IPEC
Inland Pacific Engineering Company
Geotechnical Engineering and Consulting

July 23, 2015
Project No. 2013-026A

NAI Black
c/o Mr. Bryan Walker
107 South Howard
Suite 500
Spokane, WA 99201

Re: **Geotechnical Evaluation Phase 2**
Painted Hills Golf Course Property
4403 South Dishman-Mica Road
Spokane Valley, WA

Dear Mr. Walker:

As you authorized, we have completed the Phase 2 geotechnical evaluation for the Painted Hills Golf Course property at the above-referenced site in Spokane Valley, Washington. The purpose of the Phase 2 evaluation is to assess subsurface soil and groundwater conditions to assist your civil engineer, Whipple Consulting Engineers, Inc. (WCE) in evaluating stormwater management alternatives relative to potential future development. This report summarizes the results of our field investigation, laboratory testing, engineering analyses, and our opinions and recommendations for stormwater management.

PROJECT DESCRIPTION

We understand that the proposed project may consist of a residential development. The site consists of 91 acres currently developed as a golf course. We have assumed that stormwater runoff will be treated using drywells and/or gravel galleries for subsurface infiltration. This Phase 2 evaluation is intended to identify areas where subsurface infiltration of stormwater may be feasible due to the presence of suitable soils at depth.

AVAILABLE INFORMATION

We were provided a topographic survey for the project site by WCE. This topographic survey showed the existing roadways, existing structures, property lines, and existing ground surface elevation contours. This plan was prepared by WCE and was dated November 7, 2013. The site was used as a golf course prior to our evaluation. The site is relatively level with some elevated golf greens and excavated areas for water hazards. The site is primarily grass-covered with scattered trees along the fairways and pine trees in the undeveloped area to the northwest. The clubhouse building is present at the southwest corner.

In addition, we performed a preliminary geotechnical evaluation for the property in December 2013. The results of that evaluation, along with our opinions and recommendations, are summarized in our Preliminary Geotechnical Evaluation dated December 31, 2013.

We also performed a geotechnical evaluation for certification of the existing levee along Chester Creek in April 2014. The results of that evaluation are summarized in our Geotechnical Evaluation dated February 12, 2015.

FIELD EVALUATION

Procedures

A geotechnical engineer from Inland Pacific Engineering Company (IPEC) observed the drilling of 10 penetration test borings at the site. The borings were drilled between July 1 and 13, 2015 using a truck-mounted drill operated by an independent firm working under subcontract to IPEC. A geotechnical engineer from IPEC observed the borings and logged the surface and subsurface conditions. After we logged the borings, they were abandoned in accordance with state requirements. Ground surface elevations at the borings were provided by WCE.

The soils encountered in the borings were visually and manually classified in the field by our field personnel in accordance with ASTM D 2488, “Description and Identification of Soils (Visual-Manual Procedures)”. The samples were returned to our facility for review of the classification by a geotechnical engineer and laboratory testing.

Soils Encountered

In general, the borings encountered 1 to 3 feet of topsoil at the surface. However, Borings B-4 and B-5 encountered “possible fill” in the upper 6 feet (it was considered “possible fill” because it did not appear to be native soil, but no indicator, such as buried topsoil, debris, etc., was found to confirm our opinion). Below the topsoil or “possible fill”, the borings generally encountered alluvial lean clay, silty to clayey sand, and poorly graded sands to depths ranging from 6 to 21 feet, but were typically in the upper 10 to 12 feet. Below the fill, topsoil, and alluvial soils, the borings encountered glacially deposited sands to their termination depths.

Penetration resistances (N-values) in the "possible fill" were 9 and 16 blows per foot (BPF). Penetration resistances in the sands ranged from 3 to 62 BPF and averaged 26 BPF, indicating that these soils were very loose to very dense, but were typically medium dense. A penetration resistance of 14 BPF was recorded in the clay indicating that this soil was stiff in consistency.

Geologic maps indicate the soils in this area consist primarily of alluvial and/or glacially deposited silts, clays, sands, and gravels. According to the Soil Survey of Spokane County, the site soils are classified by the Natural Resource Conservation Service (NRCS) as Hardesty ashy silt loam, Narcisse silt loam, Endoaquolls and Fluvaquents, Phoebe ashy sandy loam, and Urban land-Springdale disturbed complex. The native soils encountered in the borings were consistent with the NRCS data.

