through placement of proper sedimentation control facilities. We recommend siltation control facilities, consisting of either hay bales or silt fences, be fabricated around the construction area. Typical details for siltation control using either hay bales or silt fences are attached to this report.

Siltation devices should be placed downgradient of all construction areas and cleared areas to provide siltation control during construction. All siltation control devices should be maintained during construction, and left in operable condition until the site has been revegetated and siltation is no longer a threat. At that time the siltation facilities should be removed.

(Page 7 of 16)

### Closure

This report is intended for use by the owner or his representative in the development of the Cornehl property located to the southwest of the intersection of 172<sup>nd</sup> St. NE and 67<sup>th</sup> Ave. NE in Snohomish County, Washington. This report should not be used for any other purposes or other project sites without the specific consent of Western Geotechnical Consultants, Inc.

Our test pit logs show subsurface conditions at the dates and locations indicated. The analysis, conclusions, and recommendations contained in our report are based on site conditions to the limited depth of our test pits at the time of our investigation. We assume that the exploratory test pits are representative of the subsurface conditions throughout the site. If during construction, different subsurface conditions from those encountered during our explorations are observed or appear to be present in excavations, we must be advised promptly so that we can review these conditions and reconsider and/or modify our recommendations and conclusions where necessary.

We appreciate the opportunity to be of assistance to you on this project. If you have any questions regarding the contents of this report, or if we can be of further assistance, please contact our office.

Sincerely,

**Western Geotechnical Consultants, Inc.**



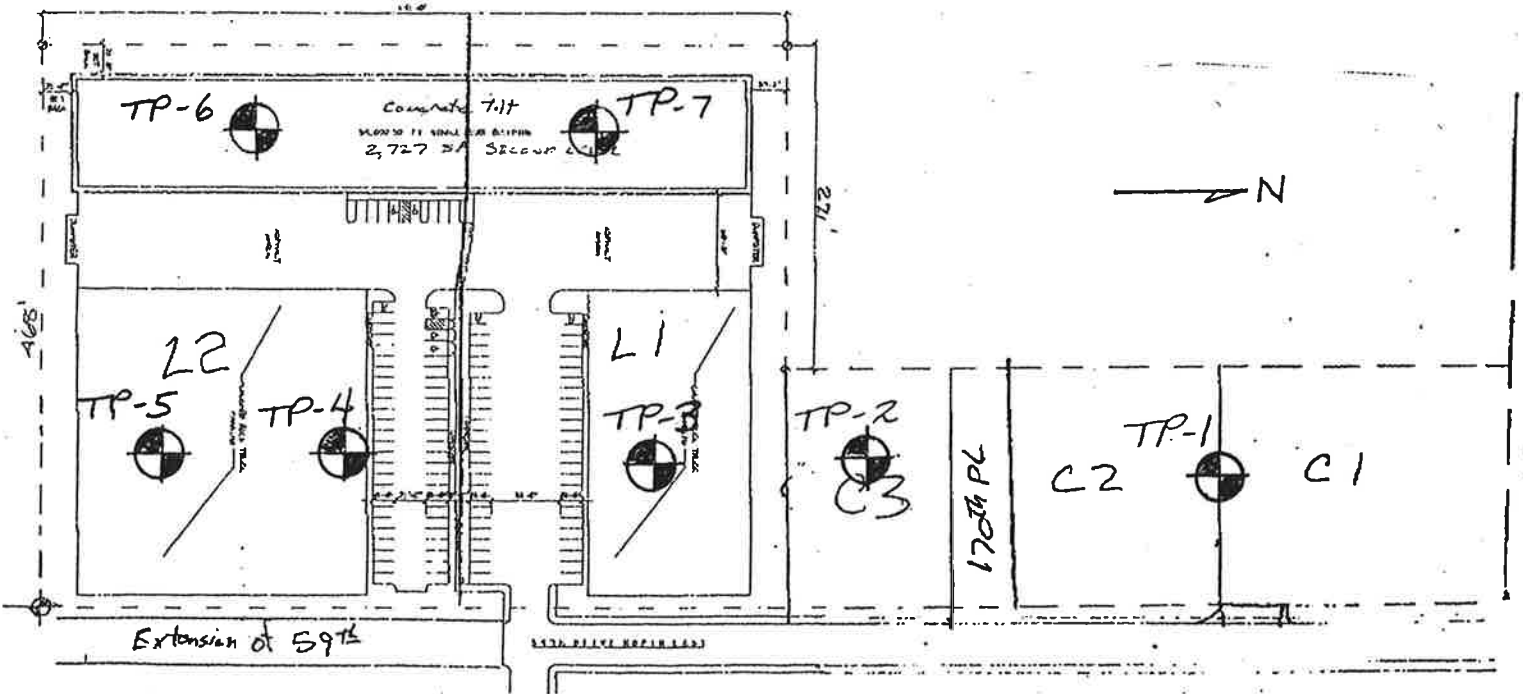
Theodore A. Hammer, P.E.  
Geotechnical Engineer

Attachments: Figure 1, Site Plan and Test Pit Locations  
Unified Soil Classification Chart  
Tabulated Test Pit Logs  
Typical Erosion Control Facilities

