APPENDIX B

Fecal Coliform Sampling Results, AmTest, 2005

TA 909

recieved 18 May 2005

AM TEST
LABORATORIES

14603 NE 87th ST. Redmond WA 98052
Ph: 425-885-1664 Fax: 425-883-3495

FAX COVER SHEET

FAX NUMBER TRANSMITTED TO:

ATTN: Dan Johnson

OF:

DATE: 5/18/5

FROM:

- ☐ Kathy Fugiel
- ☐ Aaron Young
- ☐ Shauna Brookes
- ☐ Keith Stewart
- ☐ Neila Glidden
- ☐

Number of Pages:	

COMMENTS:

909 fecd sampling proj

AMTEST LABORATORIES

ANALYSIS REPORT

TALASAEA CONSULTANTS
15020 BEAR CREEK ROAD NE
WOODINVILLE, WA 98077
Attention: PER JOHNSON

Date Received: 5/12/05
Date Reported: 5/18/05

Project Name: 909 FECAL SAMPLING
Project #: TAL909
Date Sampled: 5/12/05

Water Samples

PARAMETER		RESULT
05-A005077 **Client ID: F8** **Date Sampled: 5/12/05,** Fecal Coliform	MPN/100 ml	> 240000
05-A005078 **Client ID: F5** **Date Sampled: 5/12/05,** Fecal Coliform	MPN/100 ml	70.
05-A005079 **Client ID: A30** **Date Sampled: 5/12/05,** Fecal Coliform	MPN/100 ml	540
05-A005080 **Client ID: WELL 6** **Date Sampled: 5/12/05,** Fecal Coliform	MPN/100 ml	350
05-A005081 **Client ID: F6** **Date Sampled: 5/12/05,** Fecal Coliform	MPN/100 ml	350
05-A005082 **Client ID: A31** **Date Sampled: 5/12/05,** Fecal Coliform	MPN/100 ml	23.

AMTEST LABORATORIES

ANALYSIS REPORT

TALASAEA CONSULTANTS

Attention: PER JOHNSON

Date Received: 5/12/05
Date Reported: 5/18/05

Water Samples

PARAMETER		RESULT
05-A005083 **Client ID: F7** **Date Sampled: 5/12/05,** Fecal Coliform	MPN/100 ml	1600
05-A005084 **Client ID: A35** **Date Sampled: 5/12/05,** Fecal Coliform	MPN/100 ml	33.

Reported by: Neila Glidden
Neila Glidden

APPENDIX C

City of Kirkland Wetland Field Data Form

Plate 26

WETLAND FIELD DATA FORM

WETLAND FIELD DATA FORM

BEGIN BY CHECKING ANY OF THE FOLLOWING (a. – e.) THAT APPLY:

a. The wetland is contiguous to Lake Washington;

b. The wetland contains at least 1/4 acre of organic soils, such as peat bogs or mucky soils;

c. The wetland is equal to or greater than 10 acres in size and having three or more wetland classes, as defined by the U.S. Fish & Wildlife Service (Cowardin et al., 1979), one of which is open water;

d. The wetland has significant habitat value to state or federally listed threatened or endangered wildlife species; or

e. The wetland contains state or federally listed threatened or endangered plant species.

IF ANY OF THE CRITERIA LISTED ABOVE ARE MET, THEN THE WETLAND IS CONSIDERED TO BE TYPE 1. IF THAT IS THE CASE, PLEASE CONTINUE TO COMPLETE THE ENTIRE FORM, BUT DO NOT ASSIGN POINTS.

IF THE WETLAND DOES NOT MEET THE CRITERIA LISTED ABOVE FOR TYPE 1, COMPLETE THE ENTIRE FORM, USING THE ASSIGNED POINTS TO DETERMINE IF IT IS A TYPE 2 OR TYPE 3 WETLAND.

Type 2 wetlands typically have at least two wetland vegetation classes, are at least partially surrounded by buffers of native vegetation, connected by surface water flow (perennial or intermittent) to other wetlands or streams, and contain or are associated with forested habitat.

1. **Total wetland area**

Estimate wetland area and score from choices

Acres		Point Value
>20.00	=	6
10-19.99	=	5
5-9.99	=	4
1-4.99	=	3
0.1-0.99	=	2
<0.1	=	1

Points: 3

2. **Wetland classes: Determine the number of wetland classes that qualify, and score according to the table.**

	# of Classes		Points
Open Water: if the area of open water is >1/3 acre or >10% of the total wetland area	1	=	1
Aquatic Beds: if the area of aquatic beds is >10% of the **open water** area **or** >1/2 acre	2	=	3
Emergent: if the area of emergent class is >1/2 acre **or** >10% of the total wetland area	3	=	5
Scrub-Shrub: if the area of scrub-shrub class is >1/2 acre **or** >10% of the total wetland area	4	=	7
Forested: if the area of forested class is >1/2 acre or >10% of the total wetland area	5	=	10

3

3. **Plant species diversity.**

For all wetland classes which qualified in 2 above, count the number of different plant species and score according to the table below. You do not have to name them.

e.g., if a wetland has an aquatic bed class with 3 species, and emergent class with 4 species and a scrub-shrub class with 2 species, you would circle 2, 2, and 1 in the second column (below).

Class	# of Species	Point Value
Aquatic Bed	1-2	= 1
	3	= 2
	>3	= 3
Emergent	1-2	= 1
	3-4	= 2
	>4	= 3

3

Class	# of Species	Point Value
Scrub-Shrub	1-2	= 1
	3-4	= 2
	>4	= 3
Forested	1-2	= 1
	3-4	= 2
	>4	= 3

2

1

6

4. **Structural diversity.**

If the wetland has a forested class, add 1 point for each of the following attributes present:

Trees >50' tall = 1
Trees 20' to 49' tall = 1
shrubs = 1
Herbaceous ground cover = 1

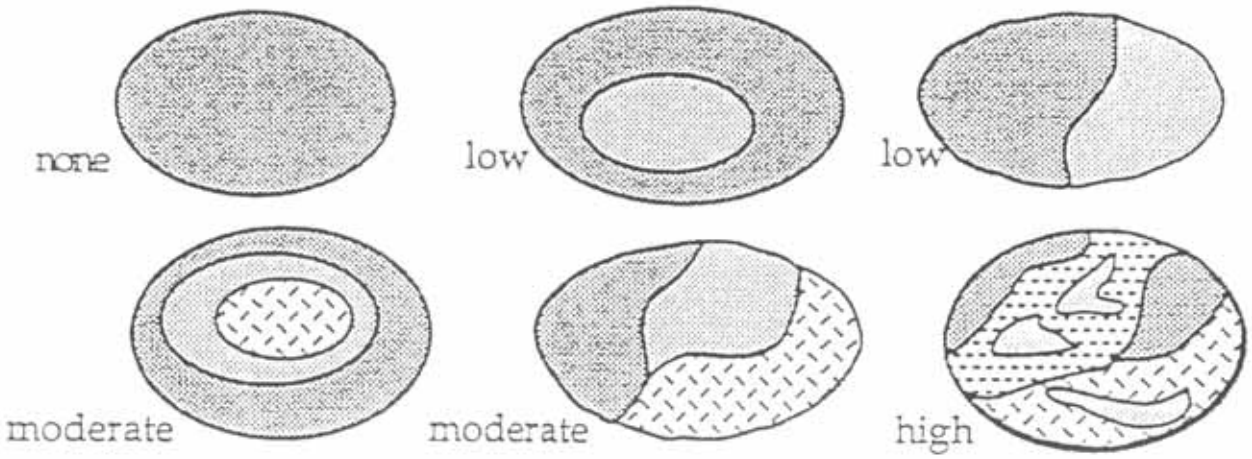
3

5. **Interspection between wetland classes.**

Decide from the diagrams below whether interspection between wetland classes is high, moderate, low or none

3 = High
2 = Moderate
1 = Low
0 = None

1



6. **Habitat features**

Add points associated with each habitat feature listed

Is there evidence of current use by beavers?	= 3
Is a heron rookery located within 300'?	= 2
Are raptor nest(s) located within 300'?	= 1
Are there at least 2 standing dead trees (snags) per acre?	= 1
Are there any other perches (wires, poles, or posts)?	= 1
Are there at least 3 downed logs per acre?	= 1

3

7. **Connection to streams**

Is the wetland connected at any time of the year via surface water? **(score one answer only)**

Is the wetland connected at any time of the year via surface water?	
To a perennial stream or a seasonal stream *with* fish	= 5
To a seasonal stream *without* fish	= 3
Is not connected to any stream	= 0

3

8. **Buffers**

Step 1: Estimate (to the nearest 5%) the percentage of each buffer or land-use type (below) that adjoins the wetland boundary. Then multiply these percentages by the factor(s) below and enter result in the column to the right.

	% of Buffer		Step 1	Width Factor		Step 2
Roads, buildings or parking lots	40 %	X 0 =			=	0
Lawn, grazed pasture, vineyards or annual crops	30 %	X 1 =	30	1	=	30
Ungrazed grassland or orchards	%	X 2 =			=	
Open water or native grasslands	%	X 3 =			=	
Forest or shrub	30 %	X 4 =	120	2	=	240
				Add buffer total		270

Step 2: Multiply result(s) of step 1:

By 1 if buffer width is 25-50'

By 2 if buffer width is 50-100'

By 3 if buffer width is >100'

Enter results and add subscores

Step 3: Score points according to the following table:

Buffer Total

900-1200 = 4

600-899 = 3

300-599 = 2

100-299 = 1

1

9. **Connection to other habitat areas:**

Is there a riparian corridor to other wetlands within 0.25 of a mile, or a corridor >100' wide with good forest or shrub cover to any other habitat area?	= 5
Is there a narrow corridor <100' wide with good cover or a wide corridor >100' wide with low cover to any other habitat area?	= 3
Is there a narrow corridor <100' wide with low cover or a significant habitat area within 0.25 mile but no corridor?	= 1
Is the wetland and buffer completely isolated by development and/or cultivated agricultural land?	= 0

1

10. Scoring

Add the scores to get a total: 24

Question: Is the total greater than or equal to 22 points?

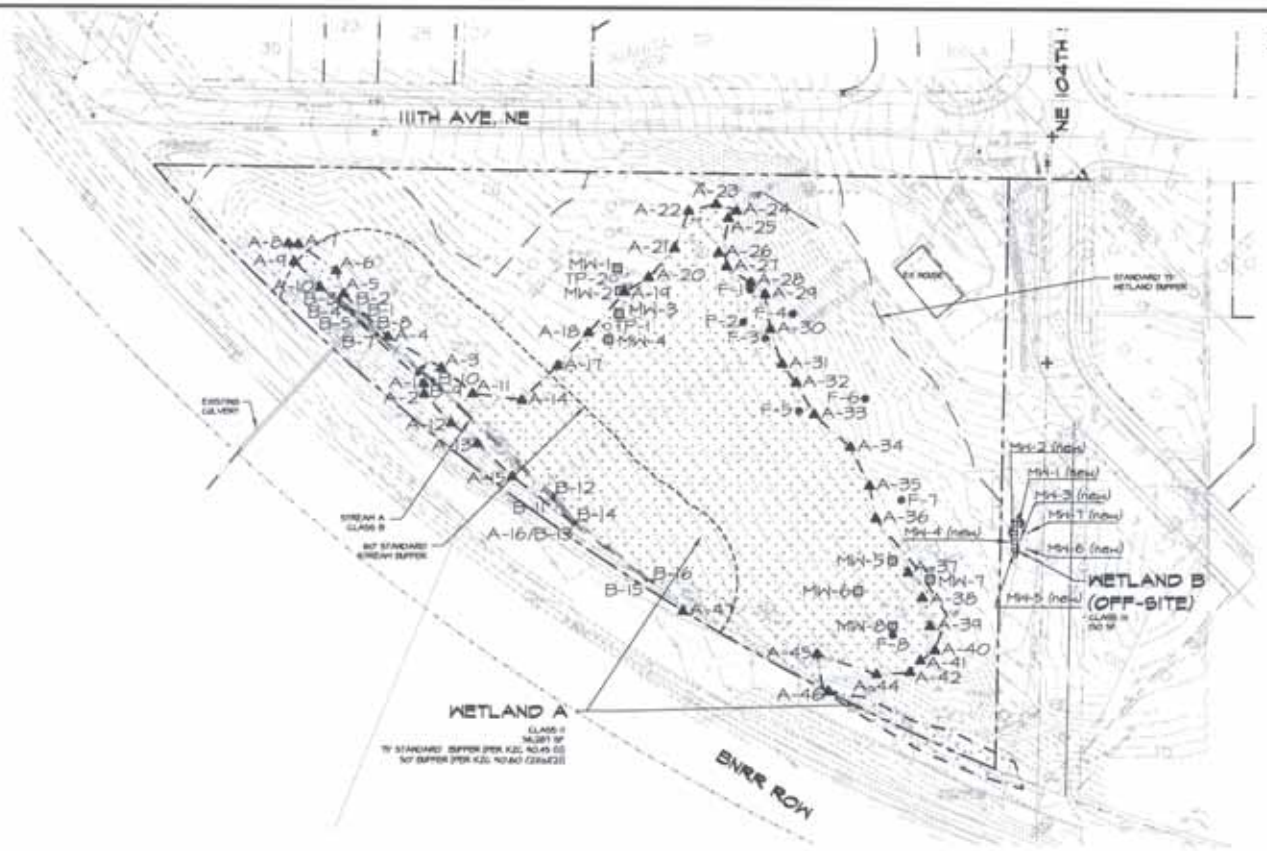
Answer:

Yes = Type 2

No = Type 3

APPENDIX D

Wetland Mitigation Plan Sheets



GOALS, OBJECTIVES, & PERFORMANCE STANDARDS

The primary goal of the mitigation project is to replace the functions and values lost due to the indirect (paper fill) impacts of approximately 2,510 square feet of a Type 2 wetland. To accomplish this goal, the proposed project will create a minimum of 3,944 square feet of new wetland, enhance 4,504 square feet of existing wetland, and enhance 37,268 square feet of existing wetland buffer. The following mitigation measures will be evaluated through the following objectives and performance standards. Performance monitoring of the mitigation areas will be conducted for a period of five years for the City of Kirkland.

Objective A: Increase the woody vegetation coverage and structural diversity in the created and enhanced wetlands, wetland buffers, and stream buffer areas by planting a wide variety of native evergreen and deciduous trees and shrubs to increase biological support functional values.

Performance Standard A: In the created wetlands, and in the enhanced wetland and buffers, at least 15 species of desirable native plant species will be present in the overall mitigation area at the end of Year 5. Woody plant coverage must be at least 10% by Year 1, 30% by Year 3, and 50% by Year 5. Woody coverage may be comprised of both planted and recolonized native species.

Objective B: Ensure the success of the woody species in the mitigation areas.

Performance Standard B: Percent survival of planted woody species must be 100% at the end of Year 1, and at least 85% for each subsequent year of the monitoring period.

Objective C: Increase the overall habitat functions of the mitigation area to wildlife by incorporating habitat features (i.e., bird nest boxes, bat roosting boxes, snags, down logs, brush piles, boulder piles, and constructed cavities in stumps and down logs) into the wetlands and buffer system.

Performance Standard C: In the created wetland and wetland and buffer enhancement areas, there will be at least 17 habitat features per acre (1 piece/2300 square feet) including down woody material (logs, rootwads, etc.) and snags. Large woody debris will only be placed where large equipment is able to access the mitigation areas without causing any further environmental damage to the wetlands and buffers. There will also be a minimum of three bird nest boxes installed on new snags or existing large trees and a minimum of 3 bat roosting boxes installed on existing large trees.

Objective D: Increase the habitat functions and erosion control functions in the created and enhanced wetland and buffer areas by planting a wide variety of herbaceous vegetation to provide erosion control, slope stability, and increased wildlife habitat.

Performance Standard D: Herbaceous coverage of vegetation in mitigation areas shall be at least 50% by the end of Year 1, 50% by the end of Year 2, and 85% by the end of Years 3 and 5, excluding those areas of the site that may have sparse herbaceous vegetation due to dense shade from woody species coverage.

Objective E: Following construction, the created and enhanced wetland areas will exhibit wetland hydrology. In these wetland areas, wetland conditions will be verified by the presence of field indicators.

Performance Standard E: Throughout the five-year monitoring period, a combination of native or naturalized woody and herbaceous vegetation that is predominantly FAC or wetter will cover the wetland areas. Wetland areas will also exhibit evidence of saturated soil conditions (i.e., signs of ponding, water marks, water-stained leaves, or redoximorphic features in the soil) and will remain inundated or saturated to the surface for at least 10% of the growing season, defined as April through mid-November. Additionally, two shallow groundwater monitoring wells will be provided within each of the wetland creation areas so that groundwater elevations are documented during the early part of the growing season.