Groundwater was encountered in all the borings at depths ranging from 11 to 47 feet. The following table summarizes the groundwater depths and approximate elevations.

Boring Number	Depth to Groundwater (feet)	Approximate Groundwater Elevation
B-1	36	1970
B-2	30	1976
B-3	47	1960
B-4	31	1975
B-5	46	1962
B-6	28	1981
B-7	31	1977
B-8	36	1973
B-9	11	2000
B-10	27	1981

The observed water levels indicate that the groundwater levels drop generally from south to north with higher levels near Chester Creek. These water levels are generally consistent with the observed levels in the borings performed on the Chester Creek levee and is consistent with our opinion that this portion of the creek is the beginning of the recharge section as evidenced by the typical lack of water in the creek further downstream along with dropping groundwater levels away from the creek. Fluctuations in the groundwater level may occur due to rainfall, flooding, irrigation, spring thaw and other seasonal and annual factors not evident at the time the observations were made.

ANALYSIS, OPINIONS, AND RECOMMENDATIONS

Based on the data obtained from the borings, previous test pits, field permeability tests, and laboratory tests performed, it is our opinion that subsurface infiltration of stormwater is feasible. The most promising layers are the glacial sands and gravels. These soils would be suitable for infiltration using standard drywells. In areas where the alluvial soils are deeper, use of gravel galleries in addition to drywells would be feasible. However, the shallow groundwater encountered in Boring B-9 would restrict the depth of a gravel gallery.

REMARKS

This report is for the exclusive use of the addressee and the copied parties to use in design of the proposed project and to prepare construction documents. In the absence of our written approval, we make no representations and assume no responsibility to other parties regarding this report. The data, analyses, and recommendations may not be appropriate for other structures or purposes. We recommend that parties contemplating other structures or purposes contact us.

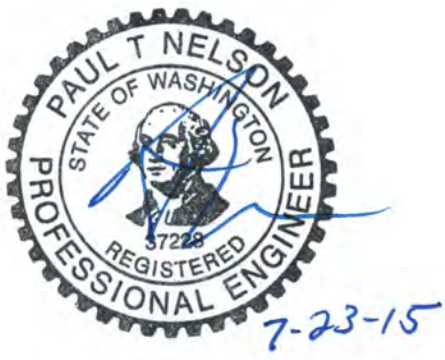
Services performed by the geotechnical engineers for this project have been conducted in a manner consistent with that level of care ordinarily exercised by members of the profession currently practicing in this area under similar budget and time restraints. No warranty, expressed or implied, is intended or made.

GENERAL REMARKS

It has been a pleasure being of service to you for this project. If you have any questions or need additional information, please do not hesitate to call me at (509) 209-6262 at your convenience.

Sincerely,

Paul T. Nelson, P.E.
Principal Engineer



Attachments: Figure 1, Site Location Map
Figure 2, NRCS Map
Figure 3, Boring Location Map
Logs of Borings B-1 through B-10
Descriptive Terminology
Laboratory Test Results