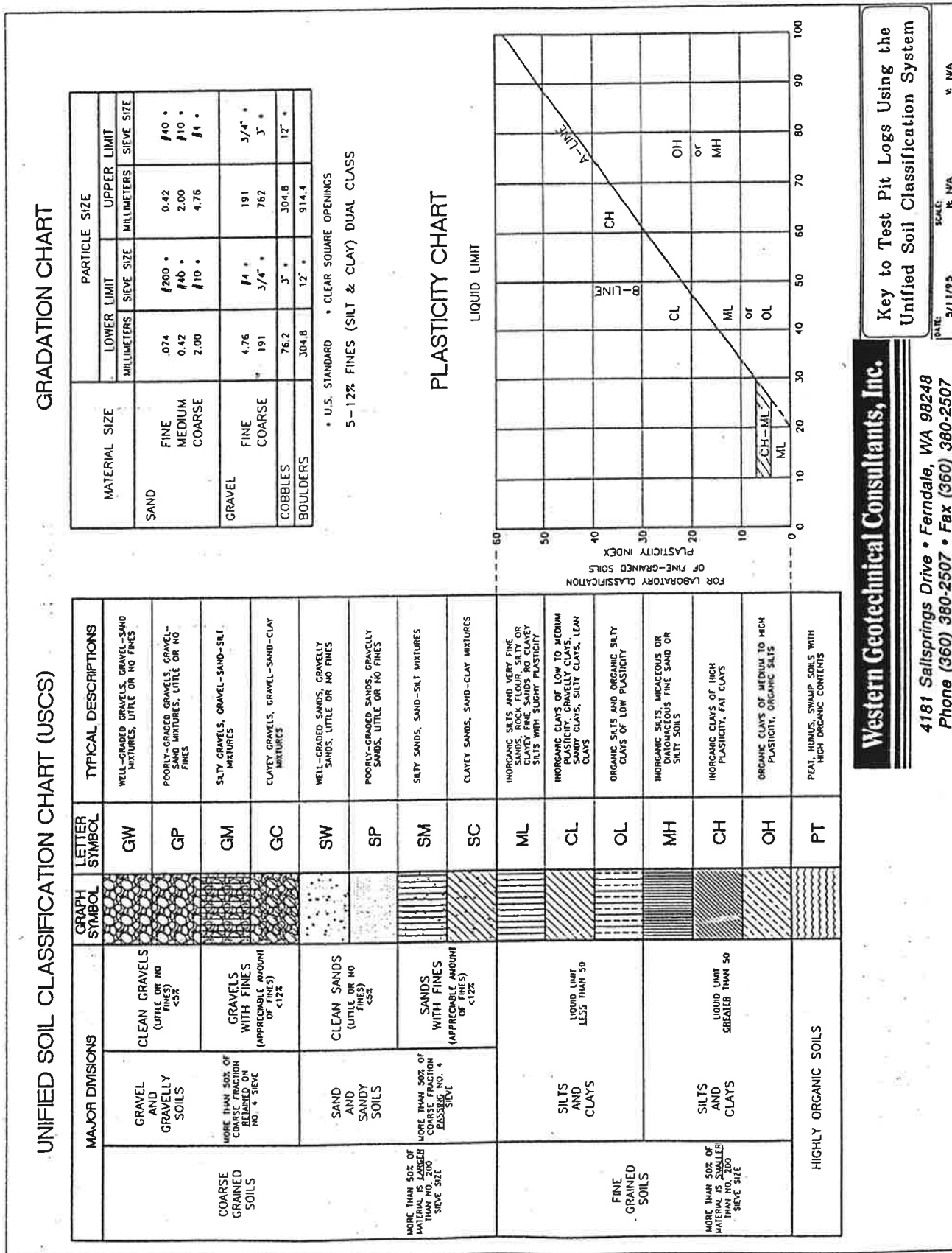
File:04 14 1

(Page 8 of 16)

**Figure 1**  
**Site Plan & Test Pit Locations**  
**Cornel Property**  
**Thomco Commercial & Light Industrial Site**  
**Snohomish Co., WA**



## USCS Classification Chart & Key to Test Pit Logs



		Log of Test Pit			File: 04-14-1	
Test Pit No.	Depth Interval (feet)	USCS Class.	Soil Description	Sample No./ Depth (feet)	Water Content (%)	Pocket Pen. (Kg/sq. cm)
TP-1	0.0-1.0	OL/SM	Brown sandy organic SILT to silty SAND with numerous roots (wet, soft) (topsoil)			
	1.0-2.4	SP/SM	Orange brown mottled slightly silty to silty fine to medium SAND (very moist, relatively compact)	1-1/1.5'	21.8%	
	2.4-5.5	SP	Gray fine to medium SAND, trace gravel (moist, relatively compact)	1-2/4.0'	8.8%	
	5.5-8.0	SP	Gray gravelly fine to coarse SAND (gravel is rounded, 3 " minus) (moist grading wet, relatively compact)	1-3/7.0'	17.6%	

- Test Pit terminated on 01/29/04 at 8.0 feet
- Test Pit backfilled upon completion
- Piezometer installed to full depth
- Groundwater seepage encountered at 7 feet. Piezometric surface measured at 5.91' below ground surface on 02/04/04.

		Log of Test Pit			File: 04-14-1	
Test Pit No.	Depth Interval (feet)	USCS Class.	Soil Description	Sample No./ Depth (feet)	Water Content (%)	Pocket Pen. (Kg/sq. cm)
TP-2	0.0-1.3	OL/SM	Brown sandy organic SILT to silty SAND with numerous roots (wet, soft) (topsoil)			
	1.3-2.3	SP/SM	Orange brown mottled slightly silty to silty fine to medium SAND (very wet, relatively compact)	2-1/2.0'	31.3%	
	2.3-5.3	SP	Gray fine to medium SAND, trace gravel (wet grading saturated, relatively compact) (seepage at 4 ft.)	2-2/4.0'	25.5%	
	5.3-7.0	SP	Gray gravelly fine to coarse SAND (gravel is rounded, 3" minus) (saturated, relatively compact) (strong seepage at 6.5-ft., caving)	2-3/6.8'	22.7%	

- Test Pit terminated on 01/29/04 at 7.0 feet
- Test Pit backfilled upon completion
- Piezometer installed to full depth
- Groundwater seepage encountered at 4-feet (strong seepage at 6.5 feet, caving). Piezometric surface measured at 3.45' below ground surface on 02/04/04.