Objective F: Remove and control invasive plants to less than 20% cover at mitigation areas.

Performance Standard F: After construction and following every monitoring event for a period of five years, exotic and invasive plant species will be maintained at levels below 20% total cover in the mitigation areas. These species include: Scot's broom, Himalayan and evergreen blackberry, reed canarygrass, purple loosestrife, hedge bindweed, Japanese knotweed, English ivy, Canada thistle, and creeping nightshade.

OVERVIEW PLAN

GRAPHIC SCALE
1 IN FEET
0 30 60 80
SCALE: 1"=60'

PLAN LEGEND

- PROPERTY LINE
- EXISTING CONTOUR
- SURVEYED WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (OFF SITE) EXEMPT PER KZC 90.20 (3)
- 15' STANDARD WETLAND BUFFER
- OHWM OF STREAM
- A-1 ▲ WETLAND FLAG LOCATION
- 60' STANDARD STREAM BUFFER
- O EXISTING TREES
- +B-2 STREAM FLAG LOCATION
- MW-6 MONITOR WELL LOCATION
- F-5 FECAL COLIFORM SAMPLING LOCATIONS
- TP-2 TEST PIT LOCATIONS

CONTACTS

APPLICANT:
KEN DAVIDSON
DCK PROPERTY, LLC
520 KIRKLAND WAY, SUITE 400
KIRKLAND, WA 98033

PHONE:

PROPERTY OWNER:
KEN DAVIDSON
DCK PROPERTY, LLC
520 KIRKLAND WAY, SUITE 400
KIRKLAND, WA 98033

PHONE:

ENVIRONMENTAL CONSULTANT
TALASAEA CONSULTANTS, INC.
15020 BEAR CREEK RD. NE
WOODINVILLE, WA 98077

PHONE: (425) 861-1550

VICINITY MAP

NOTES

1. SURVEY PROVIDED BY JH HART & ASSOCIATES, 220 8TH ST., KIRKLAND, WA 98033, (425) 822-4151.
2. WETLAND B FIELD LOCATED BY TALASAEA CONSULTANTS FOR VISUAL ENHANCEMENT.
3. SOURCE DRAWING WAS MODIFIED BY TALASAEA CONSULTANTS FOR VISUAL ENHANCEMENT.
4. THIS PLAN IS AN ATTACHMENT TO THE WETLAND MITIGATION REPORT PREPARED BY TALASAEA CONSULTANTS IN OCTOBER OF 2007.

TALASAEA
CONSULTANTS, INC.
Resource & Environmental Planning

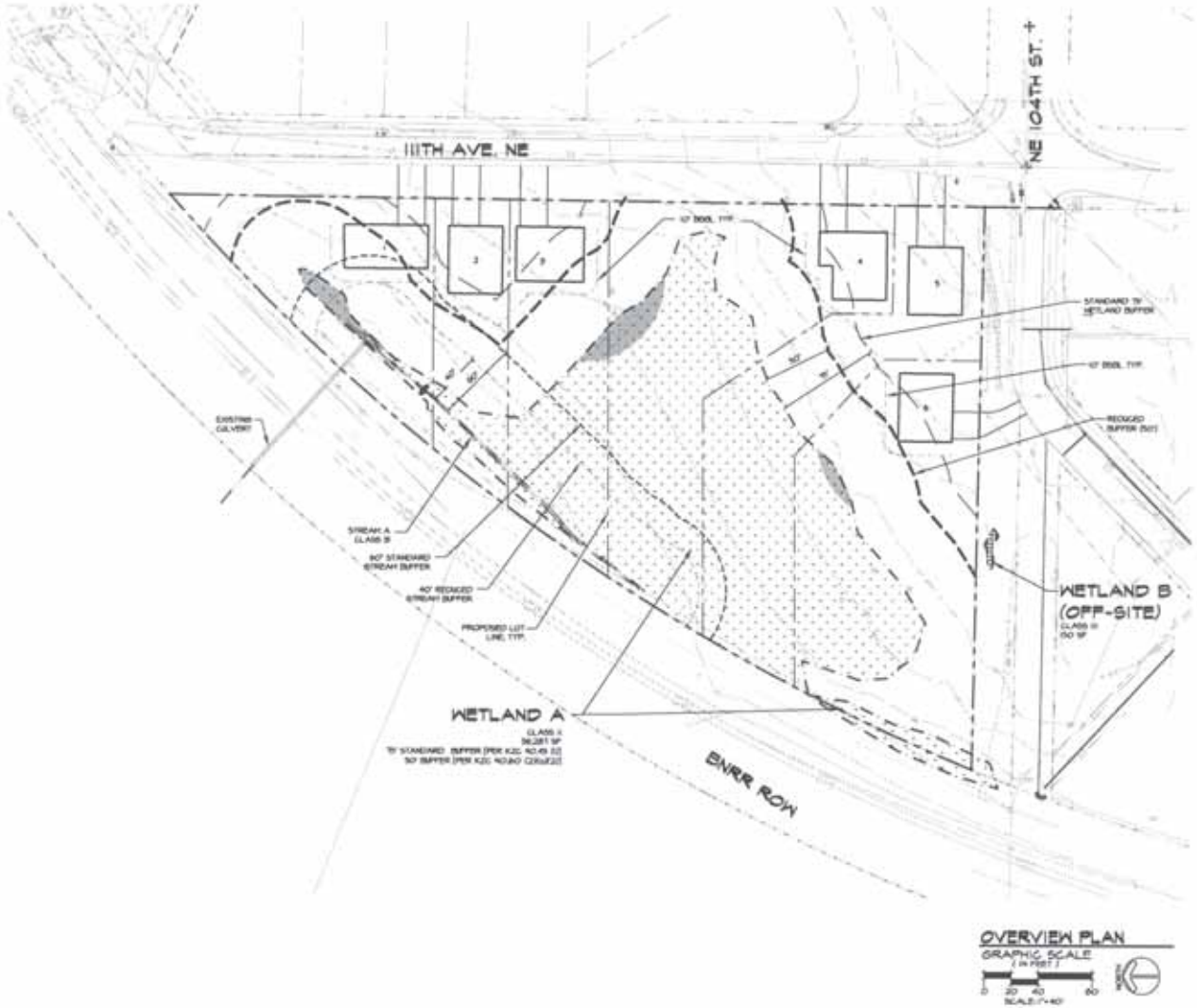
CONCEPTUAL WETLAND MITIGATION PLAN
EXISTING CONDITIONS
HIGHLAND GLEN SHORT PLAT
KIRKLAND, WA

Revisions	Date	By
CITY COMMENTS	2-22-08	JS
CITY COMMENTS	3-20-08	JS

Date: Jul 2007
Scale: As Noted
Designed: JS
Drawn: JS
Checked: JS
Approved: JS

Project # 529

Sheet # W1.0



OVERVIEW PLAN

GRAPHIC SCALE
(IN FEET)
0 20 40 60
SCALE: 1"=40'

PLAN LEGEND

- PROPERTY LINE
- EXISTING CONTOUR
- SURVEYED WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (OFF-SITE) EXEMPT PER KZC 90.20 (5)
- STANDARD WETLAND BUFFER (75' FOR WETLAND A, 50' FOR WETLAND B)
- 50' REDUCED WETLAND BUFFER - MAX. ALLOWABLE REDUCTION IS 1/3 PER KZC 90.60(2)(a)(2)
- OHWM OF STREAM
- STANDARD STREAM BUFFER (50')
- 40' REDUCED STREAM BUFFER - MAX ALLOWABLE REDUCTION IS 1/3 PER KZC 90.60(3)
- PROPOSED LOT LINE
- BSBL ADJACENT TO NWPE

IMPACTS LEGEND

PAPER FILL 2,140 SF

NOTES

1. SURVEY PROVIDED BY JIH HART & ASSOCIATES, 220 6TH ST., KIRKLAND, WA 98033, (425) 822-4151.
2. WETLAND B FIELD LOCATED BY TALASAEA.
3. SOURCE DRAWING HAS MODIFIED BY TALASAEA CONSULTANTS FOR VISUAL ENHANCEMENT.
4. THIS PLAN IS AN ATTACHMENT TO THE WETLAND MITIGATION REPORT PREPARED BY TALASAEA CONSULTANTS IN OCTOBER OF 2007.

TALASAEA
CONSULTANTS, INC.
Resource & Environmental Planning

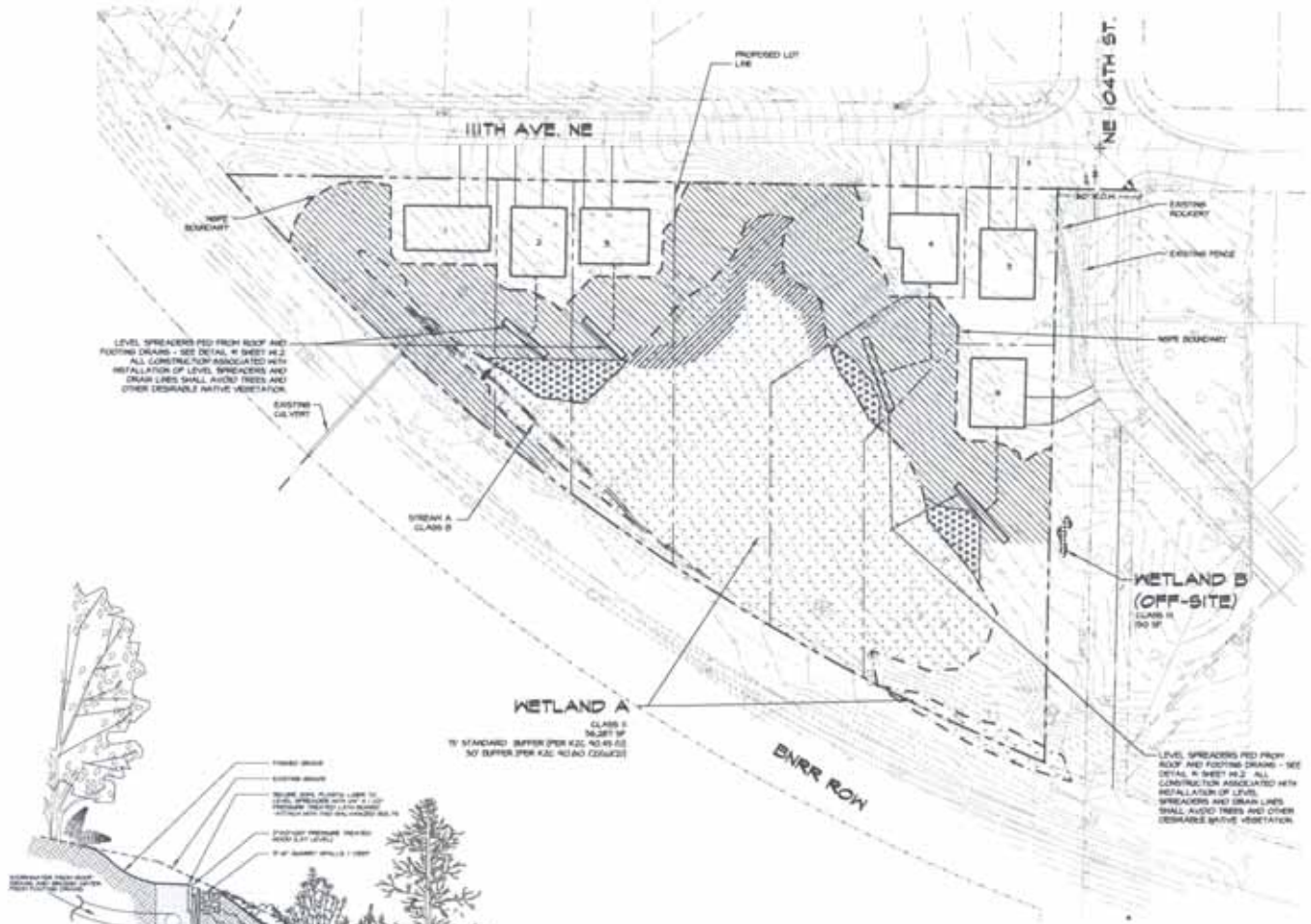
CONCEPTUAL WETLAND MITIGATION PLAN
SITE PLAN & IMPACTS
HIGHLAND GLEN SHORT PLAT
KIRKLAND, WA

Revisions	Date	By
CITY COMMENTS	2.22.08	JS
CITY COMMENTS	3.20.08	JS

Date 11.13.07
Scale AS NOTED
Designed JS
Drawn JS
Checked BLS
Approved BLS

Project # 506

Sheet # WL1



PLAN LEGEND

- PROPERTY LINE
- EXISTING CONTOUR
- SURVEYED WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (OFF-SITE) EXEMPT PER KZC 90.30 (5)
- NATIVE GROWTH PROTECTION EASEMENT (NGPE) BOUNDARY
- CHAIN OF STREAM
- PROPOSED LOT LINE

MITIGATION LEGEND

	WETLAND ENHANCEMENT (ACHIEVED AT A 4:1 RATIO)	4,304 SF*
	WETLAND CREATION (SEE DETAIL 'A' THIS SHEET)	3,444 SF*
	BUFFER ENHANCEMENT	42,800 SF

*WETLAND MITIGATION REQUIRED AT A 2:1 RATIO PER KZC 90.55(4). WETLAND MITIGATION INCLUDES WETLAND CREATION AND WETLAND ENHANCEMENT. NO MORE THAN 1/3 OF THE WETLAND MITIGATION IS WETLAND ENHANCEMENT PER KZC 90.55(4).

OVERVIEW PLAN

GRAPHIC SCALE
(IN FEET)
0 20 40 80
SCALE: 1"=40'

NOTES

1. SURVEY PROVIDED BY JH HART & ASSOCIATES, 220 6TH ST., KIRKLAND, WA 98033, (425) 822-4175.
2. WETLAND B FIELD LOCATED BY TALASAEA.
3. SOURCE DRAWING WAS MODIFIED BY TALASAEA CONSULTANTS FOR VISUAL ENHANCEMENT.
4. THIS PLAN IS AN ATTACHMENT TO THE WETLAND MITIGATION REPORT PREPARED BY TALASAEA CONSULTANTS IN OCTOBER OF 2001.

1 CONCEPTUAL SLOPED WETLAND CREATION CROSS-SECTION

TALASAEA CONSULTANTS, INC.
Resource & Environmental Planning

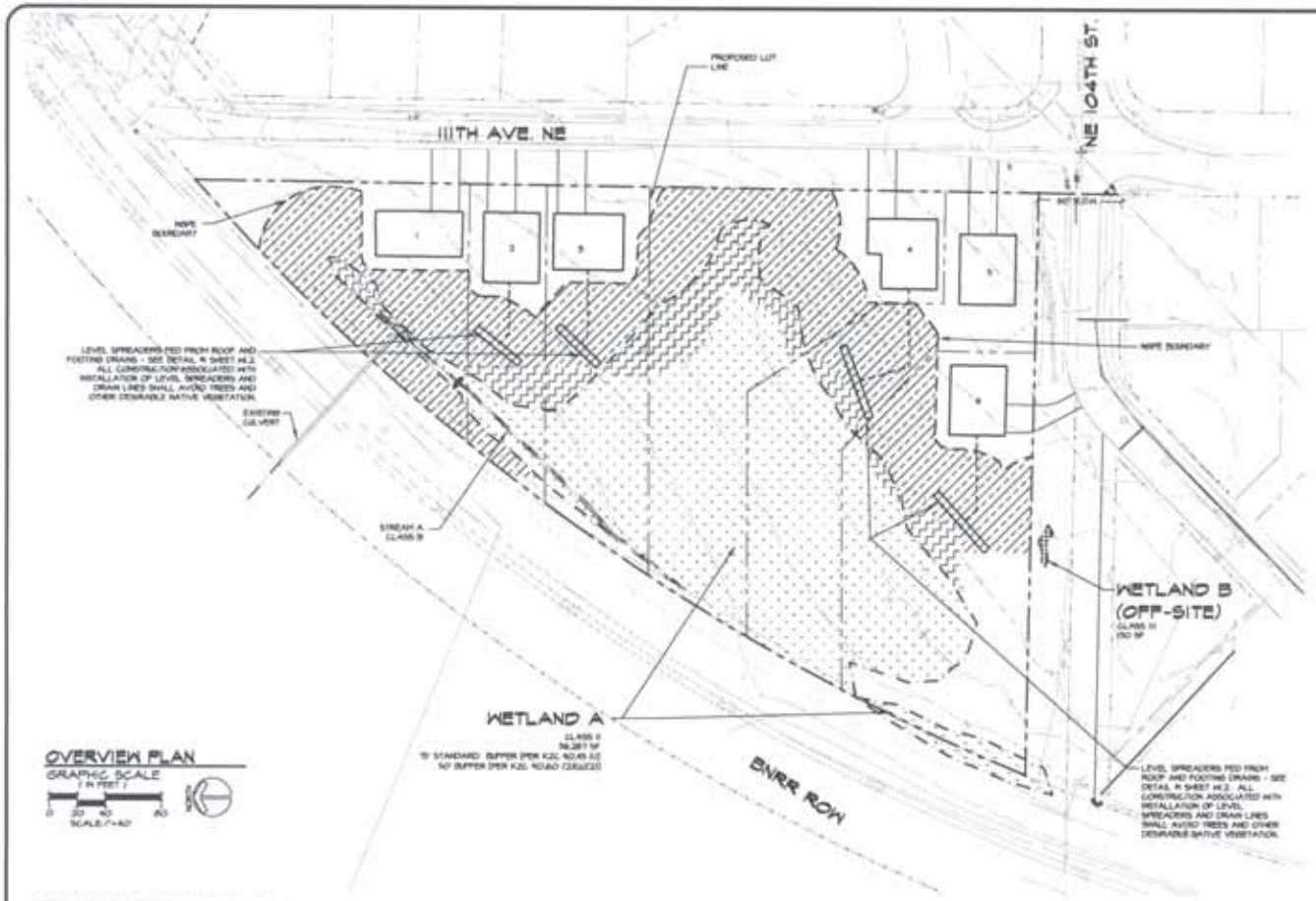
CONCEPTUAL WETLAND MITIGATION PLAN
MITIGATION PLAN
HIGHLAND GLEN SHORT PLAT
KIRKLAND, WA