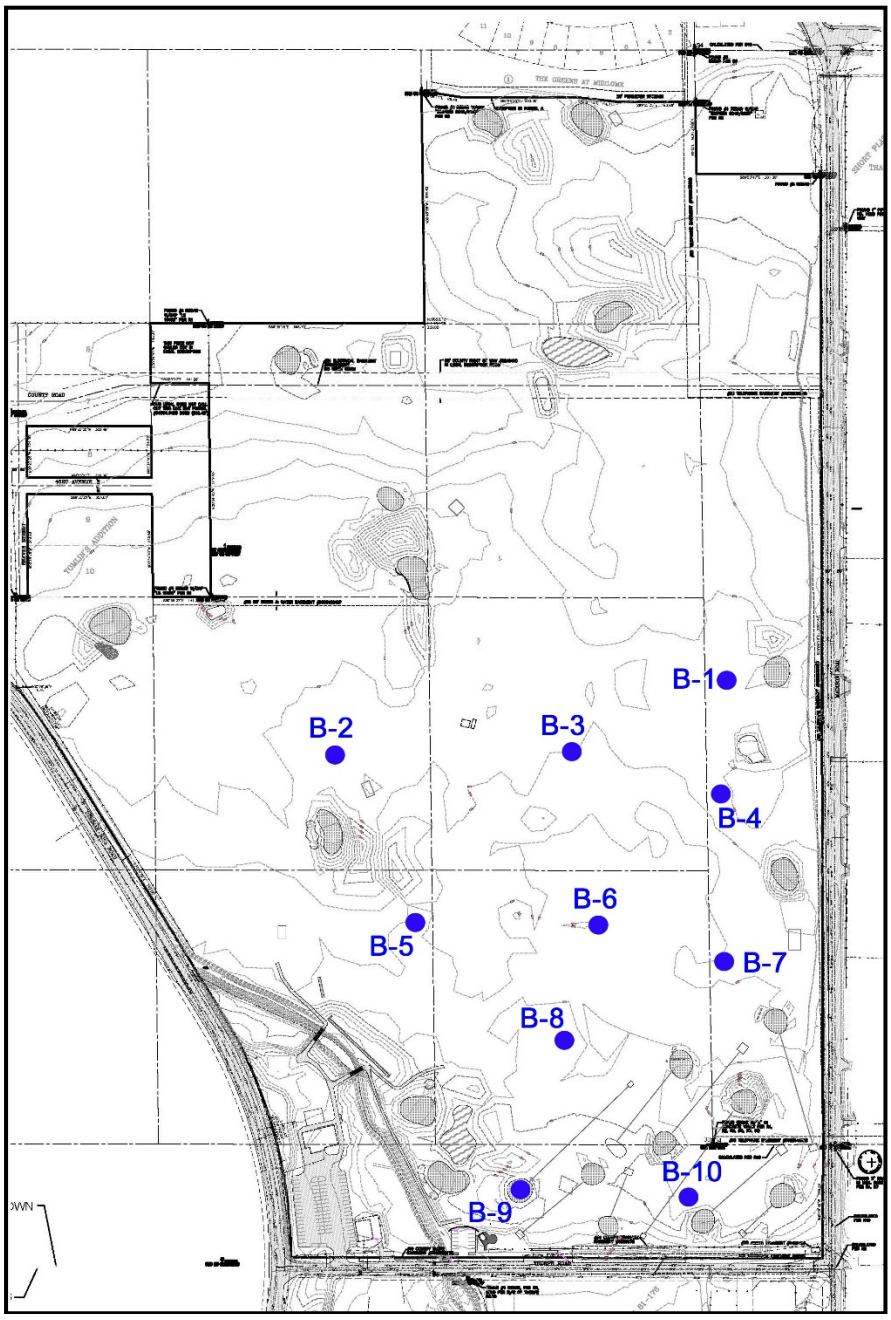
FIGURE 1

Site Location Map		
IPEC Inland Pacific Engineering Company Geotechnical Engineering and Consulting	Project No. 2013-026A	July 23, 2015
	Painted Hills Phase 2 4403 South Dishman-Mica Road Spokane Valley, WA	

FIGURE 2

NRCS Map		
IPEC Inland Pacific Engineering Company Geotechnical Engineering and Consulting	Project No. 2013-026A	July 23, 2015
	Painted Hills Phase 2 4403 South Dishman-Mica Road Spokane Valley, WA	

FIGURE 3



Boring Location Map		
IPEC Inland Pacific Engineering Company Geotechnical Engineering and Consulting	Project No. 2013-026A	July 23, 2015
	Painted Hills Phase 2 4403 South Dishman-Mica Road Spokane Valley, WA	

IPEC
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BORING NUMBER B-1

CLIENT NAI Black
PROJECT NAME Pinted Hills Phase 2
PROJECT NUMBER 2013-026A
PROJECT LOCATION Spokane Valley, WA
DATE STARTED 7/2/15 **COMPLETED** 7/2/15
GROUND ELEVATION 2006 ft **HOLE SIZE** 8 inches
DRILLING CONTRACTOR Johnson Exploration Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING --- Not encountered
LOGGED BY PTN **CHECKED BY** PTN
AT END OF DRILLING 36.00 ft / Elev 1970.00 ft
NOTES
AFTER DRILLING --- Not encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		(ML) SILT, with roots, dark brown, moist. (Topsoil)										
		(CL) LEAN CLAY, brown, wet, stiff. (Alluvium)										
5			SS		6-8 (14)							
		(SP) POORLY GRADED SAND with GRAVEL, medium to coarse grained, brown, moist, medium dense to dense. (Glacial Outwash)										
10			SS		13-12 (25)							
15			SS		17-14 (31)							
20			SS		16-15 (31)							
		(SP) POORLY GRADED SAND, fine to medium grained, a trace of Gravel, brown, moist to 36', then water-bearing, medium dense to dense. (Glacial Outwash)										
25			SS		10-10 (20)							
30			SS		11-12 (23)							