(Page 12 of 16)

		Log of Test Pit			File: 04-14-1	
Test Pit No.	Depth Interval (feet)	USCS Class.	Soil Description	Sample No./ Depth (feet)	Water Content (%)	Pocket Pen. (Kg/sq. cm)
TP-3	0.0-1.2	OL/SM	Brown sandy organic SILT to silty SAND with numerous roots (wet, soft) (topsoil)	3-1/0.6'	34.1%	
	1.2-1.8	SP/SM	Orange brown mottled slightly silty to silty fine to medium SAND (very moist, relatively compact)			
	1.8-5.7	SP	Gray fine to medium SAND, trace gravel (very moist grading saturated, relatively compact)(seepage at 3.8-ft.)	3-2/4.0'	24.7%	
	5.7-7.2	SP	Gray gravelly fine to coarse SAND (gravel is rounded, 3" minus) (saturated, relatively compact) (Seepage & Caving at 6-ft., heavy seepage & caving at 7-ft.)	3-3/7.0'	26.4%	

- Test Pit terminated on 01/29/04 at 7.2 feet
- Test Pit backfilled upon completion
- Piezometer installed to full depth
- Groundwater seepage encountered at 3.8 feet (heavy seepage & caving from 6 feet). Piezometric surface measured at 3.24' below ground surface on 02/04/04.

		Log of Test Pit			File: 04-14-1	
Test Pit No.	Depth Interval (feet)	USCS Class.	Soil Description	Sample No./ Depth (feet)	Water Content (%)	Pocket Pen. (Kg/sq. cm)
TP-4	0.0-1.0	OL/SM	Brown sandy organic SILT to silty SAND with numerous roots (wet, soft) (topsoil)			
	1.0-3.2	SP/SM	Orange brown mottled slightly silty to silty fine to medium SAND (very moist, relatively compact)	4-1/2.0'	20.2%	
	3.2-6.2	SP	Gray fine to medium SAND, trace gravel (wet grading saturated, relatively compact) (slightly silty fine sand lense at 5.5-ft. (SP/SM)) (seepage @ 6-ft.)	4-2/4.8'	37.2%	
	6.2-7.5	SP	Gray gravelly fine to coarse SAND (gravel is rounded, 3 " minus) (wet grading saturated, relatively compact) (seepage & caving at 7-ft.)	4-3/7.0'	20.1%	

- Test Pit terminated on 01/29/04 at 7.5 feet
- Test Pit backfilled upon completion
- Piezometer installed to full depth
- Groundwater seepage encountered at 6.0 feet (seepage & caving @ 7-feet). Piezometric surface measured at 5.17' below ground surface on 02/04/04.



(Page 14 of 16)

		Log of Test Pit			File: 04-14-1	
Test Pit No.	Depth Interval (feet)	USCS Class.	Soil Description	Sample No./ Depth (feet)	Water Content (%)	Pocket Pen. (Kg/sq. cm)
TP-5	0.0-0.9	OL/SM	Brown sandy organic SILT to silty SAND with numerous roots (wet, soft) (topsoil)			
	0.9-2.3	SP/SM	Orange brown mottled slightly silty to silty fine to medium SAND (wet grading saturated, relatively compact) (slight seepage @ 2-ft.)			
	2.3-3.2	SP	Gray fine to medium SAND, trace gravel (very moist grading wet, relatively compact) (seepage at 3-ft., heavy caving)	5-1/3.5'	19.9%	
	3.2-4.8	SP	Gray gravelly fine to coarse SAND (gravel is rounded, 3 " minus) (wet grading saturated, relatively compact) (strong seepage at 3.8-ft.)	5-2/4.5'	20.1%	

- Test Pit terminated on 01/29/04 at 4.8 feet due to heavy caving
- Test Pit backfilled upon completion
- Piezometer installed to full depth
- Groundwater seepage encountered at 2 feet (seepage & caving from 3-feet). Piezometric surface measured at 2.45' below ground surface on 02/04/04.

		Log of Test Pit			File: 04-14-1	
Test Pit No.	Depth Interval (feet)	USCS Class.	Soil Description	Sample No./ Depth (feet)	Water Content (%)	Pocket Pen. (Kg/sq. cm)
TP-6	0.0-1.2	OL/SM	Brown sandy organic SILT to silty SAND with numerous roots (wet, soft) (topsoil)			
	1.2-3.2	SP/SM	Orange brown mottled slightly silty to silty fine to medium SAND (very moist, relatively compact)	6-1/2.0'	21.8%	
	3.2-4.0	SP	Gray fine to medium SAND, trace gravel (moist grading saturated, relatively compact) (seepage at 4-ft., caving)	6-2/3.8'	13.5%	
	4.0-6.0	SP	Gray gravelly fine to coarse SAND (gravel is rounded, 3 " minus) (saturated, relatively compact) (gravelly at 6 ft., heavy seepage & caving)	6-3/5.5'	23.1%	

- Test Pit terminated on 01/29/04 at 6.0 feet
- Test Pit backfilled upon completion
- Piezometer installed to full depth
- Groundwater seepage encountered at 4.0 feet , caving from 4-feet. Piezometric surface measured at 2.56' below ground surface on 02/04/04.

		Log of Test Pit			File: 04-14-1	
Test Pit No.	Depth Interval (feet)	USCS Class.	Soil Description	Sample No./ Depth (feet)	Water Content (%)	Pocket Pen. (Kg/sq. cm)
TP-7	0.0-1.1	OL/SM	Brown sandy organic SILT to silty SAND with numerous roots (wet, soft) (topsoil)			
	1.1-2.0	SP/SM	Orange brown mottled slightly silty to silty fine to medium SAND (very moist, relatively compact)			
	2.0-4.4	SP	Gray fine to medium SAND, trace gravel (wet, relatively compact)	7-1/2.5'	19.2%	
				7-2/4.4'	18.5%	
4.4-6.5	SP	Gray gravelly fine to coarse SAND (gravel is rounded, 3" minus) (wet grading saturated, relatively compact) (seepage at 6-ft., caving)	7-3/5.8'	17.1%		

- Test Pit terminated on 01/29/04 at 6.5 feet
- Test Pit backfilled upon completion
- Piezometer installed to full depth
- Groundwater seepage encountered at 6-feet (caving). Piezometric surface measured at 4.17' below ground surface on 02/04/04.