Revisions	Date	By
KCC COMMENTS	2-22-08	AS
KCC COMMENTS	3-20-08	AS
KCC COMMENTS	4-22-08	AS

Date 2-9-01
Scale AS NOTED
Designed JH
Drawn JH
Checked JH
Approved JH

Project # 525

Sheet # WL2



OVERVIEW PLAN

GRAPHIC SCALE
(IN FEET)
0 20 40 80
SCALE: 1"=40'

PLAN LEGEND

- PROPERTY LINE
- EXISTING CONTOUR
- SURVEYED WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (OFF-SITE) EXEMPT PER KZC 90.20 (5)
- NATIVE GROWTH PROTECTION EASEMENT (NBPE) BOUNDARY
- CHAN OF STREAM
- PROPOSED LOT LINE

NOTES

1. SURVEY PROVIDED BY JIM HART & ASSOCIATES, 220 6TH ST, KIRKLAND, WA 98033, (425) 822-4151.
2. WETLAND B FIELD LOCATED BY TALASAEA.
3. SOURCE DRAWING WAS MODIFIED BY TALASAEA CONSULTANTS FOR VISUAL ENHANCEMENT.
4. THIS PLAN IS AN ATTACHMENT TO THE WETLAND MITIGATION REPORT PREPARED BY TALASAEA CONSULTANTS IN OCTOBER OF 2007.

PLANT COMMUNITIES LIST (ALL PLANTS TO BE FIELD LOCATED BY LANDSCAPE ARCHITECT/BIOLOGIST)

BUFFER ENHANCEMENT & RESTORATION (.81 ACRES)

SYMBOL	SCIENTIFIC NAME	COMMON NAME	HB STATUS	DENSITY (PER ACRE)	TOTAL QTY.	SIZE (MIN.)	NOTES
	ACER CIRCINATUM	VINE MAPLE	FACU-	10	8	3' HT.	MULTI-STEM (3 MIN.)
	ACER MACROPHYLLUM	BIG LEAF MAPLE	FACU	8	6	2-3' HT.	SINGLE TRUNK, WELL BRANCHED
	AMELANCHIER ALNIFOLIA	SERVICEBERRY	FACU	50	30	24" HT.	MULTI-CANE (3 MIN.)
	CORNUS NUTTALLII	PACIFIC DOGWOOD	NL	10	8	2-3' HT.	SINGLE TRUNK, WELL BRANCHED
	CORYLUS CORNUTA	WESTERN HAZELNUT	FACU	10	8	2-3' HT.	MULTI-STEM (3 MIN.)
	CRATAEGUS DOUGLASII	BLACK HAWTHORN	FAC	50	30	24" HT.	MULTI-CANE (3 MIN.)
	GAULTHERIA SHALLON	SALAL	FACU	50	30	1 GAL.	FULL 4 BUSHY
	HOLODISCUS DISCOLOR	OCEAN SPRAY	NL	50	30	24" HT.	MULTI-CANE (3 MIN.)
	MAHONIA AQUIFOLIUM	OREGON GRAPE	NL	50	30	18" HT.	FULL 4 BUSHY
	OEMLERIA CERASIFORMIS	INDIAN PLUM	FACU	50	30	24" HT.	MULTI-CANE (3 MIN.)
	PRUNUS EMARGINATA	BITTERCHERRY	FACU	10	8	2-3' HT.	SINGLE TRUNK, WELL BRANCHED
	PSEUDOTSUGA MENZIESII	DOUGLAS FIR	FACU	8	6	2-3' HT.	2 GAL., FULL 4 BUSHY
	RIBES SANGUINEUM	RED CURRANT	NL	50	30	24" HT.	MULTI-CANE (3 MIN.)
	ROSA GYMNOCARPA	BALDHIP ROSE	FACU	50	30	18" HT.	MULTI-CANE (3 MIN.)
	ROSA NUTKANA	NOOTKA ROSE	FAC	50	30	18" HT.	MULTI-CANE (3 MIN.)
	SORBUS SITCHENSIS	SITKA MOUNTAIN ASH	NL	8	6	2-3' HT.	SINGLE TRUNK, WELL BRANCHED
	SYMPHORICARPOS ALBUS	COMMON SNOWBERRY	FACU	50	30	18" HT.	MULTI-CANE (3 MIN.)
	THUJA PLICATA	WESTERN RED CEDAR	FAC	8	6	2-3' HT.	2 GAL., FULL 4 BUSHY
	TSUGA HETEROPHYLLA	WESTERN HEMLOCK	FACU-	8	6	2-3' HT.	2 GAL., FULL 4 BUSHY

FORESTED / SCRUB-SHRUB WETLAND ENHANCEMENT & CREATION (.25ACRES)

SYMBOL	SCIENTIFIC NAME	COMMON NAME	HB STATUS	DENSITY (PER ACRE)	TOTAL QTY.	SIZE (MIN.)	NOTES
	ACER CIRCINATUM	VINE MAPLE	FACU-	5	1	3' HT.	MULTI-STEM (3 MIN.)
	ALOPECURUS GERICULATUS	WATER FOXTAIL	OBL	2M	48		4" HT. CLUMP, DIVIDED
	CAREX OBNUPTA	SLOUGH SEDGE	OBL	2M	48		4" HT. CLUMP, DIVIDED
	CAREX STIPATA	SAWBEAK SEDGE	OBL	2M	48		4" HT. CLUMP, DIVIDED
	CORNUS SERICEA	RED-OSIER DOGWOOD	FACW	15	5	18" HT.	MULTI-CANE (3 MIN.)
	CRATAEGUS DOUGLASII	BLACK HAWTHORN	FAC	15	3	24" HT.	MULTI-CANE (3 MIN.)
	FRAXINUS LATIFOLIA	OREGON ASH	FACW	1	2	2-3' HT.	SINGLE TRUNK, WELL BRANCHED
	LONICERA INVOLUCRATA	BLACK TWIN-BERRY	FAC+	15	9	18" HT.	MULTI-CANE (3 MIN.)
	LYSICHITUM AMERICANUM	SKUNK CABBAGE	OBL	2M	48		1 GAL. OR BARE ROOT RHIZOME
	OENANTHE SARMENTOSA	PACIFIC WATER PARSLEY	OBL	2M	48		ROOTED CUTTING
	MALUS FUSCA	WESTERN CRABAPPLE	FAC+	8	2	2-3' HT.	SINGLE TRUNK, WELL BRANCHED
	PHYSOCARPUS CAPITATUS	PACIFIC NINEBARK	FACW+	15	3	24" HT.	MULTI-CANE (3 MIN.)
	PICEA SITCHENSIS	SITKA SPRUCE	FAC	1	1	2-3' HT.	2 GAL., FULL 4 BUSHY
	RIBES LACUSTRE	SWAMP GOOSEBERRY	FAC+	15	8	24" HT.	MULTI-CANE (3 MIN.)
	ROSA NUTKANA	NOOTKA ROSE	FAC	15	9	18" HT.	MULTI-CANE (3 MIN.)
	ROSA PISOCARPA	CLUSTERED WILD ROSE	FAC	15	9	18" HT.	MULTI-CANE (3 MIN.)
	SALIX LASIANDRA	PACIFIC WILLOW	FACW+	45	10	4' CUTTING	1/2" DIA. MIN., BARK INTACT
	SALIX SCOULERIANA	SCOULER WILLOW	FAC	45	10	4' CUTTING	1/2" DIA. MIN., BARK INTACT
	SALIX SITCHENSIS	SITKA WILLOW	FACW	45	10	4' CUTTING	1/2" DIA. MIN., BARK INTACT
	THUJA PLICATA	WESTERN RED CEDAR	FAC	5	1	2-3' HT.	2 GAL., FULL 4 BUSHY

TALASAEA CONSULTANTS, INC.
Resource & Environmental Planning

CONCEPTUAL WETLAND MITIGATION PLAN
CONCEPTUAL PLANTING PLAN & SCHEDULE
HIGHLAND GLEN SHORT PLAT
KIRKLAND, WA

Revisions	Date	By
CITY COMMENTS	2-22-08	AS
CITY COMMENTS	3-20-08	AS
CITY COMMENTS	4-22-08	AS

Date JUNE 07
Scale AS SHOWN
Designed JL
Drawn DW
Checked AS
Approved MS

Project # 626

Sheet # L2.0

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February 8, 2008

Lauri Anderson
Planning Consultant
Planning & Community Development Dept.
City of Kirkland
123 - 5th Avenue
Kirkland, WA 98033

Re: Highland Glen Short Plat & Wetland and Buffer Modifications
File No. SPOO7-0034

Dear Ms. Anderson:

I met with our geotechnical engineer and our civil engineer to address the question raised in your February 4 letter concerning the fill on the site. They advised me that they do not anticipate or propose any mass removal of the fill during either the construction of the foundations for houses to be built on the proposed lots or for widening of the road. We do not have plans for the houses which may be built on the proposed lots. The buyer of each lot will decide upon a design for his or her house and that design will determine the type of foundation to be constructed. Regardless of the type of foundation selected, our engineers anticipate that conventional construction methods will be used, which will not require mass removal of fill. It is anticipated that the contractors constructing the individual homes will attempt to balance the site by using any materials removed for foundations to enhance the front yard areas for landscaping, and that any material which cannot be used on site will be removed to an approved dump. It is anticipated that the contractors will follow required and prudent practices for erosion control during construction so that excavation for foundations will not impact either the wetland buffer or the wetland. We anticipate specific requirements for erosion control will be imposed as conditions for building permits for each home.

Our street improvements include widening the existing road by a width of approximately 4 feet. Our engineers anticipate use of conventional construction techniques, which will include removal of topsoil, over-excavation of the area to be widen to a depth of approximately 3 feet. Structure fill will be imported to the extent that materials on site are not suitable. Unsuitable materials will be removed to an approved dump. Layers of gravel, ATB and asphalt will be installed in lifts in accordance with the civil engineer's plans approved by the City. The approved plans will also include temporary erosion control measures which the contractors will be required to follow so that impact to the wetland buffer and wetlands can be avoided.

In sum, we do not anticipate removing a large amount of fill from the site and anticipate that the modest widening of the street and the construction of homes will follow typical and conventional

ENCLOSURE 5
SEPA- SPL07-00034

construction methods. I hope the foregoing fully addresses your questions. However, if you have further questions, please do not hesitate to call me.

Sincerely yours,

Kenneth H. Davidson

KDH:akt
Enc.
KHD/6852.01/Anderson.let.2.8.08

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REPORT ON

GEOTECHNICAL HAZARDS INVESTIGATION
PROPOSED HIGHLAND GLEN SHORT PLAT
10405 111TH AVENUE NE
KIRKLAND, WASHINGTON

Submitted to:

Mr. Ken Davidson
DCK, LLC
520 Kirkland Way, Suite 400
Kirkland, Washington 98034

Submitted by:

Golder Associates Inc.
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David P. Findley, L.E., L.E.G.
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for Charles W. Lockhart
Principal, Senior Consultant

Distribution:

2 Copies - DCK, LLC
3 Copies - Golder Associates Inc.

October 30, 2007

053-1672.000

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1.0 PURPOSE AND SCOPE

The primary purpose of the work described in the following report is to assess the geologic and geotechnical conditions of the property located at 10405 111th Avenue Northeast in Kirkland, Washington. The site is to be subdivided into residential building lots. The subject property lies within an area defined by the City of Kirkland as being a "High Landslide Hazard Area", the work described in this report has been carried out to address the requirements of development in geologic hazard areas in accordance with Chapter 85.15 of the Kirkland Municipal Code.

Current plans are to develop seven (7) single-family homes around the eastern and southern edges of the subject property. We understand that portions of the wetland are to be filled to accommodate the proposed development plans. A detention vault is proposed to be built within the 111th Avenue right-of-way at the northern corner of the subject property to accommodate storm water. In addition, consideration is being given to directing run-off from the roofs and foundation drains directly into the wetland areas.

Our scope of services consisted of:

- Excavation of nine (9) exploration test pits and five (5) hand-augered boreholes to determine the site soil and groundwater conditions;
- An assessment of potential geologic hazards on the site, including seismic hazards, landslide hazards, and erosion hazards;
- Provision of geotechnical engineering recommendations for the site development.

The architectural and structural details of the proposed home construction have not been determined, and will likely be specific to each lot. Therefore, general geotechnical recommendations have been provided for general planning purposes only.

Our scope of work, and our investigation did not include provision for environmental screening or sampling.

2.0 SITE INVESTIGATION

2.1 Site Reconnaissance

We conducted a reconnaissance of the subject property on November 4 and 7, 2005. We documented the reconnaissance through notes and digital photographs.

During the reconnaissance, we observed that the majority of the trees on the subject property were relatively small alders and cottonwoods, with a slight tilt, as described in Section 1.1. We observed occasional relatively small slumps in the fill adjacent to 111th Avenue Northeast. These slumps had vertical displacements of less than one-foot. Both slumps measured about one-hundred-feet long in the north-south direction (parallel to 111th Avenue Northeast), and about ten to twenty-feet long east-west. The downslope direction of the slumps was to the west.

We did not observe ground cracks, hummocky topography, disturbed soils, or other similar indications of slope instability at the subject property, with the exception of the aforementioned slumps. We should note that the site was thickly vegetated with blackberries and thus difficult to observe the ground surface over most of the site. During the site reconnaissance, we also observed abundant trash, including household trash, automotive parts (e.g., tires, headlights, auto body parts, etc.), plastic, bottles and cans, and street signs.

2.2 Remote Sensing Review

We reviewed stereographic aerial photographs of the subject property and the adjacent area from 1936, 1956, 1977, and 1995 and LiDAR from 2003 in order to look for evidence of slope instability or changes to the subject property, such as the addition of large amounts of fill, or the removal of soil from the site. In our review of the 1936 aerial photograph, we noted that the subject property appeared to be located within a larger area defined by a slightly concave, hummocky, irregular topography. We did not observe this hummocky, irregular topography in the other remote sensing data which we reviewed.

The subject property appeared to be largely cleared of vegetation in the 1936 and 1977 photographs, and thickly vegetated in the 1956 and 1995 photographs. A house at the current location of the house at the subject property is visible on the 1956 photographs. A sand and gravel pit is visible to the north of the subject property in the 1936, 1956 and 1977 photographs, on the other side of the Burlington Northern railroad, and may potentially be the source for some of the fill material observed at the subject property. In the 1977 and preceding photographs, the section of 111th Avenue Northeast bordering the eastern side of the subject property has not yet been constructed. The section of 111th Avenue Northeast bordering the eastern side of the subject property is visible in the 1995 photographs.

2.3 Records Review

We contacted Mr. Ken Carlson of the City of Kirkland Building Department on November 1, 2005 to see if the City knew of any slope stability issues at or near the subject property. Mr. Carlson stated that the nearest issue that he knew of was the collapse of a rockery about 6 or 7 blocks away from the site, and that he did not believe that the City had any records of slope stability problems at the subject property.

2.4 Subsurface Investigation

In order to investigate soil conditions at the subject property, we oversaw the excavation and logging of nine (9) exploration test pits, and five (5) hand augered boreholes at the subject property. Test pits TP-1 through TP-4, and the hand-auger holes (HA-1 through HA-5) were put down over the period November 4, 7, and 8, 2005. These test pits were excavated using a John Deere 160 LC tracked excavator to between 9.5 to 20 feet below ground surface, depending on the conditions encountered. Test pits TP-5 through TP-9 were excavated on December 5, 2005 using a Komatsu WB140 rubber tired backhoe to depths between 7.0 feet and 15 feet.