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BORING NUMBER B-1

CLIENT NAI Black **PROJECT NAME** Pinted Hills Phase 2

PROJECT NUMBER 2013-026A **PROJECT LOCATION** Spokane Valley, WA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
35		(SP) POORLY GRADED SAND, fine to medium grained, a trace of Gravel, brown, moist to 36', then water-bearing, medium dense to dense. (Glacial Outwash) *(continued)*	SS		13-15 (28)							
40			SS		11-13 (24)							
45			SS		17-21 (38)							
50		(SM) SILTY SAND, very fine to fine grained, brown, wet, medium dense. (Alluvium)	SS		8-8 (16)							

End of boring.

Groundwater not encountered with 49' of hollow-stem auger in the ground.

Groundwater at 36' immediately after withdrawal of the auger.

Bore hole then grouted to the surface.

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BORING NUMBER B-2

CLIENT NAI Black
PROJECT NAME Pinted Hills Phase 2
PROJECT NUMBER 2013-026A
PROJECT LOCATION Spokane Valley, WA
DATE STARTED 7/10/15 **COMPLETED** 7/13/15
GROUND ELEVATION 2005.9 ft **HOLE SIZE** 8 inches
DRILLING CONTRACTOR Johnson Exploration Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
▽ **AT TIME OF DRILLING** 30.00 ft / Elev 1975.90 ft
LOGGED BY SLN **CHECKED BY** PTN
▼ **AT END OF DRILLING** 39.00 ft / Elev 1966.90 ft
NOTES
AFTER DRILLING --- Not encountered (cave-in)

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		(SM) SILTY SAND, fine to medium grained, with roots, dark brown, moist. (Topsoil)										
		(SM) SILTY SAND, fine to coarse grained, a trace of Gravel, brown, moist, medium dense. (Glacial Outwash)										
5			SS		16-14 (30)							
		(SW) WELL GRADED SAND with GRAVEL, medium to coarse grained, brown, moist to 30'. then water-bearing, medium dense to very dense. (Glacial Outwash)										
10			SS		6-8 (14)							
15			SS		9-8 (17)							
20			SS		7-9 (16)							
25			SS		9-9 (18)			7				4
30	▽		SS		10-15 (25)							

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BORING NUMBER B-2

CLIENT NAI Black **PROJECT NAME** Pinted Hills Phase 2

PROJECT NUMBER 2013-026A **PROJECT LOCATION** Spokane Valley, WA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
35		(SW) WELL GRADED SAND with GRAVEL, medium to coarse grained, brown, moist to 30'. then water-bearing, medium dense to very dense. (Glacial Outwash) *(continued)*	SS		31-18 (49)							
40			SS		25-19 (44)							
45			SS		29-26 (55)							
50			SS		22-16 (38)							

End of boring.

Groundwater at 30' with 34' of hollow-stem auger in the ground.

Groundwater at 39' with 49' of hollow-stem auger in the ground 3 days later.

Groundwater not encountered to cave-in depth of 27' immediately after withdrawal of the auger.

Bore hole then grouted to the surface.

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BORING NUMBER B-3

CLIENT NAI Black
PROJECT NAME Pinted Hills Phase 2
PROJECT NUMBER 2013-026A
PROJECT LOCATION Spokane Valley, WA
DATE STARTED 7/2/15 **COMPLETED** 7/2/15
GROUND ELEVATION 2007 ft **HOLE SIZE** 8 inches
DRILLING CONTRACTOR Johnson Exploration Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING --- Not encountered
LOGGED BY PTN **CHECKED BY** PTN
AT END OF DRILLING 47.00 ft / Elev 1960.00 ft
NOTES
AFTER DRILLING --- Not encountered (cave-in)