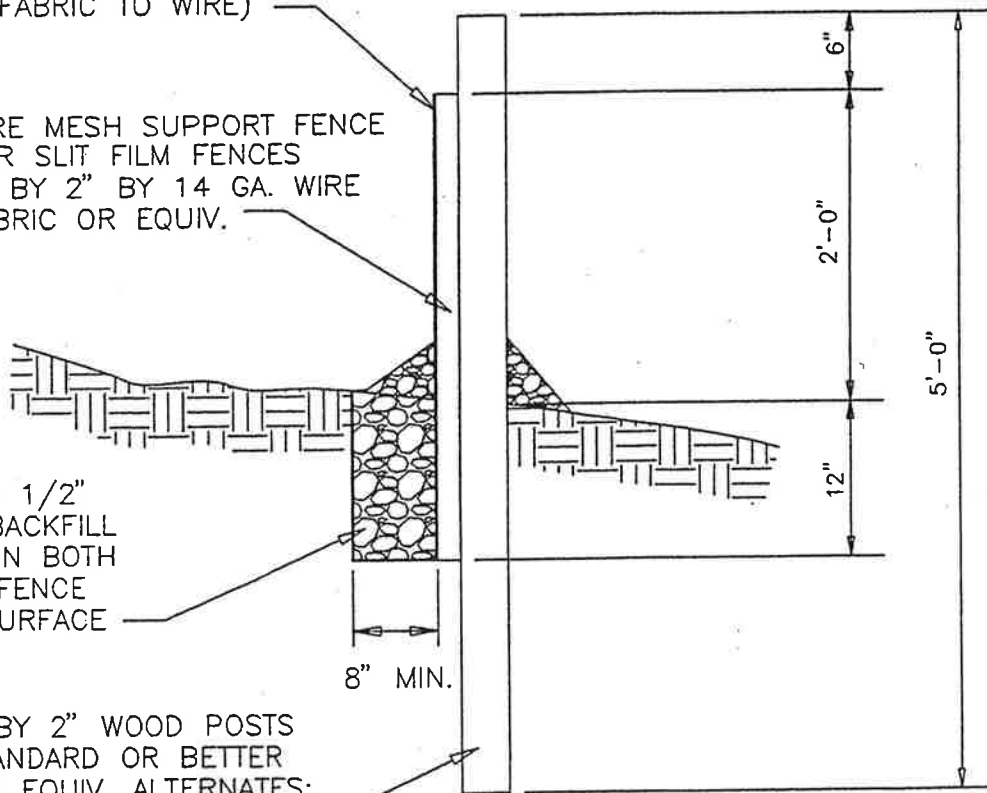
FILTER FABRIC MATERIAL 60" WIDE ROLLS  
(USE STAPLES OR WIRE RINGS TO  
ATTATCH FABRIC TO WIRE)

NOTE: SPACING BETWEEN POSTS  
NOT TO EXCEED 6'

WIRE MESH SUPPORT FENCE  
FOR SLIT FILM FENCES  
2" BY 2" BY 14 GA. WIRE  
FABRIC OR EQUIV.

PROVIDE 3/4" - 1 1/2"  
WASHED GRAVEL BACKFILL  
IN TRENCH AND ON BOTH  
SIDES OF FILTER FENCE  
FABRIC ON THE SURFACE

2" BY 2" WOOD POSTS  
(STANDARD OR BETTER  
OR EQUIV. ALTERNATES:  
STEEL FENCE POSTS)



### FILTER FABRIC FENCE

NOT DRAWN TO SCALE

JOB NO.:

**Western Geotechnical Consultants, Inc.**

DESIGNED BY:

DRAWN BY:

4181 Saltsprings Drive • Ferndale, WA 98248  
Phone (360) 380-2507 • Fax (360) 380-2507

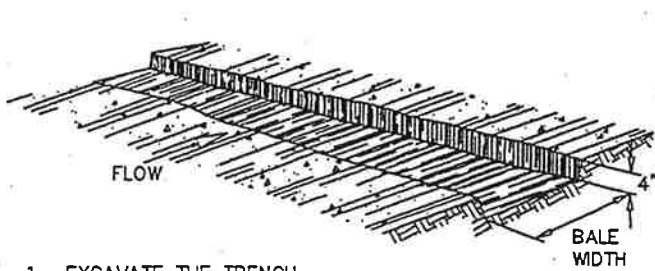
CHECKED BY:

SEDIMENT CONTROL  
FILTER FABRIC FENCE

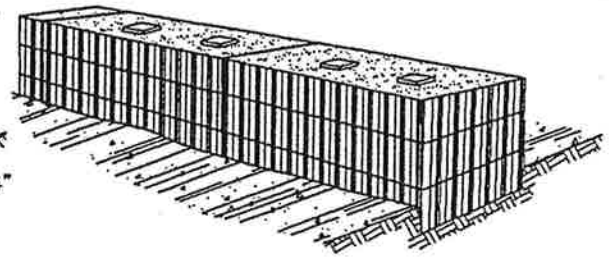
DATE:

SCALE:  
N/A

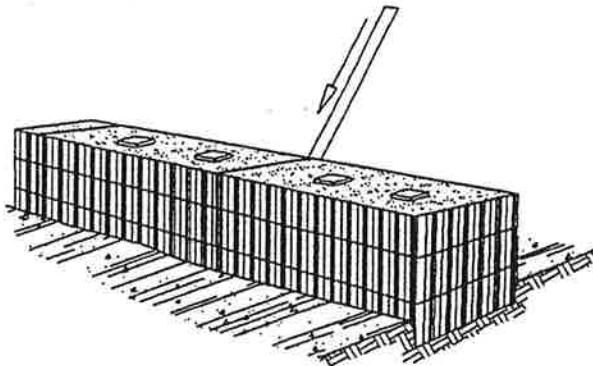
v. N/A



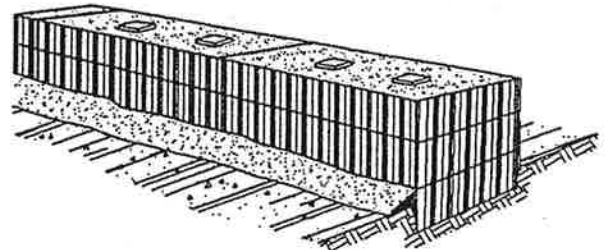
1. EXCAVATE THE TRENCH.