The test pits were excavated in accordance with Golder Technical Procedures TP-1.2-21 "Geotechnical Test Pit Logging and Sampling", and TP-1.3-1 "Geologic Mapping of Soils Exposed in Test Pits". The hand auger borings were excavated to between 4 and 6 feet below the ground surface, and the shovel-dug hand holes were excavated to between 1 and 2 feet below the ground surface. In areas where erosion control was an issue Golder placed grass seed and straw over the disturbed soils at the groundsurface upon completion of backfilling of the test pits.

Soils encountered during excavation were logged by a Golder geologist in accordance with Golder Technical Procedure TP-1.2-6 "Field Identification of Soil". Samples from the encountered subsurface soils were placed into plastic sample containers, and returned to our Redmond, Washington lab for further analysis.

3.0 SITE CONDITIONS

3.1 Site Description

The site is located at 10405 111th Avenue Northeast in Kirkland, Washington in a residential area (Figure 1). The subject property consists of a roughly wedge-shaped property, bounded by 111th Avenue Northeast on the eastern edge of the property, Northeast 104th Street on the southern edge, and a Burlington Northern railroad on the north and western edges of the property. The subject property consists of approximately 3.34 acres. The southeastern corner of the subject property is occupied by an existing single-story single-family home and a lawn associated with the home. The rest of the property is generally covered with blackberries and small alders (less than one-foot diameter), with a few (about 10-percent) larger cottonwoods measuring two or more feet in diameter.

Approximately 1.25 acres of the subject property have been designated a Class 3 wetland by Talasaea Consultants, Inc. of Woodinville, Washington. The wetland area is located along the western and central areas of the subject property (Figure 2).

In general, the subject property slopes to the northwest. The southeastern corner of the subject property, occupied by the single-family home, appears to have been leveled and is relatively flat compared to the rest of the property. The hill to the northwest of the home slopes steeply to the northwest at an approximately 43-percent slope for about 60 feet. The hill flattens out to a slope typical of the rest of the subject property, sloping to the northwest at approximately a 20- to 25-percent slope. The northern corner of the subject property, where the Burlington Northern railroad and 111th Avenue Northeast converge, forms an enclosed depression, bounded by the hillside, 111th Avenue Northeast, and the Burlington Northern railroad.

3.2 Geologic Setting

Geologic mapping (USGS, 1983) indicates that the site is located within a sequence of glacial deposits of fine-grained transitional beds consisting of dense silts and sands, which are overlain by glacial advance outwash deposits consisting of dense sands and gravels and thin local glaciolacustrine deposits.

Geologic conditions observed during the reconnaissance of the general vicinity of the site was consistent with this geologic setting, as were the results of the site explorations, which are described below. We observed well-defined bedding in the advance outwash in TP-1, as well as below the contact between this unit and the overlying glaciolacustrine unit at about elevation 200 feet above mean sea level. The bedding appeared to be intact, and to have not been displaced or disrupted.

3.3 Subsurface Soil Conditions

Based on our investigation, specific soil conditions at the subject property vary considerably over a relatively small area. The various soil types encountered at the subject property are described below. In the descriptions that follow, the qualifiers "trace", "little", and "some" mean 0 to 5 percent, 5 to 12 percent, and 12 to 30 percent, respectively, by mass. Summary test pit and borehole logs are presented in Appendix A.

We encountered topsoil in all of our explorations with thicknesses between about 0.1 and 1-feet. The topsoil generally consisted of sandy organic soil or forest duff (i.e., leaves, moss and other organic debris).

3.3.1 Eastern Portion of the Site

The eastern portion of the site, adjacent to 111th Avenue NE, generally consists of up to 8 feet of fill, overlying strata of dense glacial soils consisting of compact to dense sands, gravels, and silts. We encountered soil that we interpreted as fill in test pits TP-1, TP-2, and TP-3, as well as in all of the hand holes that were excavated in this area. The fill material ranged from fine to coarse sand, with some gravel, and some silt; to sand with some gravel and trace silt, with stumps, roots and other deleterious materials. The encountered thickness of the fill material ranged from about seven to eight feet in TP-1 and TP-2, to about four feet in TP-3. TP-1 encountered a layer of organic materials from about 4.5 feet to about 7 feet, underlain by a 1-foot layer of clayey silt; TP-3 encountered a layer of soft organic silt from a depth of 4 feet to 6 feet below grade. In all three test pits, the fill and organic materials were underlain by compact to dense sands, gravels and silts.

3.3.2 111th Avenue NE ROW

A total of four test pits (TP-6 through TP-9) were excavated along the western edge of the 111th Avenue NE Right-of-Way. The test pits encountered fill soils consisting of loose to dense sand with varying amounts of silt, gravel, cobbles, organics and construction debris. The fill soils extended to the bottom of the excavation for TP-9 at a depth of 8 feet. In test pit TP-8 Golder observed gray sand with some silty clay and little organics as sticks and logs to 10 inch diameter from a depth of 5 feet to 15 feet. We were unable to confirm whether this was fill or native soils. Test pits TP-6 and TP-7 encountered outwash sand underlying the fill, at depth of 7 feet and 3.7 feet, and extending to the bottom of each test pit.

3.3.3 South-Eastern Portion of the Site

In the south-eastern portion of the property, in the area currently occupied by the residence, test pit TP-4 encountered a hard, blocky silt, to a depth of about 7 feet. This was in turn underlain by a medium gray, silty fine sand. This unit most likely underlies the house, and the southeast corner of the subject property.

3.3.4 South-Western Portion of the Site

In the south-western portion of the site, along the southern property line, two hand auger borings (HA-1 and HA-2) and one test pit (TP-5) were completed. The test pit and hand auger borings encountered a silty sand and silt with varying amounts of gravel which was interpreted as colluvium (soil transported down a slope through a combination of gravity and surface water). Underlying the colluvium, advance outwash sands were generally encountered. However, we observed a thin (0.3 feet) layer of peat below the colluvium in HA-1 which was then underlain by the advance outwash.

3.3.5 Wetland Areas of the Site

We did not investigate within the wetlands area of the site. However, we put a hand-auger hole (HA-3) in the west-central portion of the site, in order to determine the geologic materials. HA-3 encountered about 1.2 feet of soft organic materials underlain by silts. We expect that organic silt and peat underlie much of the area mapped as a wetland at the site.

3.4 Groundwater

At the time of our site visits, standing water was exposed at the surface, or within one-half foot of the ground surface in the area designated as wetland.

At the time of our investigation, groundwater was observed in the sidewalls of test pits TP-1, TP-3, TP-6, and TP-8. In addition, we observed a perforated drain pipe, at a depth of approximately 2 feet, in the sidewall of test pit TP-9 that was contributing water to the subsurface soils in the area. We also observed groundwater in hand auger holes HA-1, 3, 4 and 5. We did not observe groundwater seepage in test pits TP-2, TP-4, TP-5, TP-7, and hand auger boring HA-2.

Based on our experience in the general area, we would expect that groundwater may be encountered in any cuts or excavations at this site.

4.0 DISCUSSION OF GEOLOGIC HAZARDS

The site is designated by the City of Kirkland Environmentally Sensitive Areas (ESA) Maps as being located in an area of "Seismic Hazards" and "Landslide and Erosion Hazards". As a result, it is designated per Chapter 85.13. 3 as a "geologically hazardous area". In our opinion, based on our review of the site conditions, and the results of our subsurface exploration, the site is underlain by competent soils, and the risk of geologic hazards are low. Further, in our opinion, any potential risks can be mitigated for each lot development based on the lot-specific geotechnical conditions, and the incorporation of measures to minimize these impacts. These are discussed in the subsequent paragraphs of this report.

4.1 Site Specific Seismic Hazards

Seismic hazard areas are defined in Chapter 85.13 as "those areas subject to "severe risk of earthquake damage as a result of seismically induced settlement or soil liquefaction…".

Based on our site investigation, we conclude that the site is in general underlain by dense deposits of silty sand and gravel, or inter-bedded dense silts, which typically present a low to negligible risk of liquefaction and/or seismically induced settlements. These soils would be designated Type C or D by the International Building Code (2003).

We recommend that specific geotechnical investigations be undertaken for the individual building units, so the building design can incorporate specific measures that are based on the soil and groundwater conditions unique to the building footprint and lot development concepts.

4.2 Site Specific Erosion Hazards

The ESA maps designate the site as within an Erosion Hazard Areas. The fine-grained nature of the site soils result in a potential for erosion. In our opinion, erosion will need to be controlled using careful erosion control practices. This is discussed in more detail in section 5.8 of this report. The City of Kirkland has specific regulations to control erosion, which will be dependent upon the actual design elements of individual building lots.

4.3 Site Specific Landslide Hazards

As a result of the site topography, portions of the site are designated as being in a moderate to high landslide hazard area as defined by the ESA. We observed intact, horizontal bedding within the advance outwash unit, and a horizontal contact between the overlying glaciolacustrine unit and the underlying advance outwash. Based on these indicators, along with a general lack of indicators of landsliding at the subject property (such as pistol-butted trees or ground cracking), it is our opinion that the subject property has not been the site of large or deep-seated landslides during the Holocene (last 10,000 years), whether caused by seismic events or other natural triggers.

The slight tilt to the trees observed at the subject property is most likely from soil creep, which typically occurs on most hillsides. The slumps observed adjacent to 111th Avenue Northeast are most likely small road-bed fill slumps, occurring shortly after they were placed, and do not represent global stability issues at the subject property. The irregular, hummocky, slightly concave topography observed in the 1936 aerial photograph may be the result of erosion due to clearing of vegetation off of the subject property, or the result of small-scale mining of sand and gravel from the subject property prior to the 1930s.

5.0 PRELIMINARY GEOTECHNICAL DESIGN CONSIDERATIONS

This section of the report presents our geotechnical engineering recommendations based on the reconnaissance, remote sensing review, and subsurface conditions encountered in the test pits and hand-auger boreholes completed for this study. The recommendations provided in this report are based on our understanding of the project and are applicable for this site only.

The architectural and structural details of the proposed home construction have not been determined, and will likely be specific to each lot. Therefore, general geotechnical recommendations have been provided for general planning purposes only.

5.1 Foundation design

The site soil and groundwater conditions are conducive to standard foundation designs. Dependent on the architectural and structural design of the residence structures, foundations may be either conventional shallow foundations bearing on the undisturbed native soils underlying the topsoil and/or miscellaneous fill materials, or deep foundations such as piers or piles.

Conventional shallow isolated or continuous spread footings may be used throughout the site provided they are founded on the competent native soils or on properly compacted structural fill placed over the competent native soils.

We recommend a maximum allowable bearing pressure of 2,000 psf. These bearing values may be increased by 1/3 for short-term wind or seismic loading.

Minimum Embedment for Frost Protection:

Perimeter footings ..... 18 inches
Interior footings (below exterior grades)..... 12 inches

Minimum Footing Widths:

Perimeter footings..... 18 inches
Interior isolated footings..... 18 inches

Settlement:

Settlements are expected to occur during construction. Total and differential settlements should be in the range of one inch and one-half inch, respectively, and should occur during construction. Consolidation (long-term) settlements are not expected at the site.

The depth to suitable bearing soils should be determined in the field. In particular, we note that depths of fill in excess of 8 feet were encountered along the west side of 111th Avenue NE, and will likely impact proposed lots 1, 2, and 3.

Foundation drains should be provided for all foundations, as well as any construction which is below exterior grade.

Deep foundation systems such as piers or piles should be designed in conjunction with the specific structural design.

5.2 Lateral Load Resistance

Building foundations must resist lateral loads due to earth pressures, wind, and seismic events. For design purposes, we recommend the following:

- *Base Friction:*

  An allowable value of 0.40 can be assumed for base friction between the soil and spread footings. This value includes a factor of safety of 1.5.

- *Passive resistance on basement walls founded against soil:*

  The maximum available passive pressure on deep basement walls can be significant. However, considerable deformation is required to develop the full passive pressures and for deep basement walls the resulting deformation is usually unacceptable. Thus for design purposes, we recommend that the allowable passive pressure be based on a fluid with a density of 220 pcf, or a maximum average lateral pressure of 1,000 psf, whichever is smaller. The 1,000 psf maximum average value is intended to limit the lateral movement to less than about 1/2 inch. These values can be increased by one-third for seismic loads.

5.3 Lateral Earth Pressures

It is likely that basement walls, buried vaults, and retaining walls may be required. For planning purposes, we recommend the following equivalent fluid pressures for wall design:

- Earth pressure at rest (basement walls of buildings/buried vaults): 60 psf/feet of depth
- Active earth pressure: 40 psf/feet of depth

Where traffic loads will occur adjacent to a wall, a uniform lateral surcharge load of 100 psf should be added. Additional surcharges due to adjacent buildings or foundations should be added to the design pressures as required.

These recommended laterals pressures assume full height wall drainage, and have no provision for hydrostatic pressures.

5.4 Building slabs

Conventional slab-on-grade floors can be supported on a subgrade of the native bearing soils as noted above, or on structural fill placed and compacted as noted in the *Earthworks* subsection of this report. Slab-on-grade floors should not be founded on organic soils, loose native soils, or miscellaneous fills. We recommend that slabs be underlain by a suitable capillary break material, consisting of a minimum of four inches of clean, free draining gravel, or crushed rock containing less than three percent fines passing the US No. 200 sieve (based on the minus US No. 4 sieve fraction) to reduce the potential for vapor migration through the slab.

Vapor transmission through floor slabs is an important consideration in the performance of floor coverings and controlling moisture in structures. Floor slab vapor transmission can be reduced through the use of suitable vapor retarders such as plastic sheeting placed between the capillary break and the floor slab, and/or specially formulated concrete mixes. Framed floors should also include vapor protection over any areas of bare soils and adequate crawl space ventilation and drainage should be provided. The identification of alternatives to prevent vapor transmission is outside of our expertise. We recommend that a qualified architect or building envelope consultant provide

recommendations for reducing vapor transmission through the slab, based on the building use and flooring specifications.

5.5 Site Grading and Earthworks

5.5.1 Fill Materials and Placement

Structural fill should be free of organic and inorganic debris, be near the optimum moisture content, and be capable of being compacted to the required specifications listed below. We note that the on-site materials consist of silts, and silty sands and gravels. Given the high proportion of silt-size particles, these on-site materials are moisture-sensitive, and will likely be very difficult to compact, and thus will probably not be suitable for structural fill. If the on-site materials cannot be reworked to be suitable, we recommend using imported granular fill consisting of well graded material free of organic material, with less than five percent fines (that portion of the soil that passes the # 200 sieve).

Minimum Compaction Requirements:

- Beneath Building Foundations - The structural fill should be compacted to at least 95 percent of the ASTM D1557 maximum dry density value (modified Proctor value) for the material. The structural fill beneath footings should at a minimum extend laterally at a 1H:1V slope projected down and away from the bottom footing edge.
- Beneath Roadways, Slabs and Pavements – Structural fill should be compacted to at least 90 percent of the ASTM D 1557 maximum dry density value for the material, up to three feet below final grade. Within about three feet of subgrade elevation, the fill should be compacted to at least 95 percent of the ASTM D 1557 maximum dry density value for the material. The City of Kirkland or the local utility district may have more stringent requirements.
- Utility Trench Backfill - The fill should generally be compacted to at least 90 percent of the ASTM D 1557 maximum dry density value for the material, except within three feet of subgrade elevation, where the fill should be compacted to at least 95 percent of the ASTM D 1557 maximum dry density value for the material. The local utility district may have more stringent requirements.
- Non-structural/Landscaped Areas - Firmly compact the soil to prevent excessive settlement and sloughing. Topsoil and surficial soils generated during stripping of the site would likely be suitable for these areas.

5.5.2 Permanent and Temporary Slopes

We recommend that permanent cut slopes should be 2H:1V (Horizontal: Vertical) or flatter, and permanent fill slopes should be 2.5H:1V or flatter. All cut and fill slopes should be provided with proper compaction, drainage and erosion control. In general, 3H:1V slopes or gentler are preferred for ease of maintenance and application of landscaping.

In our experience, constructed slopes are significantly more likely to experience erosion or sloughing during the first winter season, until vegetation is well established. Aggressive erosion control measures, including plastic sheeting are sometimes needed to prevent significant slope damage.

Safe temporary slopes are the responsibility of the contractor and should comply with all applicable OSHA and WISHA standards. Temporary cuts in the loose fill materials and the native soils are expected to have some raveling at the cut face. Temporary cut slopes in the fill may need to be laid back flatter if there is a change in material type or debris is encountered.