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		(SM) SILTY SAND, fine to medium grained, with roots, dark brown, moist. (Topsoil)										
		(SC) CLAYEY SAND, fine to medium grained, dark brown to brown, moist to wet, loose to medium dense. (Alluvium)										
5			SS		3-3 (6)							
10			SS		7-8 (15)							
		(SP) POORLY GRADED SAND, medium to coarse grained, a trace of Gravel, brown, moist, medium dense. (Glacial Outwash)										
15			SS		9-12 (21)							
20			SS		24-27 (51)							
		(SP) POORLY GRADED SAND, fine to medium grained, a trace of Gravel, brown, water-bearing, medium dense. (Glacial Outwash)										
25			SS		14-8 (22)							
30			SS		8-13 (21)							

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BORING NUMBER B-3

CLIENT NAI Black **PROJECT NAME** Pinted Hills Phase 2

PROJECT NUMBER 2013-026A **PROJECT LOCATION** Spokane Valley, WA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
35		(SP) POORLY GRADED SAND,fine grained, brown, moist, dense to medium dense. (Glacial Outwash)	SS		16-16 (32)							
40			SS		15-14 (29)							
45		(SP) POORLY GRADED SAND with GRAVEL, medium to coarse grained, with seams of Silty Sand, brown, moist to water-bearing, very dense to dense. (Glacial Outwash) ▼	SS		29-23 (52)							
50			SS		21-20 (41)							

End of boring.

Groundwater at 47' with 49' of hollow-stem auger in the ground.

Groundwater not encountered to cave-in depth of 19' immediately after withdrawal of the auger.

Bore hole then grouted to the surface.

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BORING NUMBER B-4

CLIENT NAI Black
PROJECT NAME Pinted Hills Phase 2
PROJECT NUMBER 2013-026A
PROJECT LOCATION Spokane Valley, WA
DATE STARTED 7/6/15 **COMPLETED** 7/6/15
GROUND ELEVATION 2006.1 ft **HOLE SIZE** 8 inches
DRILLING CONTRACTOR Johnson Exploration Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING 31.00 ft / Elev 1975.10 ft
LOGGED BY DD **CHECKED BY** PTN
AT END OF DRILLING --- Not encountered (cave-in)
NOTES
AFTER DRILLING 45.00 ft / Elev 1961.10 ft

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		(SM) SILTY SAND, fine grained, with roots, dark brown, moist. (Topsoil)										
		(SC-SM) SILTY CLAYEY SAND, fine grained, brown, moist. (Possible Fille)										
5			SS		7-9 (16)							
		(SC) CLAYEY SAND, fine to medium grained, with seams of Lean Clay, brown, moist to wet, loose. (Alluvium)										
10			SS		5-5 (10)							
		(SW-SM) WELL GRADED SAND with SILT, medium to coarse grained, brown, moist, medium dense. (Alluvium)										
15			SS		11-13 (24)			10				9
		(SM) SILTY SAND, very fine to fine grained, with seams of Clayey Sand, brown, wet, loose. (Alluvium)										
20			SS		3-2 (5)							
		(SP) POORLY GRADED SAND, medium to coarse grained, brown, moist to 31', then water-bearing, medium dense to very dense. (Glacial Outwash)										
25			SS		7-7 (14)							
30			SS		6-9 (15)							

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BORING NUMBER B-4

CLIENT NAI Black **PROJECT NAME** Pinted Hills Phase 2

PROJECT NUMBER 2013-026A **PROJECT LOCATION** Spokane Valley, WA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
35		(SP) POORLY GRADED SAND, medium to coarse grained, brown, moist to 31', then water-bearing, medium dense to very dense. (Glacial Outwash) *(continued)*	SS		12-16 (28)							
40			SS		50							
45		▽	SS		4-11 (15)							
50			SS		23-35 (58)							

End of boring.

Groundwater at 31' with 34' of hollow-stem auger in the ground.

Groundwater at 45' with 49' of hollow-stem auger in the ground 3 days later.

Groundwater not encountered to cave-in depth of 30' immediately after withdrawal of the auger.

Bore hole then grouted to the surface.