2. PLACE AND STAKE STRAW BALES.



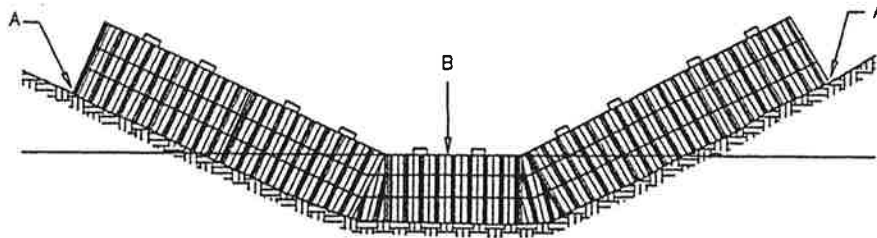
3. WEDGE LOOSE STRAW BETWEEN BALES.



4. BACKFILL AND COMPACT THE EXCAVATED SOIL.

### CONSTRUCTION OF A STRAW BALE BARRIER

NOT DRAWN TO SCALE



POINTS A SHOULD BE HIGHER THAN POINT B

### PROPER PLACEMENT OF STRAW BALE BARRIER IN DRAINAGE WAY

NOT DRAWN TO SCALE

JOB NO.:

DESIGNED BY:

DRAWN BY:

CHECKED BY:

**Western Geotechnical Consultants, Inc.**

4181 Saltsprings Drive • Ferndale, WA 98248  
Phone (360) 380-2507 • Fax (360) 380-2507

SEDIMENT CONTROL  
STRAW BALE BARRIER

DATE:

SCALE:

H: N/A

V: N/A

Premier Pacific Properties, LLC  
13700 - 44<sup>th</sup> St. NE \*\* Lake Stevens, WA 98258  
Phone (425) 377-9130 \*\* Fax (425) 377-9135

DATE:	3/29/04
COMPANY:	Trepanier Engineering
ATTENTION:	Ted Trepanier
FAX:	(425) 259-5556

Re: Soil logs Western Geotechnical Consultants, Inc (Cornehl Property)  
MESSAGE: Ted,  
Here is copy of report (March 23, 2004) you requested.

THANK YOU,

Sent By: Edmund M Thomas

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**PAGES: 8**  
**INCLUDING COVER SHEET**

## Western Geotechnical Consultants, Inc.

4183 Saltsprings Dr., Ferndale, WA 98248  
Phone/FAX (360)380-2507

March 23, 2004

Thomco Construction, Inc.  
13700 - 44<sup>th</sup> St NE  
Lake Stevens, WA 98258  
ATTN: Mr. Edmund Thomas

**Re: Report - Addendum Report - Geotechnical Investigation  
Cornehl Property  
Thomco Commercial & Light Industrial Site  
SW of Intersection of 172<sup>nd</sup> St. NE and 67<sup>th</sup> Ave. NE  
Snohomish County, WA**

Western Geotechnical Consultants, Inc. is pleased to present the results of our supplemental geotechnical engineering investigation conducted at the above referenced property. On March 22, 2004 a geotechnical engineer from our firm oversaw the excavation of 2 test pits at the approximate locations shown on the attached Site Plan, Figure 1. Our site investigation was supplemented with subsurface soil and groundwater information documented in our original geotechnical report, dated February 5, 2004 and subsurface data developed by Cascade Surveying and Engineering, Inc.

The site is made up of two rectangular portions, one to be developed as three commercial lots and the other to be developed with a 2-story concrete tilt-up building and two light industrial lots (see Figure 1). Stormwater generated on the site will be controlled with detention/infiltration facilities if favorable site conditions are present. The purpose of this supplemental investigation was to characterize and evaluate subsurface soil and groundwater conditions at the northern-most portion of the site. The specific scope of this supplemental investigation for the site was to define subsurface soil and groundwater conditions in the far northern portion of the site where the USDA Soil Conservation Service (SCS) "Soil Survey of Snohomish County Area, WA" has mapped a change in soil conditions relative to the remainder of the site (see Figure 1).

### Site Conditions

#### Surface Conditions

The site is an irregular shaped parcel composed of 2 rectangular pieces (see Figure 1). The property is relatively flat pasture land that is for the most part grass covered. The property is approximately 9.68 acres in size with the three commercial sites occupying 2.75 acres of the property and the two light industrial sites and concrete tilt up building occupying the remainder of the site. A majority of the site was investigated on January 29, 2004 and the results were documented in a report dated February 5, 2004.

Addendum Geotechnical Investigation  
 Thomco Construction, Inc. - Corneli Property  
 SW of Intersection of 172<sup>nd</sup> St. NE and 67<sup>th</sup> Ave. NE  
 Snohomish Co., WA  
 March 23, 2004

WESTERN GEOTECHNICAL CONSULTANTS, INC.  
 #04 14 7

(Page 2 of 7)

This report documents a supplemental subsurface investigation to define soil properties in the northern-most portion of the property.

Subsurface Conditions

Subsurface soil and groundwater conditions at the northern portion of the site were explored on March 22, 2004 using a rubber tire mounted, 4-wheel drive John Deere 310-D backhoe with a 1-1/2-wide bucket. A total of 2 test pits were excavated to a maximum depth of 8.6 feet. The locations of the test pits are shown on the attached Site Plan, Figure 1. A Geotechnical Engineer from our office continuously logged and classified the soils encountered in the test pits using the Unified Soils Classification System (USCS), and the obtained representative soil samples for further analyses and testing. Edited, tabulated test pit logs are included with this report along with a USCS Chart explaining soil descriptions. The test pits were loosely backfilled upon completion of the explorations.