5.5.3 Dewatering

Based on the general site conditions, groundwater conditions should be anticipated during construction. In the event that groundwater seepage is encountered during excavation, the contractor must install temporary drainage measures to protect the cut face and prevent degradation of the excavation area until permanent drainage measures can be constructed.

5.6 Drainage Provisions

Permanent control of surface water and groundwater should be incorporated in the final grading design and vegetative protection should be established. We recommend that run-off from paved surfaces be directed away from the slope faces, and into a storm drainage system.

Foundation drains should include:

- **WALL DRAINS:** Retaining walls and backfilled walls should include a permanent drainage system. This should include a wall footing drain consisting of at least a 4-inch diameter perforated heavy walled PVC pipe surrounded by at least 6 inches of drainage gravel. We recommend that a geotextile (Mirafi 140N or approved equivalent) be placed between the drain rock and native soils. The backfill against the wall should consist of at least a 12 inch thickness of drainage gravel or a suitable geocomposite drain board. A relatively fine grained soil should be placed within a foot of the ground surface and the slope behind the wall should be graded to drain away from the wall.
- **FOOTING DRAINS:** Exterior footing drains as described above should be provided for all buildings. Roof drainage should be collected and conveyed in a system separate from the footing drain system.
- **CRAWL SPACE DRAINAGE:** If a raised floor and crawl space is used, footing drains should be used with the drain invert lower than the crawl space. Alternatively, the crawl space could be graded to drain towards one or more low points with drains installed at the low points with a positive gravity discharge point.
- **UNDER DRAIN:** Based on the explorations at the site, we recommend consideration of slab under drains. However, if seepage is observed in the base of the excavation, we recommend that an under slab drain be considered. The need for an under drain should be determined once the excavation is completed.

5.7 Discharge into the Wetlands Areas

We understand that consideration is being given to directing roof and foundation drainage to discharge directly into the wetlands areas using spreaders. While the actual configuration of the spreaders has not been determined, we understand that they would consist of perforated pipes, or gravel-filled trenches. We recommend that the water be directed into the spreader pipe or trench in a tight-lined system, so the water will not recharge the slope areas below the structures. The spreader trenches should be shallow trenches, and avoid concentrated discharge points which could result in erosion and degradation of the slope face. The spreaders should be located as far downslope, and as close to the wetland boundary as possible. Actual location should determined for each lot location.

5.8 Geotechnical Construction Considerations

Most of the perimeter of the site is underlain by fill material, most likely placed on the site during the construction of 111th Avenue Northeast and the Burlington Northern Railroad. In addition, during

our site reconnaissance, we noted the presence of garbage throughout the site. Fill may have also been placed on the site from construction debris during the construction of nearby homes. Informal garbage pits, consisting of household trash may be located on the subject property. The exact boundaries and thickness of the fill are difficult to define, but based on the results of the site reconnaissance, it can be expected that 7 to 8 feet of fill (or more) will be encountered along the portions of the site bordering 111th Avenue Northeast. Lesser thicknesses of fill may be encountered in other areas of the site.

Groundwater was encountered in several of the site explorations, and is at or near the surface in the vicinity of the wetlands. In addition, there is a potential for surface water, as well as springs, from the areas to the south and east of the site. Based on our experience in the general area, we would expect that groundwater may be encountered in any cuts or excavations at this site. Careful control of surface and groundwater will be important for site development, and will be dependent on the actual design elements of the individual building lots.

5.8.1 Construction Drainage

The grading contractors should channel all surface drainage into approved surface water collection systems. Surface water drainage from the site must be controlled during and after construction to avoid erosion and uncontrolled runoff.

In wet areas, where seeps are encountered or where existing drainage swales/ravines will be covered with structural fill, drains consisting of a suitably sized PVC pipe surrounded by clean, free draining gravel and wrapped in filter fabric should be installed and drained by gravity to a positive discharge. Prior to structural fill placement, the geotechnical engineer of record should visit the site to provide recommendations for drain installation.

5.8.2 Erosion Control

Erosion control for the site will include best management practices (BMP's) incorporated in the civil design drawings and may contain the following recommendations:

- Complete the primary site grading during the summer months;
- Limit exposed cut slopes;
- Route surface water through temporary drainage channels around and away from exposed slopes;
- Use silt fences, straw berms, and temporary sedimentation ponds to collect and hold eroded material on the site;
- Seeding or planting vegetation on exposed areas where work is completed and no buildings are proposed; and
- Retaining existing vegetation to the greatest possible extent.

We recommend that the contractor sequence excavations so as to provide constant positive surface drainage for rainwater and any groundwater seepage that may be encountered. This will require grading slopes, constructing temporary ditches, sumps and/or berms.

6.0 USE OF THIS REPORT

This report has been prepared exclusively for the use of DCK, LLC and its consultants for the subject property. We encourage review of this report by bidders and/or contractors as it relates to factual data only. The conclusions and preliminary recommendations presented in this report are based on the explorations and observations completed for this study and conversations regarding the proposed site development, and are not intended, nor should they be construed to represent, a warranty regarding the proposed development, but are forwarded to assist in the planning and design process.

The soil explorations conducted for this investigation were excavated in general accordance with locally accepted geotechnical engineering practice, subject to the time limits and financial and physical constraints applicable to the services for this project, to provide information for the areas explored. There are possible variations in the subsurface conditions between the test locations and variations over time.

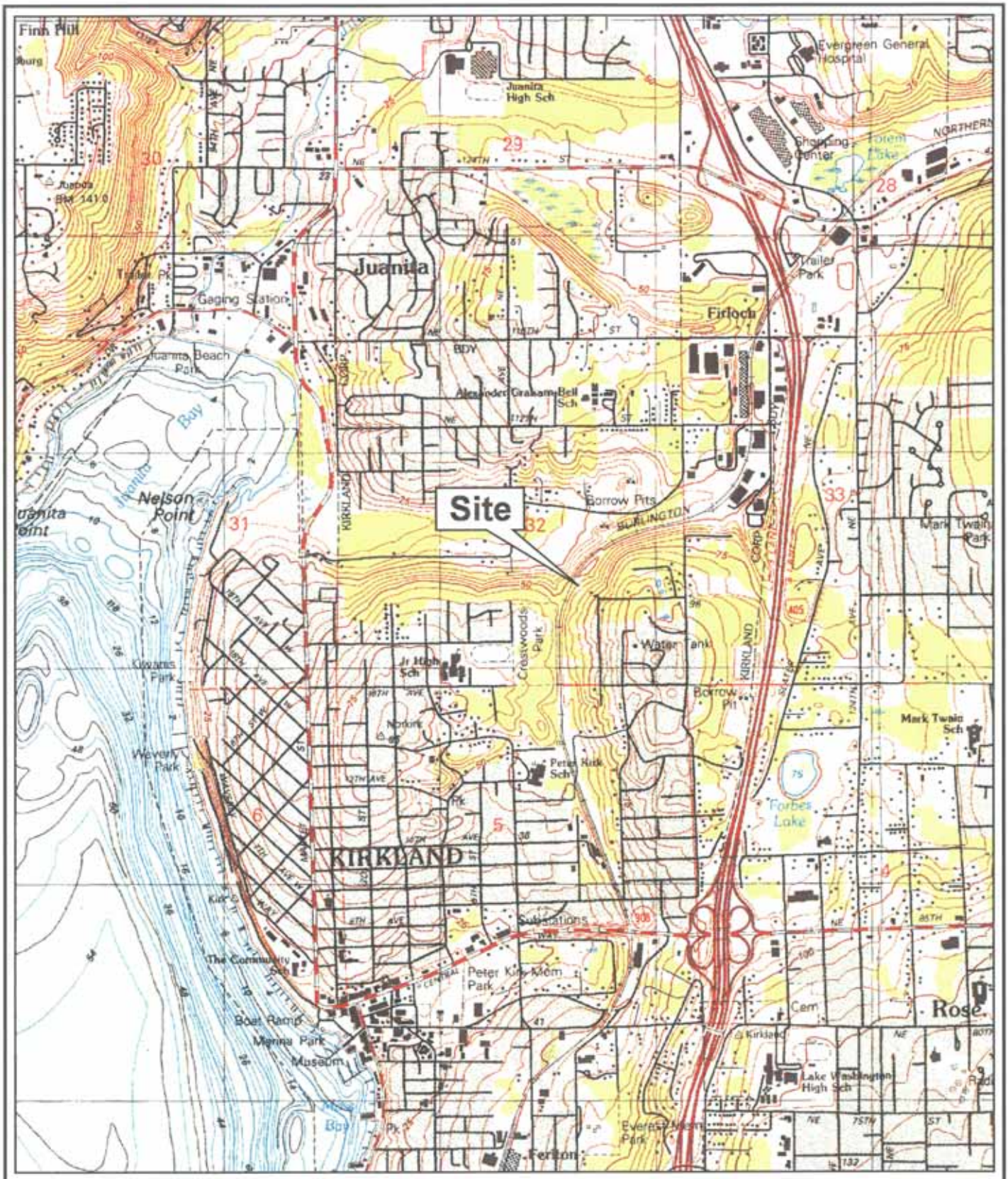
This report has not been prepared to provide geotechnical recommendations for the development of housing on the residential lots. We recommend that a geotechnical investigation be undertaken for each of the residences to be constructed on the property.

Judgment has been applied in interpreting and presenting the results. Variations in subsurface conditions outside the test pit and boring locations are common in glacial environments such as those encountered in the area of Kirkland, Washington. Actual conditions encountered during construction may be different from those observed in the test pits and borings. When the site project plans are finalized, we recommend that we be given the opportunity to review the plans and specifications to verify that they are in accordance with the conditions described in this report.

7.0 REFERENCES

USGS, Geologic Map of the Kirkland Quadrangle, Map MF-1543 (Minard, 1983).

FIGURES



Source: USGS 7.5 Minute Topographic Quadrangle Map, Bellevue North, WA, 1982

FIGURE 1

SITE LOCATION MAP

DCK/10405 111TH AVE SOILS INVEST/WA

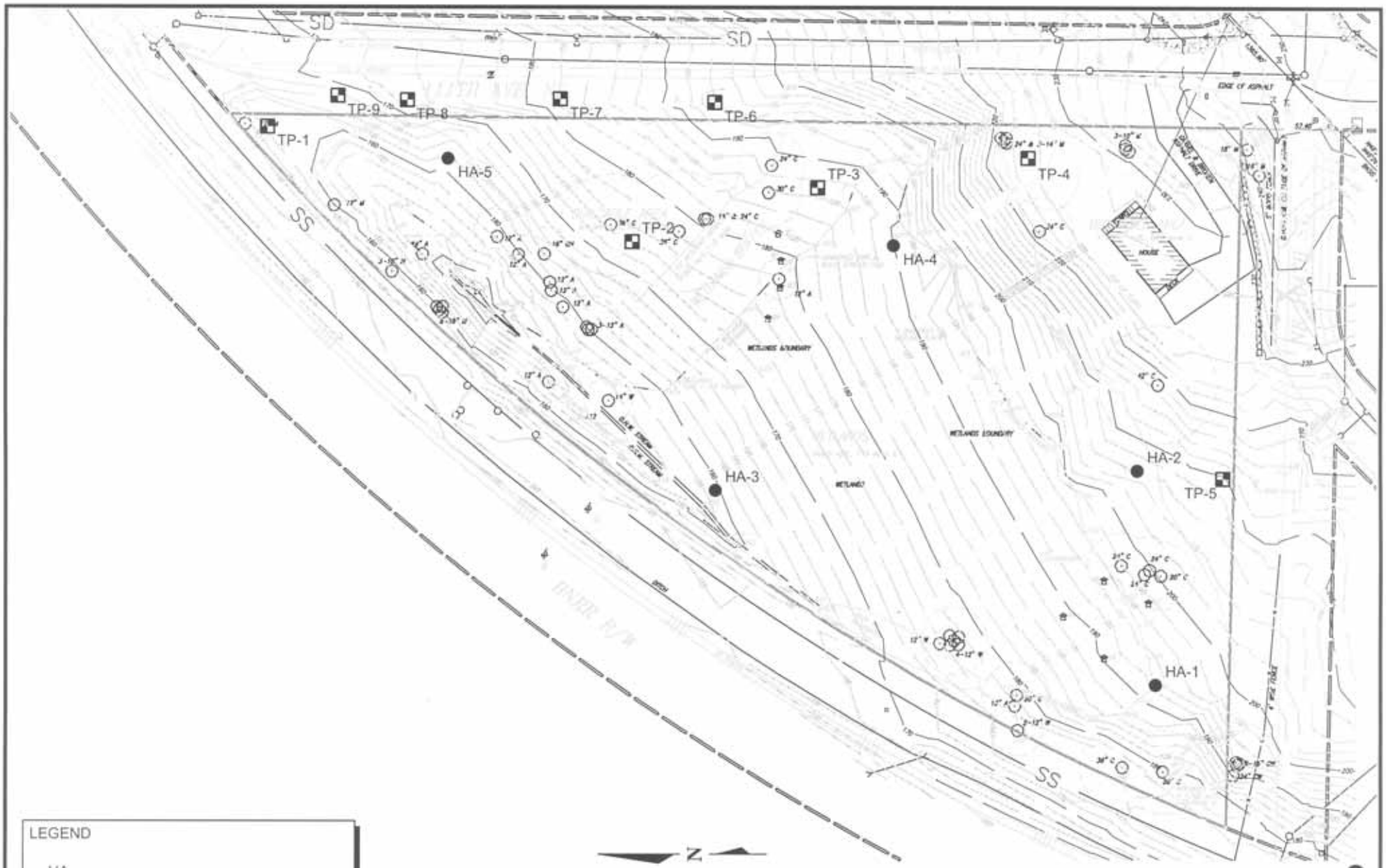


FIGURE 2

SITE PLAN AND EXPLORATION LOCATIONS

DCK/10405 111TH AVE SOILS INVEST/WA

0531672000F01.dwg | Layout: Layout2 | Modified: 02/21/2006, 15:20 | Plotted: 02/21/2006, 16:37

Golder Associates

APPENDIX A

Unified Soil Classification System

Criteria for Assigning Group Symbols and Names			Soil Classification Generalized Group Descriptions	
COARSE-GRAINED SOILS More than 50% retained on No. 200 sieve	GRAVELS More than 50% of coarse fraction retained on No. 4 Sieve	CLEAN GRAVELS Less than 5% fines	GW	Well-graded Gravels
			GP	Poorly-graded gravels
		GRAVELS WITH FINES More than 12% fines	GM	Gravel and Silt Mixtures
			GC	Gravel and Clay Mixtures
	SANDS 50% or more of coarse fraction passes No. 4 Sieve	CLEAN SANDS Less than 5% fines	SW	Well-graded Sands
			SP	Poorly-graded Sands
		SANDS WITH FINES More than 12% fines	SM	Sand and Silt Mixtures
			SC	Sand and Clay Mixtures
FINE-GRAINED SOILS 50% or more passes the No. 200 sieve	SILTS AND CLAYS Liquid limit less than 50	INORGANIC	CL	Low-plasticity Clays
			ML	Non-plastic and Low-Plasticity Silts
		ORGANIC	OL	Non-plastic and Low-Plasticity Organic Clays Non-plastic and Low-Plasticity Organic Silts
	SILTS AND CLAYS Liquid limit greater than 50	INORGANIC	CH	High-plasticity Clays
			MH	High-plasticity Silts
		ORGANIC	OH	High-plasticity Organic Clays High-plasticity Organic Silts
HIGHLY ORGANIC SOILS	Primarily organic matter, dark in color, and organic odor		PT	Peat

Component Definitions by Gradation

Component	Size Range
Boulders	Above 12 in.
Cobbles	3 in. to 12 in.
Gravel	3 in. to No. 4 (4.76mm)
Coarse gravel	3 in. to 3/4 in.
Fine gravel	3/4 in. to No. 4 (4.76mm)
Sand	No. 4 (4.76mm) to No. 200 (0.074mm)
Coarse sand	No. 4 (4.76mm) to No. 10 (2.0mm)
Medium sand	No. 10 (2.0mm) to No. 40 (0.42mm)
Fine sand	No. 40 (0.42mm) to No. 200 (0.074mm)
Silt and Clay	Smaller than No. 200 (0.074mm)

Samples

SS	SPT Sampler (2.0" OD)
HD	Heavy Duty Split Spoon
SH	Shelby Tube
P	Pitcher Sampler
B	Bulk
C	Cored

Unless otherwise noted, drive samples advanced with 140 lb. hammer with 30 in. drop.