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BORING NUMBER B-5

CLIENT NAI Black
PROJECT NAME Pinted Hills Phase 2
PROJECT NUMBER 2013-026A
PROJECT LOCATION Spokane Valley, WA
DATE STARTED 7/1/15 **COMPLETED** 7/1/15
GROUND ELEVATION 2008.1 ft **HOLE SIZE** 8 inches
DRILLING CONTRACTOR Johnson Exploration Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING --- Not encountered
LOGGED BY DD **CHECKED BY** PTN
AT END OF DRILLING 46.00 ft / Elev 1962.10 ft
NOTES
AFTER DRILLING --- Not encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		(SM) SILTY SAND, fine grained, with roots, dark brown, moist. (Topsoil)										
		(SM) SILTY SAND, fine grained, brown, moist. (Possible Fill)										
5			SS		4-5 (9)							
		(SC) CLAYEY SAND, fine grained, brown, moist, very loose. (Alluvium)										
10			SS		1-2 (3)							
		(SP-SM) POORLY GRADED SAND with SILT, medium to coarse grained, a trace of Gravel, brown, moist, loose to medium dense. (Glacial Outwash)										
15			SS		1-8 (9)							
20			SS		8-11 (19)							
25			SS		9-10 (19)			17				7
		(SP) POORLY GRADED SAND, medium to coarse grained, brown, moist to 46', then water-bearing, loose to very deense. (Glacial Outwash)										
30			SS		16-21 (37)							

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BORING NUMBER B-5

CLIENT NAI Black **PROJECT NAME** Pinted Hills Phase 2

PROJECT NUMBER 2013-026A **PROJECT LOCATION** Spokane Valley, WA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
35		(SP) POORLY GRADED SAND, medium to coarse grained, brown, moist to 46', then water-bearing, loose to very deense. (Glacial Outwash) *(continued)*	SS		14-15 (29)							
40			SS		19-22 (41)							
45		▼	SS		15-17 (32)							
50			SS		27-35 (62)							

End of boring.

Groundwater at 46' with 49' of hollow-stem auger in the ground.

Groundwater not encountered immediately after withdrawal of the auger.

Bore hole then grouted to the surface.

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BORING NUMBER B-6

CLIENT NAI Black
PROJECT NAME Pinted Hills Phase 2
PROJECT NUMBER 2013-026A
PROJECT LOCATION Spokane Valley, WA
DATE STARTED 7/7/15 **COMPLETED** 7/7/15
GROUND ELEVATION 2009.1 ft **HOLE SIZE** 8 inches
DRILLING CONTRACTOR Johnson Exploration Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING 44.50 ft / Elev 1964.60 ft
LOGGED BY DD **CHECKED BY** PTN
AT END OF DRILLING 44.50 ft / Elev 1964.60 ft
NOTES
AFTER DRILLING 28.00 ft / Elev 1981.10 ft

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		(SM) SILTY SAND, fine to medium grained, with roots, dark brown, moist. (Topsoil)										
		(SM) SILTY SAND, fine grained, with seams of Clayey Sand, brown, moist, medium dense. (Alluvium)										
5			SS		6-7 (13)							
10			SS		7-7 (14)							
15		(SP-SM) POORLY GRADED SAND with SILT, medium to coarse grained, a trace of Gravel, brown, moist, loose to medium dense. (Glacial Outwash)	SS		5-10 (15)							
20			SS		6-7 (13)			15				6
25		(SP) POORLY GRADED SAND, medium to coarse grained, brown, moist to 25', then water-bearing, medium dense to dense. (Glacial Outwash)	SS		8-11 (19)							
30			SS		10-11 (21)							

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BORING NUMBER B-6

CLIENT NAI Black **PROJECT NAME** Pinted Hills Phase 2

PROJECT NUMBER 2013-026A **PROJECT LOCATION** Spokane Valley, WA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
35		(SP) POORLY GRADED SAND, medium to coarse grained, brown, moist to 25', then water-bearing, medium dense to dense. (Glacial Outwash) *(continued)*	SS		13-15 (28)							
40			SS		12-13 (25)							
45		▼	SS		19-22 (41)							
50			SS		22-19 (41)							

End of boring.

Groundwater at 44.5' with 49' of hollow-stem auger in the ground.

Groundwater at 28' immediately after withdrawal of the auger.

Bore hole then grouted to the surface.