Our subsurface investigation revealed a relatively similar subsurface soil profile across the property. The subsurface profile consists of about 15 inches of sandy organic rich SILT to silty SAND and roots (OL/SM by USCS) (topsoil), which is underlain by slightly silty fine to medium SAND that extended 3 to 3-1/2 feet below grade (SP/SM by USCS). This soil unit is underlain by medium SAND and gravelly SAND (SP by USCS), that extended to the base of the excavations (8.6 feet maximum). These soils were moist grading saturated near the base of the excavations.

The USDA "Soil Conservation Service (SCS) "Soil Survey of Snohomish County Area, Washington" has mapped Lynnwood loamy sand across the northern portion of the site. Lynnwood loamy sand is somewhat excessively drained soil located on terraces and outwash plains. Lynnwood soils are classified in Hydrologic Group A. The USDA has mapped the remainder of the site as Custer fine sandy loam. The near surface soils encountered in all our test pits are consistent with the SCS soil description.

Groundwater

Strong groundwater seepage was encountered in both test pits at a depth of 7.8 feet to 8.3 feet below grade during our investigation and piezometers were installed in both test pits. The piezometers were read on March 22, 2004 approximately 9 hours after installation and the piezometric surface was measured at 5.68 feet and 6.95 feet in Test Pits 8 and 9 respectively. The water table will be monitored throughout the winter season to determine the depth of the seasonal high water table. Water level measurements will be documented under separate report.



Addendum Geotechnical Investigation  
Thomco Construction, Inc. - Cornehl Property  
SW of Intersection of 172<sup>nd</sup> St. NE and 67<sup>th</sup> Ave. NE  
Snohomish Co., WA  
March 23, 2004

WESTERN GEOTECHNICAL CONSULTANTS, INC.  
#04 147

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### Conclusions and Recommendations

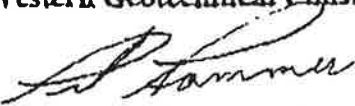
#### Infiltration

The SCS has classified the site soils as belonging to Hydrologic Group A. Our readings of the piezometric surface should be at or near the seasonal high water level. We recommend that the piezometers be monitored over the remainder of the wet season to define the seasonal high water table.

We appreciate the opportunity to be of assistance to you on this project. If you have any questions regarding the contents of this report, or if we can be of further assistance, please contact our office.

Sincerely,

Western Geotechnical Consultants, Inc.



Theodore A. Hammer, P.E.  
Geotechnical Engineer



EXPIRES 12/27/05

Attachments: Figure 1, Site Plan and Test Pit Locations  
Unified Soil Classification Chart  
Tabulated Test Pit Logs

File: 04 14 7

Addendum Geotechnical Investigation  
Thomco Construction, Inc - Cornish Property  
SW of Intersection of 172<sup>nd</sup> St NE and 67<sup>th</sup> Ave. NE  
Snohomish Co., WA  
March 23, 2004

WESTERN GEOTECHNICAL CONSULTANTS, INC.  
#04147

(Page 4 of 7)

**Figure 1**  
**Addendum Report**  
**Site Plan & Test Pit Locations**  
**Cornel Property**  
**Thomco Commercial & Light Industrial Site**  
**Snohomish Co., WA**