Relative Density or Consistency Utilizing Standard Penetration Test Values

Cohesionless Soils [a]			Cohesive Soils [b]		
Density [c]	N, blows/ft. [c]	Relative Density (%)	Consistency	N, blows/ft. [c]	Undrained Shear Strength [d] (psf)
Very loose	0 to 4	0 - 15	Very soft	0 to 2	<250
Loose	4 to 10	15 - 35	Soft	2 to 4	250-500
Compact	10 to 30	35 - 65	Firm	4 to 8	500-1000
Dense	30 to 50	65 - 85	Stiff	8 to 15	1000-2000
Very Dense	over 50	>85	Very Stiff	15 to 30	2000-4000
			Hard	over 30	>4000

(a) Soils consisting of gravel, sand, and silt, either separately or in combination, possessing no characteristics of plasticity, and exhibiting drained behavior.

(b) Soils possessing the characteristics of plasticity, and exhibiting undrained behavior.

(c) Refer to text of ASTM D 1586-84 for a definition of N, in normally consolidated cohesionless soils. Relative Density terms are based on N values corrected for overburden pressures.

(d) Undrained shear strength = 1/2 unconfined compression strength.

Laboratory Tests

Test	Designation
Moisture	(1)
Density	D
Grain Size	G
Hydrometer	H
Atterberg Limits	(1)
Consolidation	C
Unconfined	U
UU Triax	UU
CU Triax	CU
CD Triax	CD
Permeability	P

(1) Moisture and Atterberg Limits plotted on log.

Silt and Clay Descriptions

Description	Typical Unified Designation
Silt	ML (non-plastic)
Clayey Silt	CL-ML (low plasticity)
Silty Clay	CL
Clay	CH
Plastic Silt	MH
Organic Soils	OL, OH, Pt

Descriptive Terminology Denoting Component Proportions

Descriptive Terms	Range of Proportion
Trace	0-5%
Little	5-12%
Some or Adjective [a]	12-30%
And	30-50%

(a) Use Gravelly, Sandy or Silty as appropriate.

Qualitative Descriptive Terminology for Moisture Content

Dry	No discernible moisture present
Damp	Enough moisture present to darken the appearance but no moisture on materials adheres to the hand
Moist	Will moisten the hand
Wet	Visible water present on materials

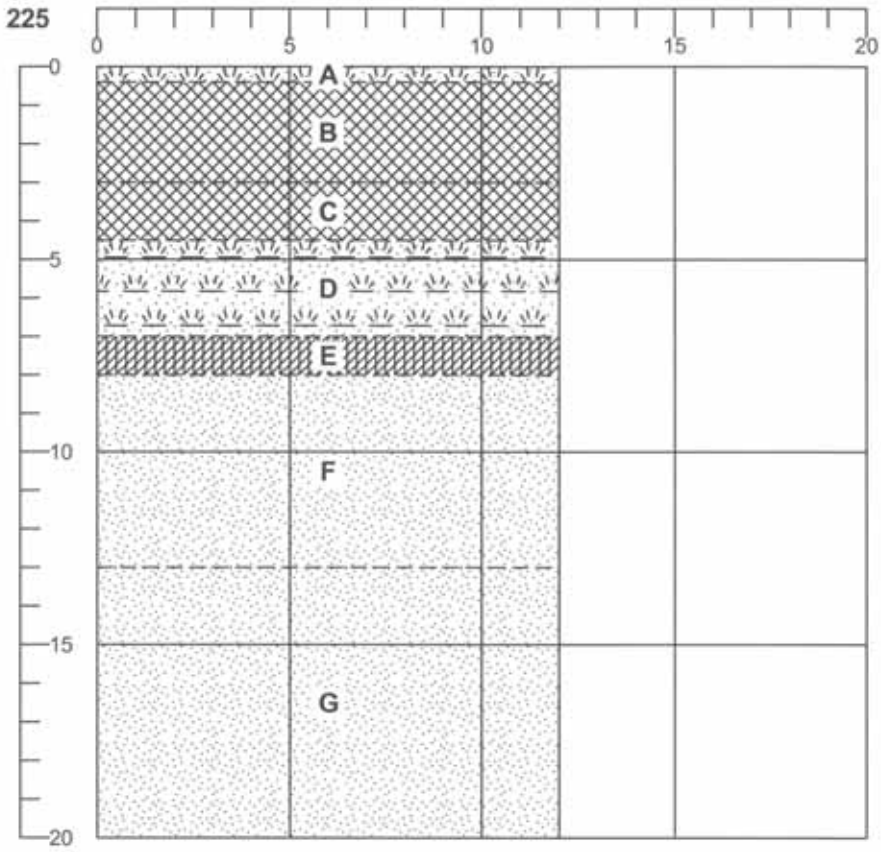
Descriptive Terminology For Soil Cover
Note following soild color description (e.g. 2.5+5/3) denotes color as determined using Munsell Soil Color Charts

SOIL CLASSIFICATION

LOG OF TEST PIT TP-1

Golder Associates

Temp 40 °F Weather Rain | Engineer AMJ/SJW | Operator
Equipment Deere 160LC | Contractor Custom | Date 11/04/05
Elevation 162.0 ft | Datum AMSL | Job 053-1672
Location N End of Property



Bottom of Test Pit at 20.0 ft

SAMPLES		
NO.	DEPTH (ft)	MOISTURE (%)
1	2.0	
2	3.5	
3	7.5	
4	12.0	

LITHOLOGIC DESCRIPTIONS AND EXCAVATION NOTES

A 0.0 - 0.4 ft: Organic silt, some sand and gravel, abundant roots and organic material. (OL) (TOPSOIL)

B 0.4 - 3.0 ft: Compact, yellowish brown, silty fine to coarse SAND, some subrounded to subangular gravel, moist, scattered garbage (plastic, construction debris). (SM) (FILL)

C 3.0 - 4.5 ft: Compact, moderate yellowish brown, fine to coarse SAND, little to some subrounded and faceted gravel, trace silt, moist. (SW) (FILL)

D 4.5 - 7.0 ft: Buried TOPSOIL, logs/woody debris

E 7.0 - 8.0 ft: Thin clayey silt layer, moist (CL-ML).

F 8.0 - 13.0 ft: Compact?, reddish brown, medium to coarse SAND, little fine to coarse subrounded gravel, wet. (SW) (ADVANCE OUTWASH)

G 13.0 - 20.0 ft: Very dense, yellowish orange, bedded, fine SAND, scattered clasts of mottled light olive gray, clayey silt to silty clay, possibly rip-up clasts from underlying Transition Beds. (SP) (ADVANCE OUTWASH).

TIME	DEPTH OF HOLE (ft)	DEPTH TO W/L (ft)	DEPTH TO SEEPAGE (ft)
11:20	0.0		
11:25	4.0		
12:05	20.0		
12:20	0.0		

SPECIAL NOTES:

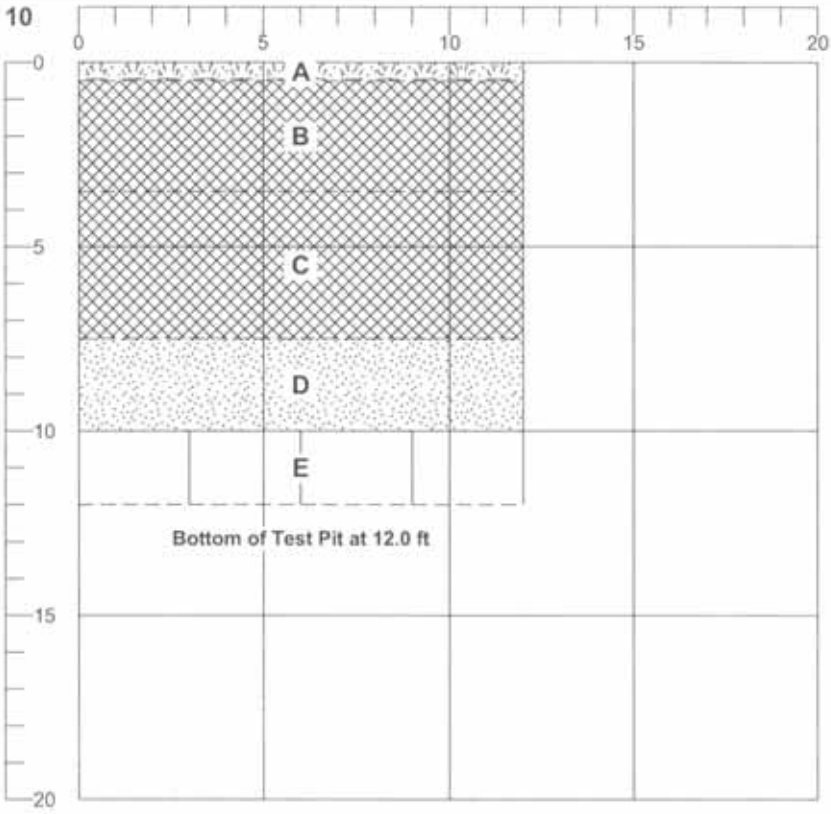
7 ft to 8 ft: Caving
8 ft: Seepage at approximately 3/10 to 4/10 gal/min

LOG OF TEST PIT 053-1672.000 LOG.GPJ GLDR_WA.GDT 1/13/06

LOG OF TEST PIT TP-2

Golder Associates

Temp 40 °F Weather Rain | Engineer AMJ/SJW | Operator
Equipment Deere 160LC | Contractor Custom | Date 11/04/05
Elevation 173.0 ft | Datum AMSL | Job 053-1672
Location Kirkland, WA



SAMPLES		
NO.	DEPTH (ft)	MOISTURE (%)
1	2.0	
2	9.0	
3	10.5	

LITHOLOGIC DESCRIPTIONS AND EXCAVATION NOTES

A 0.0 - 0.5 ft: Sandy SILT TOPSOIL with abundant organic material (roots, leaves, etc.).

B 0.5 - 3.5 ft: Dense to very dense, mottled pale and dark yellowish orange, scattered black organics (charcoal; upper 2 ft), silty SAND, some fine to coarse subangular and faceted gravel, dry. (SM) (FILL)

C 3.5 - 7.5 ft: Dense to very dense, yellowish gray, silty SAND, some fine to coarse subangular and faceted gravel, abrupt color change with overlying material, dry. (SM) (FILL?)

D 7.5 - 10.0 ft: Dense, moderate yellowish brown/light olive gray mottling, non-stratified, medium to coarse SAND, some fine to coarse subrounded gravel, trace to little silt, sloping contact from about 4 to 10 feet with overlying material, buried topsoil at contact, moist to wet. (SW) (OUTWASH)

E 10.0 - 12.0 ft: Hard, medium gray, non-stratified, SILT to CLAYEY SILT, little sand, little socketed fine gravel, moist. (ML) (TRANSITION BEDS)

TIME	DEPTH OF HOLE (ft)	DEPTH TO W/L (ft)	DEPTH TO SEEPAGE (ft)
13:00	0.0		
13:05	4.0		
13:20	12.0		
13:30	0.0		

SPECIAL NOTES:
No seepage observed
Slight caving at borrom

LOG OF TEST PIT 053-1672.000 LOG.GPJ GLDR_WA.GDT 10/30/07

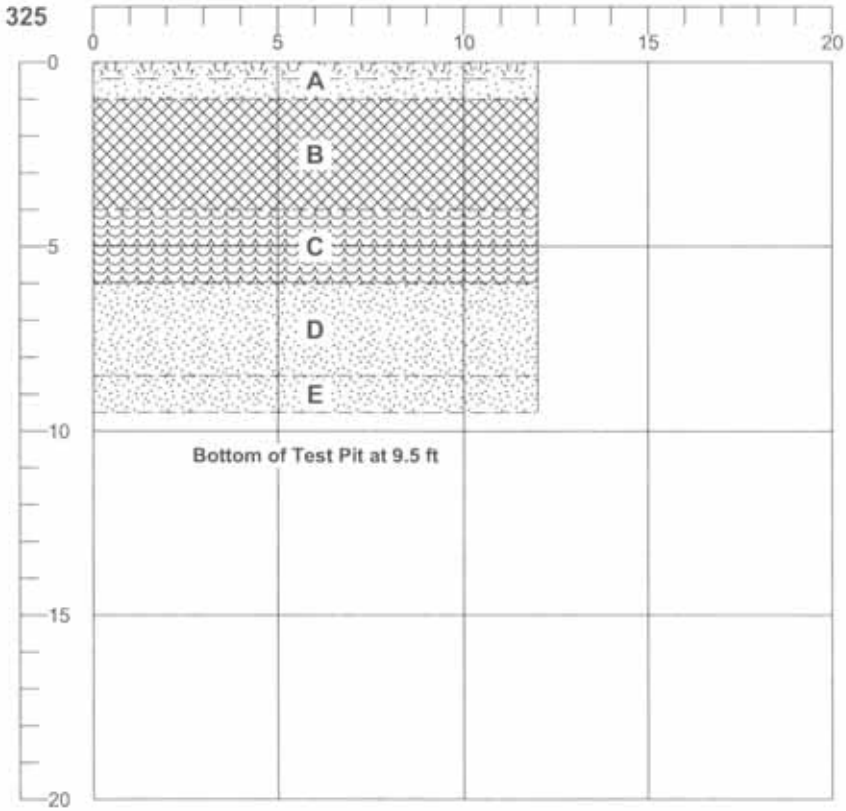
LOG OF TEST PIT TP-3

Golder Associates

Temp 40 °F Weather Rain
Equipment Deere 160LC
Elevation 187.0 ft
Location Kirkland, WA

Engineer AMJ/SJW
Contractor Custom
Datum AMSL

Operator
Date 11/04/05
Job 053-1672



SAMPLES		
NO.	DEPTH (ft)	MOISTURE (%)
1	5.0	
2	7.0	
3	9.0	

LITHOLOGIC DESCRIPTIONS AND EXCAVATION NOTES

A 0.0 - 1.0 ft: Sandy TOPSOIL

B 1.0 - 4.0 ft: Loose, mottled moderate yellowish brown to olive gray, fine to coarse SAND, some fine to coarse subangular to subrounded gravel, wet, organics (roots, stump). (SW) (FILL)

C 4.0 - 6.0 ft: Soft, medium dark gray, non-stratified, organic SILT, organic odor, organic material (roots), wet. (OH)

D 6.0 - 8.5 ft: Compact (?), medium gray, medium to coarse SAND, some fine to coarse subangular to subrounded gravel, trace silt, wet. (SW) (ADVANCE OUTWASH)

E 8.5 - 9.5 ft: Dense (?), mottled yellowish orange and dark yellowish orange, crudely stratified, fine SAND, trace to little silt, wet. (SP) (ADVANCE OUTWASH)

TIME	DEPTH OF HOLE (ft)	DEPTH TO W/L (ft)	DEPTH TO SEEPAGE (ft)
14:00	0.0		
14:05	4.0		
14:20	9.5		
14:30	0.0		

SPECIAL NOTES:

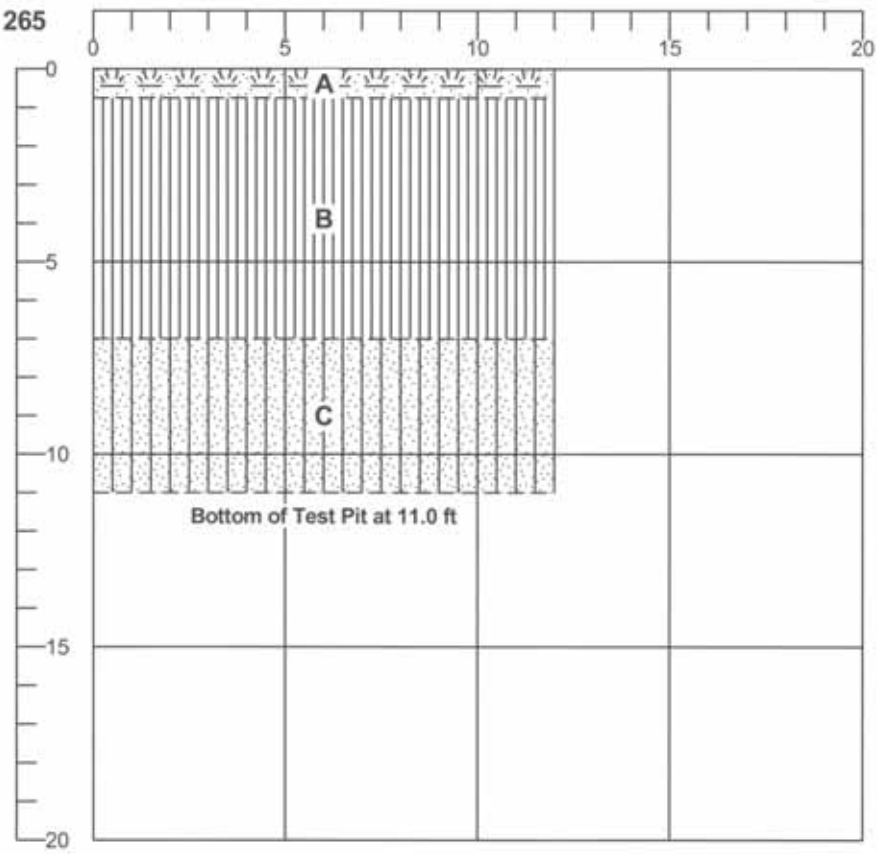
1.5 ft: Seepage at approximately 1/10 to 2/10 gal/min
2 ft: Caving
6 ft to 8.5 ft: Caving in sand and gravel layer
Hole abandoned because of excessive caving