North 

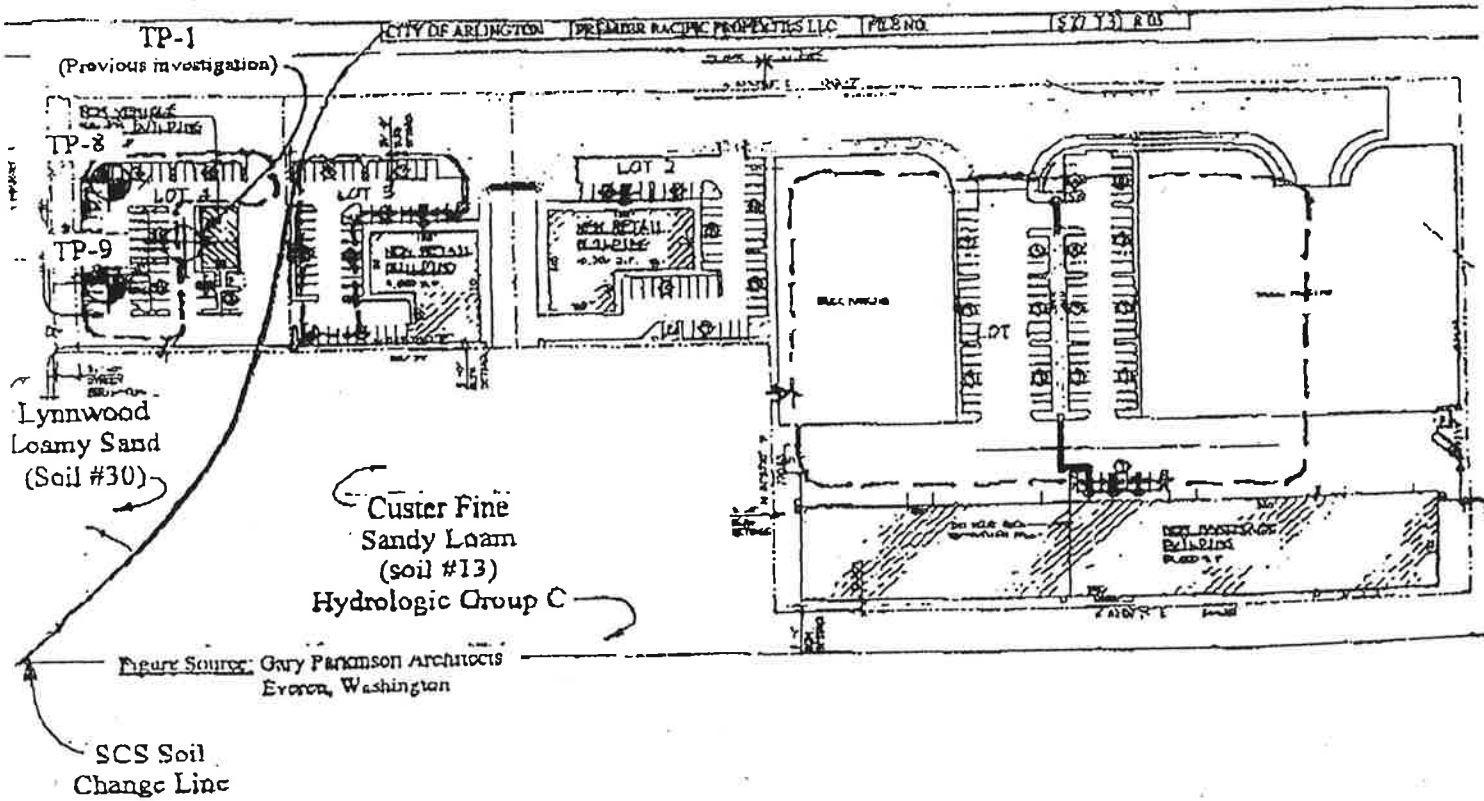


Figure Source: Gary Parkinson Architects  
Everett, Washington

UNIFIED SOIL CLASSIFICATION CHART (USCS)

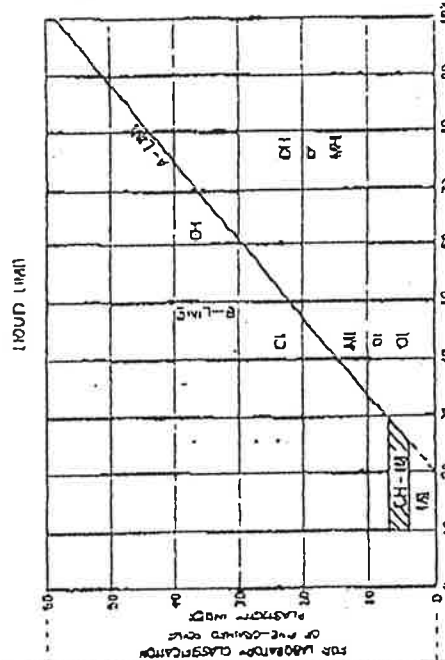
MAXIMUM EMBOSSERS	GROUP SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
GRAVEL AND SANDY GRAVEL SOILS	GW	GW	Very sharp angular, coarse sand with 10% to 20% gravel.
GRAVELLY SANDS	GP	GP	Very sharp angular, coarse sand with 10% to 20% gravel.
COARSE SANDS	SW	SW	Very sharp angular, coarse sand with 10% to 20% gravel.
MEDIUM SANDS	SM	SM	Very sharp angular, coarse sand with 10% to 20% gravel.
FINE SANDS	SP	SP	Very sharp angular, coarse sand with 10% to 20% gravel.
VERY FINE SANDS	SC	SC	Very sharp angular, coarse sand with 10% to 20% gravel.
CLAYS	CL	CL	Very sharp angular, coarse sand with 10% to 20% gravel.
SILTS AND CLAYS	ML, OL	ML, OL	Very sharp angular, coarse sand with 10% to 20% gravel.
CLAYS	CH, OH	CH, OH	Very sharp angular, coarse sand with 10% to 20% gravel.
VERY CLAYS	PT	PT	Very sharp angular, coarse sand with 10% to 20% gravel.

GRADATION CHART

MAXIMUM SIZE	PERCENT PASSING		
	LOWER LIMIT	UPPER LIMIT	UPPER LIMIT
NO. 10	5	15	15
NO. 20	10	25	25
NO. 40	15	40	40
NO. 60	20	60	60
NO. 100	25	75	75
NO. 200	30	85	85

U.S. STANDARD & OTHER NATIONAL ORGANIZATIONS  
5-12% FINES (SILT & CLAY) TUST CLASS

PLASTICITY CHART



Western Geotechnical Consultants, Inc.

4181 Gallatin Drive • Ferndale, WA 98748  
Phone (360) 980-2507 • Fax (360) 980-2507

Key to Test Pit Logs Using the Unified Soil Classification System

TEST PITS

Addendum Geotechnical Investigation  
Thomas Construction, Inc. - Cornhill Property  
SW of Intersection of 172nd St NE and 67th Ave NE  
Snohomish Co., WA  
March 23, 2004

WESTERN GEOTECHNICAL CONSULTANTS, INC  
04 14 7

(Page 5 of 7)

USCS Classification Chart & Key to Test Pit Logs

FROM: WCC, INC. PROPERTY

Addendum Geotechnical Investigation  
 Thomco Construction, Inc. - Cornehl Property  
 SW of Intersection of 172<sup>nd</sup> St NE and 67<sup>th</sup> Ave NE  
 Snohomish Co., WA  
 March 23, 2004

WESTERN GEOTECHNICAL CONSULTANTS, INC.  
 #04-147

(Page 6 of 7)

			Addendum Report - Log of Test Pit		File: 04-147	
Test Pit No.	Depth Interval (feet)	USCS Class.	Soil Description	Sample No./ Depth (feet)	Water Content (%)	Pocket Pen. (Kg/sq. cm)
TP-8	0.0-1.3	OL/SM	Brown sandy organic SILT to silty SAND with numerous roots (moist, soft) (topsoil)	8-1/1.0	22.5%	
	1.3-3.5	SP/SM	Orange brown mottled slightly silty fine to medium SAND (moist, relatively compact)	8-2/2.0'	18.1%	1.8 @ 3.0'
	3.5-6.0	SP	Gray brown medium SAND, trace gravel (moist, relatively compact)	8-3/4.0'	6.0%	
	6.0-8.5	SP	Gray gravelly fine grading saturated, relatively compact) (strong seepage at 7.8 ft.)	8-4/6.5' 8-5/8.0'	17.8% 22.3%	

Notes:

- Test Pit terminated on 03/22/04 at 8.5 Feet
- Test Pit backfilled upon completion
- Piezometer installed to 8.5 feet.
- Groundwater encountered at 7.8 feet (strong seepage). The water level measured 9 hours after instillation of the piezometers was 5.68 feet below the ground level.

Addendum Geotechnical Investigation  
 Thomco Construction, Inc. - Cornabi Property  
 SW of Intersection of 172<sup>nd</sup> St. NE and 67<sup>th</sup> Ave. NE  
 Snohomish Co., WA  
 March 23, 2004

WESTERN GEOTECHNICAL CONSULTANTS, INC.  
 404 1st St

(Page 7 of 7)

Addendum Report - Log of Test Pit				File 03-14-7		
Test Pit No.	Depth Interval (feet)	USCS Class.	Soil Description	Sample No./ Depth (feet)	Water Content (%)	Pocket Pen. (Kg/sq. cm)
TP-9	0.0-1.2	OL/SM	Brown sandy organic SILT to silty SAND with numerous roots (very moist, soft) (topsoil)			
	1.2-3.0	SP/SM	Orange brown mottled slightly silty fine to medium SAND (moist, relatively compact)	9-1/2.8'	16.9%	
	3.0-6.0	SP	Gray brown medium SAND, trace gravel (moist, relatively compact)	9-2/5.8'	16.2%	
	6.0-8.6	SP	Gray gravelly fine to coarse SAND (wet grading saturated, relatively compact) (gravelly zones at 7.5 ft.) (strong seepage at 8.3 ft.)	9-3/8.0'	12.7%	

Notes:

- Test Pit terminated on 03/22/04 at 8.6 feet
- Test Pit backfilled upon completion
- Piezometer installed to 8.6 feet.
- Groundwater encountered at 8.3 feet (strong seepage). The water table measured 9 hours of installation of the piezometer was 6.95 feet below the ground surface.

**4T Development, LLC**

13700 - 44<sup>th</sup> St. NE \*\* Lake Stevens, WA 98258  
Phone (425) 377-9130 \*\* Fax (425) 377-9135

"An Equal Opportunity Employer"

DATE:	4/28/04
COMPANY:	Trepanier Engineering
ATTENTION:	Ted Trepanier
FAX:	(425) 259-5558

**Re: 39<sup>th</sup> Ave NE Development**

MESSAGE: Dear Ted,  
Enclosed are water readings I received from Western Geotechnical Consultants letter dated 4/07/07.

**THANK YOU,**

Sent By: Edmund M Thomas

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**PAGES: 4**  
**INCLUDING COVER SHEET**

**Western Geotechnical Consultants, Inc.**

4183 Saltsprings Dr., Ferndale, WA 98248  
Phone/FAX (360)380-2507

April 7, 2004

Thomco Construction, Inc.  
13700 44<sup>th</sup> St. NE  
Lake Stevens, WA. 98258  
Attn: Edmund Thomas

**Re: Seasonal High Water Table Determination – Final Report  
Cornehl Property  
Thomco Commercial & Light Industrial Site  
Snohomish Co., WA**

Western Geotechnical Consultants, Inc. is pleased to present the results of our monitoring of 7 piezometers installed at the above referenced property. On January 29, 2004 a geotechnical engineer from our firm installed the 7 piezometers in excavated test pits. Subsurface soil and groundwater conditions were evaluated and logged at that time and a report was issued February 5, 2004.

On March 22, 2004 we oversaw the excavation of two additional test pits. Subsurface soil and groundwater conditions were documented and piezometers were installed. The results of our supplemental investigation are documented in a report dated March 23, 2004. A description of soil and groundwater conditions encountered and the logs of test pits are included in the reports. The piezometer locations are shown on the attached Site Plan, Figure 1.

The purpose of the piezometer installation was to obtain ground water level readings throughout the winter months to determine the seasonal high ground water levels. This report provides the results of our initial water level readings and the results of our periodic readings throughout the rainy season. The water level readings are summarized below. The last column in the table will indicate the seasonal high water table for each piezometer site.

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**APR 08 2004**

**THOMCO CONST.**

Seasonal High Water Table Determination  
 Thomco Commercial & Light Industrial Site  
 Cornehl Property  
 Snohomish County, WA

Western Geotechnical Consultants, Inc.

(Page 2 of 2)

<u>Piezo. No.</u>	<u>Depth of Piezometer (feet)</u>	<u>Date Piezo. Read</u> 1/29/04 <sup>1</sup>	<u>Date Piezo. Read</u> <sup>2</sup> 2/4/04	<u>Date Piezo. Read</u> 3/8/04	<u>Date Piezo. Read</u> 4/5/04	<u>Seasonal High Water Level</u> <sup>3</sup>
1	8.0'	7.0'	5.91'	5.95'	6.69'	5.91'
2	7.0'	4.0'	3.45'	3.31'	4.40'	3.31'
3	7.2'	3.8'	3.24'	3.44'	4.26'	3/24'
4	7.5'	6.0'	5.17'	5.00'	6.31'	5.00'
5	4.8'	2.0'	2.45'	2.61'	3.61'	2.45'
6	6.0'	4.0'	2.56'	2.79'	4.04'	2.56'
7	6.5'	6.0'	4.17'	4.11'	5.07'	4.11'
8	5.68 <sup>4</sup>				6.36'	5.68'
9	6.95'				7.40'	6.95'

We appreciate the opportunity to be of assistance to you on this project. If you have any questions regarding the contents of this report, or if we can be of further assistance, please contact our office.

Sincerely,

Western Geotechnical Consultants, Inc.



Theodore A. Hammer, P.E.  
 Geotechnical Engineer



Attachment: Figure 1, Site Plan Sketch

Cc: Gary Parkinson Architects

File:04-14-2

EXPIRES 7/27/05

- <sup>1</sup> Reading taken at time of field investigation
- <sup>2</sup> Data to be collected
- <sup>3</sup> To be determined
- <sup>4</sup> Piezometer read on 3/22/04, 9 hours after installation



Geotechnical Investigation  
Thomco Construction, Inc. - Cornell Property  
SW of Intersection of 172<sup>nd</sup> St. NE and 67<sup>th</sup> Ave. NE  
Snohomish Co., WA  
February 5, 2004

WESTERN GEOTECHNICAL CONSULTANTS, INC.  
#04 14 1

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**Figure 1**  
**Site Plan & Test Pit Locations**  
**Cornell Property**  
**Thomco Commercial & Light Industrial Site**  
**Snohomish Co., WA**