LOG OF TEST PIT 053-1672.000 LOG.GPJ GLDR_WA.GDT 10/30/07

LOG OF TEST PIT TP-4

Golder Associates

Temp 40 °F Weather Cloudy | Engineer AMJ/SJW | Operator
Equipment Deere 160LC | Contractor Custom | Date 11/04/05
Elevation 224.0 ft | Datum AMSL | Job 053-1672
Location Near House



SAMPLES		
NO.	DEPTH (ft)	MOISTURE (%)
1	3.5	
2	8.0	

LITHOLOGIC DESCRIPTIONS AND EXCAVATION NOTES

A 0.0 - 0.8 ft: Sandy TOPSOIL

B 0.8 - 7.0 ft: Hard, mottled pale orange/light gray/dark yellowish orange, nonstratified but with "blocky" structure composed of faceted defined prisms, SILT, damp. (ML/SP) (GLACIOLACUSTRINE DEPOSIT)

C 7.0 - 11.0 ft: Dense, medium gray, nonstratified, silty fine SAND, organic odor, damp. (SM) (GLACIOLACUSTRINE DEPOSIT)

TIME	DEPTH OF HOLE (ft)	DEPTH TO W/L (ft)	DEPTH TO SEEPAGE (ft)
16:32	0.0		
16:35	4.0		
16:40	11.0		
16:55	0.0		

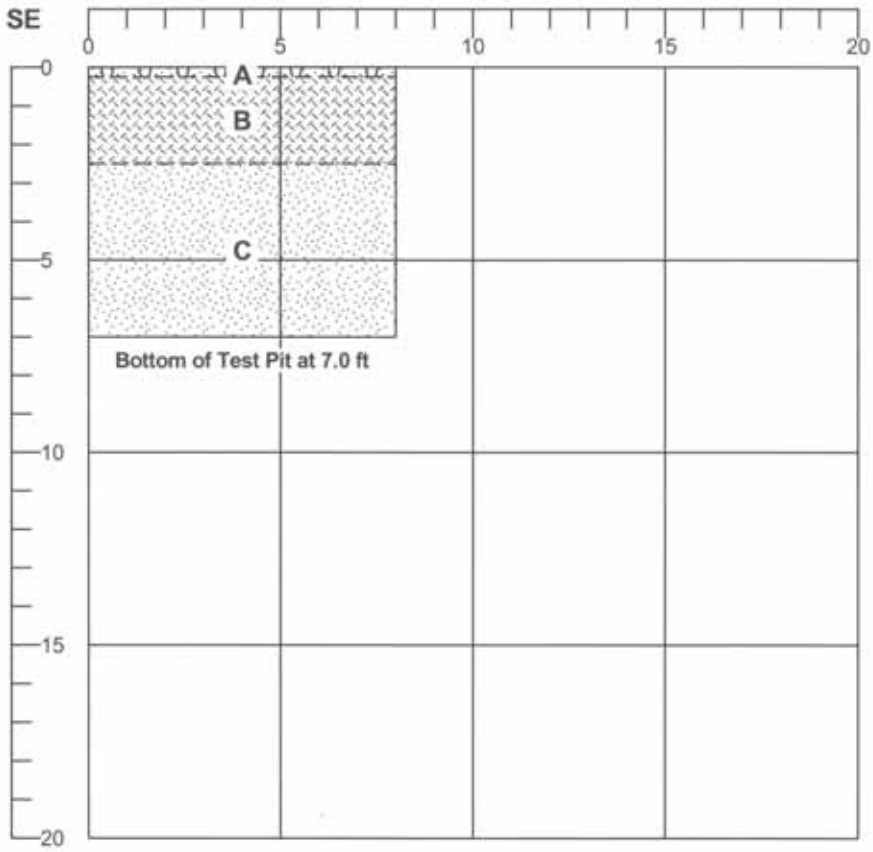
SPECIAL NOTES:

No seepage observed
No caving observed

LOG OF TEST PIT 053-1672.000 LOG.GPJ GLDR_WA.GDT 1/13/06

LOG OF TEST PIT TP-5

Temp 42 °F Weather Cloudy | Engineer C. Allen | Operator Pat
Equipment Komatsu WB 140 | Contractor Kelly's Excavating | Date 12/05/05
Elevation ~210 | Datum AMSL | Job 053-1672
Location S End of Property



SAMPLES		
NO.	DEPTH (ft)	MOISTURE (%)
1	1.5	
2	4.0	

LITHOLOGIC DESCRIPTIONS AND EXCAVATION NOTES

A 0.0 - 0.3 ft: Loose, brown to dark brown, nonstratified, SILT and ORGANICS, trace gravel, moist. (TOPSOIL) (OL)

B 0.3 - 2.5 ft: Loose to compact, yellowish brown, nonstratified, SILT, little fine to coarse sand, trace gravel, trace organics (roots), damp to moist. (COLLUVIUM) (ML)

C 2.5 - 7.0 ft: Dense to very dense, yellowish brown to olive gray, horizontally stratified and interbedded, fine to coarse SAND, trace to little gravel, trace to little silt, and SILT, trace sand, trace gravel, damp. (ADVANCE OUTWASH) (SW-ML)

TIME	DEPTH OF HOLE (ft)	DEPTH TO W/L (ft)	DEPTH TO SEEPAGE (ft)
09:50	0.0		
09:52	4.0		
10:10	7.0		

SPECIAL NOTES:

No seepage observed.
No caving observed.

T-probe penetration
@1ft. - 12 in. pen.
@2ft. - 1 in. pen.
@3ft. - 2 in. pen.
@4ft. - <1 in. pen.

Checked: D. West 12/6/05

LOG OF TEST PIT 053-1672.000 LOG.GPJ GLDR_WA.GDT 1/13/06

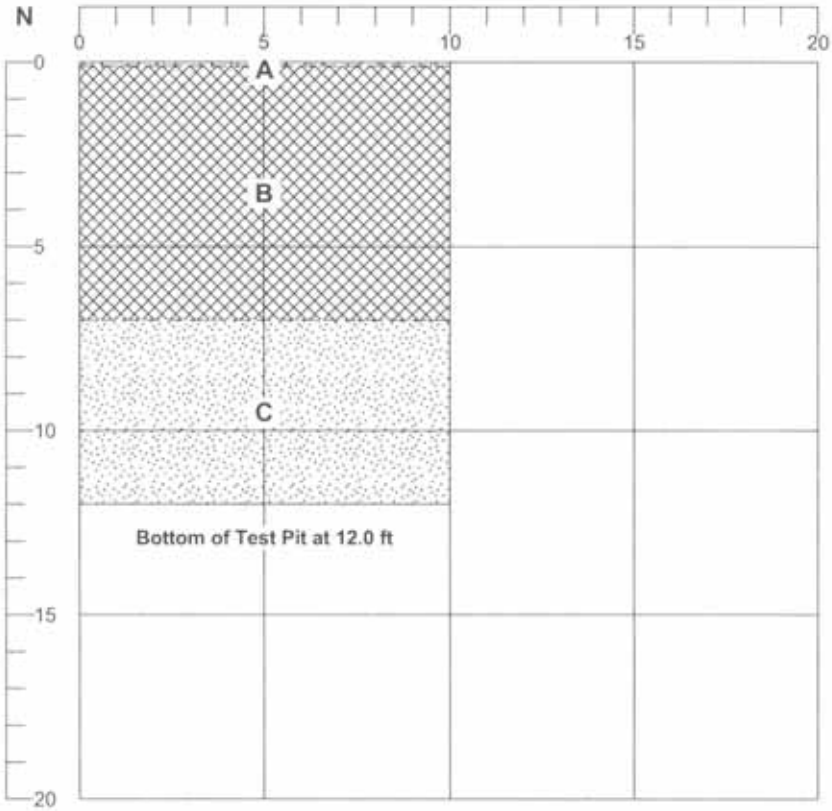
LOG OF TEST PIT TP-6

Golder Associates

Temp 42 °F Weather Cloudy
Equipment Komatsu WB 140
Elevation ~194
Location Kirkland, WA

Engineer C. Allen
Contractor Kelly's Excavating
Datum AMSL

Operator Pat
Date 12/05/05
Job 053-1672



SAMPLES		
NO.	DEPTH (ft)	MOISTURE (%)
1	2.0	
2	7.5	

LITHOLOGIC DESCRIPTIONS AND EXCAVATION NOTES

A 0.0 - 0.1 ft: SOD/TOPSOIL

B 0.1 - 7.0 ft: Loose to compact, brown to olive brown to orangish brown, mottled, SILT, little fine to coarse sand, little gravel, trace angular cobbles (quarry spalls), trace organics (sticks, wood chips, logs to 8 inch diameter and roots), moist. (FILL) (ML)

C 7.0 - 12.0 ft: Compact, orangish brown to gray, nonstratified, fine to coarse SAND, little gravel, little silt, interbedded with SILT, trace sand, trace organics and fine to medium SAND, trace silt, moist. (SW-SP-ML) (ADVANCE OUTWASH)

TIME	DEPTH OF HOLE (ft)	DEPTH TO W/L (ft)	DEPTH TO SEEPAGE (ft)
10:36	0.0		
10:40	4.0		
10:57	12.0		

SPECIAL NOTES:

Minor seepage observed <<1 gallon per minute.
No caving observed.

T-probe penetration
@1ft. - 12 in. pen.
@2ft. - 5 in. pen.
@3ft. - 12 in. pen.
@4ft. - 18 in. pen.

Checked: D. West 12/6/05

LOG OF TEST PIT 053-1672.000 LOG.GPJ GLDR_WA.GDT 10/30/07

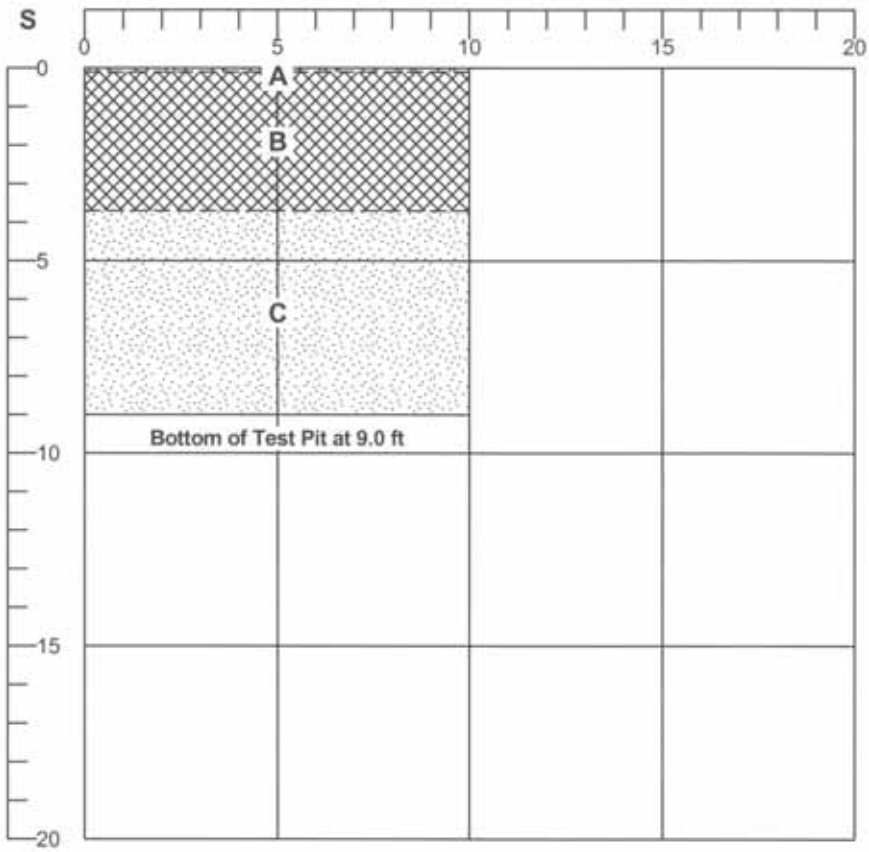
LOG OF TEST PIT TP-7

Golder Associates

Temp 41 °F Weather Cloudy
Equipment Komatsu WB 140
Elevation ~182
Location ROW on 111th Ave. NE

Engineer C. Allen
Contractor Kelly's Excavating
Datum AMSL

Operator Pat
Date 12/05/05
Job 053-1672



SAMPLES		
NO.	DEPTH (ft)	MOISTURE (%)
1	2.0	
2	4.0	

LITHOLOGIC DESCRIPTIONS AND EXCAVATION NOTES

A 0.0 - 0.1 ft: SOD/TOPSOIL

B 0.1 - 3.7 ft: Compact to dense, brown to dark brown to orangish brown to gray, mottled, nonstratified, fine to coarse SAND, some gravel, little to some silt, trace organics (sticks and roots), trace cobbles, trace construction debris (bottles), moist. (FILL)

C 3.7 - 9.0 ft: Compact to dense, gray, faintly horizontally stratified, fine SAND, trace silt, trace organics and olive gray fine sandy SILT, trace organics, moist, lens of fine to coarse sand @ 6.5 feet. (OUTWASH)

TIME	DEPTH OF HOLE (ft)	DEPTH TO W/L (ft)	DEPTH TO SEEPAGE (ft)
11:01	0.0		
11:04	4.0		
11:19	9.0		

SPECIAL NOTES:

No seepage observed.
No caving observed.

T-probe penetration
@1ft. - 3 to 6 in. pen.
@2ft. - 3 to 6 in. pen.
@3ft. - 3 to 6 in. pen.
@4ft. - 3 to 4 in. pen.

Checked: D. West 12/6/05

LOG OF TEST PIT 053-1672.000 LOG.GPJ GLDR_WA.GDT 1/13/06

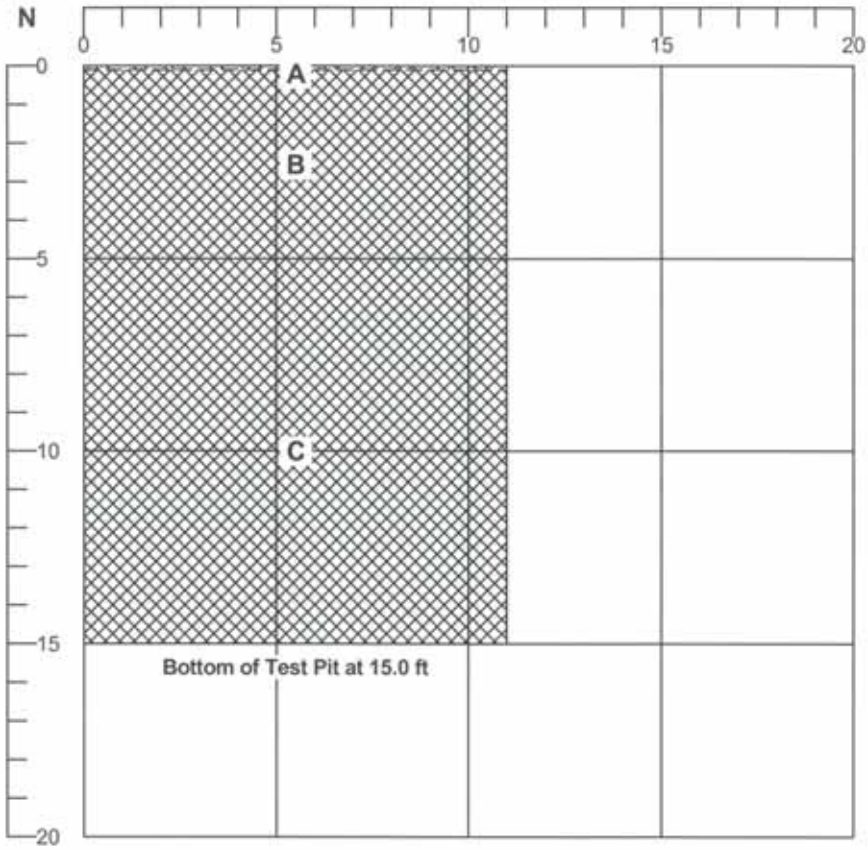
LOG OF TEST PIT TP-8

Golder Associates

Temp 40 °F Weather Cloudy
Equipment Komatsu WB 140
Elevation ~172
Location ROW on 111th Ave. NE

Engineer C. Allen
Contractor Kelly's Excavating
Datum AMSL

Operator Pat
Date 12/05/05
Job 053-1672



SAMPLES		
NO.	DEPTH (ft)	MOISTURE (%)
1	3.0	
2	15.0	

LITHOLOGIC DESCRIPTIONS AND EXCAVATION NOTES

A 0.0 - 0.1 ft: SOD/TOPSOIL

B 0.1 - 5.0 ft: Loose to compact, brown to olive brown to gray, mottled, nonstratified, silty fine to coarse SAND, some gravel, little angular cobbles (quarry spalls), trace wood, trace pea gravel, moist. (FILL) (SM)

C 5.0 - 15.0 ft: Loose to compact, gray, nonstratified, fine to coarse SAND, some silty clay, little organics (sticks, logs to 10 inch diameter), little gravel in zones, moist. (POSSIBLE FILL?) (SW-SM)

TIME	DEPTH OF HOLE (ft)	DEPTH TO W/L (ft)	DEPTH TO SEEPAGE (ft)
11:22	0.0		
11:29	4.0		
11:50	15.0		

SPECIAL NOTES:

Seepage observed from 4 feet to 13 feet <<1 gallon per minute.
Major caving of sidewalls from groundsurface to 7 feet.

T-probe penetration
@1ft. - 4 in. pen.
@2ft. - 8 in. pen.
@3ft. - 4 in. pen.
@4ft. - 9 in. pen.

Checked: D. West 12/6/05

LOG OF TEST PIT 053-1672.000 LOG.GPJ GLDR_WA.GDT 1/13/06

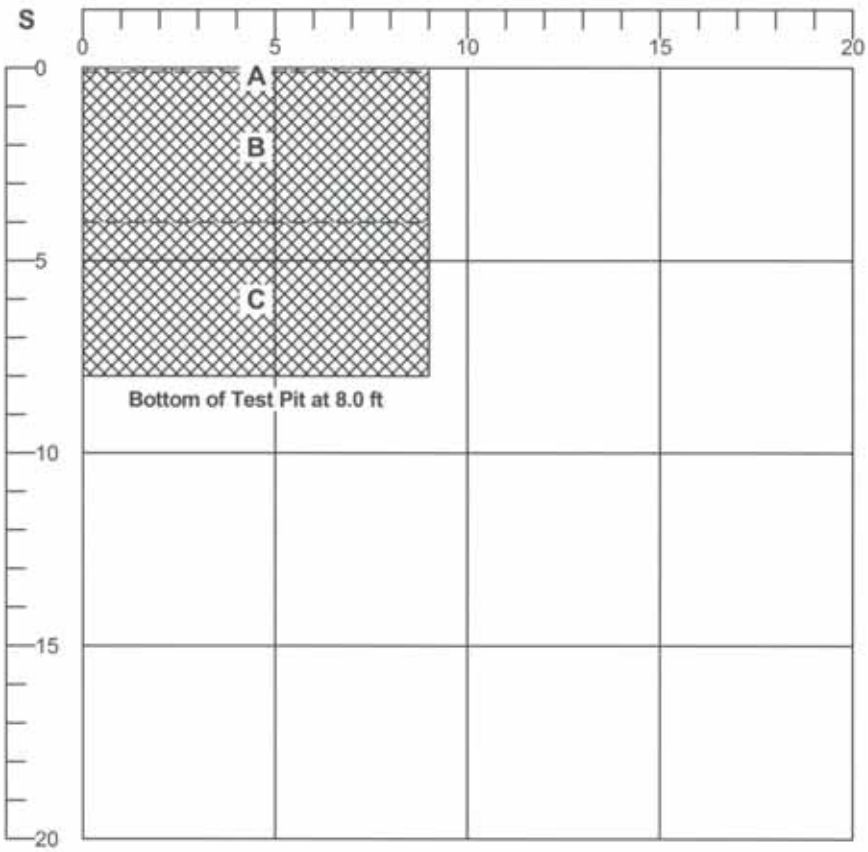
LOG OF TEST PIT TP-9

Golder Associates

Temp 40 °F Weather Cloudy
Equipment Komatsu WB 140
Elevation ~167
Location ROW on 111th Ave. NE

Engineer C. Allen
Contractor Kelly's Excavating
Datum AMSL

Operator Pat
Date 12/05/05
Job 053-1672



SAMPLES		
NO.	DEPTH (ft)	MOISTURE (%)
1	3.0	
2	7.0	

LITHOLOGIC DESCRIPTIONS AND EXCAVATION NOTES

A 0.0 - 0.1 ft: SOD/TOPSOIL

B 0.1 - 4.0 ft: Loose to compact, brown to olive brown to gray, mottled, nonstratified, fine to coarse SAND, some silt, little to some gravel, trace angular cobbles (quarry spalls), trace organics, trace construction debris (concrete and asphalt), moist to wet. (FILL) (SM)

C 4.0 - 8.0 ft: Loose to compact, gray to brownish gray, nonstratified, fine to coarse SAND, some silt, little to some gravel, trace cobbles, trace organics, moist to wet. (FILL) (SM)

TIME	DEPTH OF HOLE (ft)	DEPTH TO W/L (ft)	DEPTH TO SEEPAGE (ft)
11:55	0.0		
12:04	8.0		

SPECIAL NOTES:

Seepage observed at 2 feet associated with exposed 4 inch diameter perforated pipe on eastern sidewall of test pit.
Major caving of sidewalls observed from groundsurface to bottom of test pit.

T-probe penetration
@1ft. - 8 in. pen.
@2ft. - 12 in. pen.
@3ft. - 6 in. pen.
@4ft. - 2.5 ft. pen.
Checked: D. West 12/6/05

LOG OF TEST PIT 053-1672.000 LOG.GPJ GLDR_WA.GDT 1/13/06

RECORD OF BOREHOLE HA-1

SHEET 1 of 1

PROJECT: Davidson Geotech Invest.
PROJECT NUMBER: 053-1672.000
LOCATION: S End of Property

DRILLING METHOD: Hand Auger
DRILLING DATE: Nov 7, 2005
DRILL RIG:

DATUM: AMSL
AZIMUTH: N/A
COORDINATES: not surveyed

ELEVATION: 192
INCLINATION: -90

DEPTH (ft)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ■ (10 20 30 40) / WATER CONTENT (PERCENT) W_p — W — W_l	NOTES WATER LEVELS
0	Hand Auger	0.0 - 0.8 organic SILT TOPSOIL (leaves, roots, organic silt)	OH		191.3							Water level at 0.5' ATD
		0.8 - 1.5 Compact, mottled, silty SAND, some fine gravel, wet. (SM) (FILL/COLLUVIUM)	SM		0.8 190.5							
		1.5 - 2.5 Compact to dense, medium gray, fine SAND, little to some sub-rounded gravel, little silt, moist. (SP-SM) (FILL/COLLUVIUM)	SP-SM		1.5 189.5							
		2.5 - 2.8 Soft, brown, sandy PEAT, wet. (PT)	PT		2.5 189.2	1	GRAB					
		2.8 - 5.0 Compact to dense, medium gray/dark yellowish orange, bedded?, fine to coarse SAND, little fine to coarse sub-rounded gravel, trace to little silt, wet. (SW-SW) (ADVANCE OUTWASH)	SP-SM		2.8	2	GRAB					
5		Boring completed at 5.0 ft.			187.0 5.0							
10												

1 in to 1 ft
DRILLING CONTRACTOR:
DRILLER:

LOGGED: A. McKenzie-Johnson
CHECKED: Dave Findley
DATE: 11/9/2005

Golder Associates

BOREHOLE RECORD 053-1672.000HAND AUGER LOGS.GPJ GLDR_WA.GDT 11/10/05

RECORD OF BOREHOLE HA-2

SHEET 1 of 1

PROJECT: Davidson Geotech Invest
PROJECT NUMBER: 053-1672.000
LOCATION: S End of Property

DRILLING METHOD: Hand Auger
DRILLING DATE: Nov 7, 2005
DRILL RIG:

DATUM: AMSL
AZIMUTH: N/A
COORDINATES: not surveyed

ELEVATION: 206
INCLINATION: -90

DEPTH (ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ■ (10 20 30 40) / WATER CONTENT (PERCENT) W_p — W — W_l	NOTES WATER LEVELS
0	Hand Auger	0.0 - 0.2 Forest duff			205.8							
		0.2 - 1.0 Loose, mottled, silty SAND, some sub-angular to sub-rounded gravel, gravel is faceted, moist. (SM) (COLLUVIUM)	SM		0.2 205.0							
		1.0 - 4.0 Dense to very dense, pale yellowish orange with faint mottling, SILT, some fine sand, moist. (ML) (ADVANCE OUTWASH)	ML		1.0 202.0	1	GRAB					No water observed ATD
		4.0 - 5.0 Dense to very dense, pale yellowish orange with faint mottling, fine to coarse SAND, little fine gravel, little silt. (SW-SM) (ADVANCE OUTWASH)	SW-SM		4.0 201.0							
5		Boring completed at 5.0 ft.			5.0							
10												

1 in to 1 ft
DRILLING CONTRACTOR:
DRILLER:

LOGGED: A. McKenzie-Johnson
CHECKED: Dave Findley
DATE: 11/9/2005

Golder Associates

BOREHOLE RECORD 053-1672.000HAND AUGER LOGS.GPJ GLDR_WA.GDT 11/10/05

RECORD OF BOREHOLE HA-3

SHEET 1 of 1

PROJECT: Davidson Geotech Invest.
PROJECT NUMBER: 053-1672.000
LOCATION: W Wetland

DRILLING METHOD: Hand Auger
DRILLING DATE: Nov 8, 2005
DRILL RIG:

DATUM: AMSL
AZIMUTH: N/A
COORDINATES: not surveyed

ELEVATION: 159
INCLINATION: -90

DEPTH (ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ■ (10 20 30 40) / WATER CONTENT (PERCENT) W_p — W — W_l	NOTES WATER LEVELS
0	Hand Auger	0.0 - 1.2 Soft, brownish-black, sandy organic SILT, wet. (OH) (WETLAND DEPOSIT)	OH		157.8							Water level at surface ATD
		1.2 - 5.0 Stiff to very stiff, mottled light olive gray/pale yellowish orange/medium gray, bedded?, CLAYEY SILT to SILTY CLAY, little fine to coarse sand, wet. (CL-ML/CL) (TRANSITION BEDS)	CL		1.2	1	GRAB					
5		Boring completed at 5.0 ft.			154.0 5.0							
10												

1 in to 1 ft
DRILLING CONTRACTOR:
DRILLER:

LOGGED: A. McKenzie-Johnson
CHECKED: Dave Findley
DATE: 11/9/2005

Golder Associates

BOREHOLE RECORD 053-1672.000HAND AUGER LOGS.GPJ GLDR_WA.GDT 11/10/05

RECORD OF BOREHOLE HA-4

SHEET 1 of 1

PROJECT: Davidson Geotech Invest.
PROJECT NUMBER: 053-1672.000
LOCATION: SE Wetland

DRILLING METHOD: Hand Auger
DRILLING DATE: Nov 8, 2005
DRILL RIG:

DATUM: AMSL
AZIMUTH: N/A
COORDINATES: not surveyed

ELEVATION: 190
INCLINATION: -90

DEPTH (ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ■ (10 20 30 40) WATER CONTENT (PERCENT) w_p — w — w_l	NOTES WATER LEVELS
0	Hand Auger	0.0 - 0.5 Organic TOPSOIL	OH		189.5							
		0.5 - 4.0 Compact?, pale yellowish orange, fine to coarse SAND (more toward medium to coarse), little to some silt, little fine sub-rounded gravel, wet. (SW-SM) (ADVANCE OUTWASH)	SW-SM		0.5	1	GRAB					Water level at 0.5' ATD
		Boring completed at 4.0 ft.			186.0 4.0							
5												
10												

1 in to 1 ft
DRILLING CONTRACTOR:
DRILLER:

LOGGED: A. McKenzie-Johnson
CHECKED: Dave Findley
DATE: 11/9/2005

Golder Associates

BOREHOLE RECORD 053-1672.000HAND AUGER LOGS.GPJ GLDR_WA.GDT 11/10/05

RECORD OF BOREHOLE HA-5

SHEET 1 of 1

PROJECT: Davidson Geotech Invest
PROJECT NUMBER: 053-1672.000
LOCATION: NE End of Property

DRILLING METHOD: Hand Auger
DRILLING DATE: Nov 8, 2005
DRILL RIG:

DATUM: AMSL
AZIMUTH: N/A
COORDINATES: not surveyed

ELEVATION: 161
INCLINATION: -90

DEPTH (ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer, 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ■ (10 20 30 40) / WATER CONTENT (PERCENT) W_p ⊢ W ⊣ W_l	NOTES WATER LEVELS
0	Hand Auger	0.0 - 1.0 Sandy organic TOPSOIL	OH		160.0							
		1.0 - 3.5 Dense?, pale yellowish orange, medium to coarse SAND, some fine to coarse sub-rounded to sub-angular gravel, trace silt, moist (wet at 3'). (SW) (ADVANCE OUTWASH/FILL)	SW		1.0 157.5	1	GRAB					Wet at 3' ATD ▼
5		3.5 - 6.0 Stiff to very stiff, medium gray with yellowish orange mottling, CLAYEY SILT to SILTY CLAY, moist to wet. (CL/CL-ML) (TRANSITION BEDS)	CL		3.5							
		Boring completed at 6.0 ft.			155.0 6.0	2	GRAB					
10												

1 in to 1 ft
DRILLING CONTRACTOR:
DRILLER:

LOGGED: A. McKenzie-Johnson
CHECKED: Dave Findley
DATE: 11/9/2005

Golder Associates

BOREHOLE RECORD 053-1672.000HAND AUGER LOGS.GPJ GLDR_WA.GDT 11/10/05

THE WATERSHED COMPANY
SCIENCE & DESIGN

April 7, 2008

Lauri Anderson
City of Kirkland Planning
123 – 5th Avenue
Kirkland, WA 98033

Re: Highland Glen Short Plat (Formerly Davidson Property) March 2008 submittal
TWC # 040622.76

Dear Lauri:

Thank you for the opportunity to review the Critical Areas and Conceptual Mitigation Report and plans for the Highland Glen Short Plat prepared by Talasaea Consultants, Inc., revised date: March 20, 2008.

Findings

I have some concerns about the suitability of the westernmost wetland creation area. This area is located near the southwestern property corner, adjacent to the sewer and railroad corridors. Roughly the lower half of the proposed wetland creation area lies on an oversteepened bank that was likely cut during the installation of the sewer line. The oversteepened section is approximately 10 to 15 feet high. Unfortunately, the topographic survey is not detailed enough to show this bank. This area is much steeper than the 2:1 conceptual cross section slope shown on the plans. This slope actually approaches vertical in some areas. This is steeper than the angle of repose, however the bank appears to be stable due to dense vegetation, including large cottonwood trees. I am concerned that it is not possible to modify such a slope to become wetland without significant clearing and earthwork. Such reworking of the area may be prohibitively expensive and would likely cause unacceptable damage to the adjoining wetland and buffers.

It may be possible to shift some of the creation area to the south without increasing the buffer on the neighboring property. Since the neighboring property is a right of way it is possible that if additional mitigation area is needed, the city could allow additional buffer to extend into that area. However, the city would need to provide authorization, or permission to shift buffer into the right of way. Any redesign would need to be supported by a more detailed field survey of this area, including potentially affected trees.

The roof/footing drain line that supplies wetland hydrology to the westernmost creation area cuts directly through wetland and wetland buffer. However, there is no provision for restoring the temporary impacts of its placement. I assume that a corridor at least 10 feet wide will need to be cleared for this line. Finally, the line should be routed to avoid trees and other desirable native vegetation to the maximum extent practicable.

Several plant species are proposed that are not suitable to mitigation sites. The following plants should be removed from the plan: Shore pine (rarely found in western King County), high bush

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cranberry (not found in western King County), and evergreen huckleberry (rarely performs well and is not found east of Puget Sound).

Finally, many of the trees proposed are specified in two sizes: 2-gallon containers and ball and burlap (B&B). We have found that the larger B&B trees do not perform as well as the smaller container stock. These should be substituted for the smaller stock.

Please call with any questions.

Sincerely,

Hugh Mortensen, PWS

Ecologist

----- Original Message -----
From: Hugh Mortensen
To: LWANDERSON4@MSN.COM
Sent: Wednesday, April 30, 2008 2:46 PM
Subject: Davidson (Highland Glen)

Lauri:

I have completed my review of the latest revised submittal for this project. The submittal included a cover letter and transmittal from Talasaea Consultants, both dated April 22, 2008, and full size and letter size copies of the proposed site plan and conceptual mitigation plan and the conceptual wetland mitigation plan and conceptual planting plan.

The revised submittal adequately addresses the comments relayed in my April 7, 2008 review letter.

Please let me know if you need anything further on this project.

-**HUGH MORTENSEN; PWS**

Senior Ecologist

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