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BORING NUMBER B-7

CLIENT NAI Black
PROJECT NAME Pinted Hills Phase 2
PROJECT NUMBER 2013-026A
PROJECT LOCATION Spokane Valley, WA
DATE STARTED 7/10/15 **COMPLETED** 7/10/15
GROUND ELEVATION 2007.6 ft **HOLE SIZE** 8 inches
DRILLING CONTRACTOR Johnson Exploration Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING 34.00 ft / Elev 1973.60 ft
LOGGED BY SLN **CHECKED BY** PTN
AT END OF DRILLING 31.00 ft / Elev 1976.60 ft
NOTES
AFTER DRILLING 37.00 ft / Elev 1970.60 ft

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		(SM) SILTY SAND, fine to medium grained, with roots, dark brown, moist. (Topsoil)										
		(SM) SILTY SAND, fine grained, with seams of Lean Clay, brown, moist to wet, loose. (Alluvium)										
5			SS		2-5 (7)							
10			SS		4-6 (10)							
		(SM) SILTY SAND, very fine to fine grained, brown, moist, medium dense. (Alluvium)										
15			SS		8-11 (19)							
		(SP-SM) POORLY GRADED SAND with SILT, medium to coarse grained, a trace of Gravel, brown, moist, medium dense. (Glacial Outwash)										
20			SS		9-8 (17)			18				6
25			SS		7-10 (17)							
30			SS		10-11 (21)							

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BORING NUMBER B-7

CLIENT NAI Black **PROJECT NAME** Pinted Hills Phase 2

PROJECT NUMBER 2013-026A **PROJECT LOCATION** Spokane Valley, WA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
35		(SP-SM) POORLY GRADED SAND with SILT, medium to coarse grained, a trace of Gravel, brown, moist, medium dense. (Glacial Outwash) *(continued)*	SS		11-15 (26)							
40			SS		12-15 (27)							
45			SS		12-25 (37)							
50			SS		12-32 (44)							

End of boring.

Groundwater at 34' with 34' of hollow-stem auger in the ground.

Groundwater at 37' with 49' of hollow-stem auger in the ground 3 days later.

Groundwater at 31' immediately after withdrawal of the auger.

Bore hole then grouted to the surface.

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BORING NUMBER B-8

CLIENT NAI Black
PROJECT NAME Pinted Hills Phase 2
PROJECT NUMBER 2013-026A
PROJECT LOCATION Spokane Valley, WA
DATE STARTED 7/7/15 **COMPLETED** 7/7/15
GROUND ELEVATION 2009.3 ft **HOLE SIZE** 8 inches
DRILLING CONTRACTOR Johnson Exploration Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING 43.00 ft / Elev 1966.30 ft
LOGGED BY DD **CHECKED BY** PTN
AT END OF DRILLING 36.00 ft / Elev 1973.30 ft
NOTES
AFTER DRILLING 47.00 ft / Elev 1962.30 ft

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		(SM) SILTY SAND, fine to medium grained, with roots, dark brown, moist. (Topsoil)										
		(SM) SILTY SAND, fine to medium grained, brown, moist, medium dense. (Alluvium)										
5			SS		11-11 (22)							
		(SP) POORLY GRADED SAND, fine to medium grained, brown, moist, medium dense. (Alluvium)										
10			SS		6-5 (11)							
		(SM) SILTY SAND, fine to medium grained, with seams of Clayey Sand, brown, moist to wet, medium dense. (Alluvium)										
15			SS		8-10 (18)							
		(SW-SM) WELL GRADED SAND with SILT, fine to medium grained, brown, moist, medium dense. (Glacial Outwash)										
20			SS		8-10 (18)							
25			SS		9-9 (18)							
30			SS		10-11 (21)			18				10

(Continued Next Page)

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BORING NUMBER B-8

CLIENT NAI Black **PROJECT NAME** Pinted Hills Phase 2

PROJECT NUMBER 2013-026A **PROJECT LOCATION** Spokane Valley, WA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
		(SW-SM) WELL GRADED SAND with SILT, fine to medium grained, brown, moist, medium dense. (Glacial Outwash) *(continued)*										
35			SS		10-9 (19)							
		(SP) POORLY GRADED SAND, medium to coarse grained, brown, water-bearing, medium dense to dense. (Glacial Outwash)										
40			SS		13-17 (30)							
45			SS		18-32 (50)							
50			SS		19-25 (44)							

End of boring.

Groundwater at 43' with 44' of hollow-stem auger in the ground.

Groundwater at 47' with 49' of hollow-stem auger in the ground 3 days later.

Groundwater at 36' immediately after withdrawal of the auger.

Bore hole then grouted to the surface.

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BORING NUMBER B-9

CLIENT NAI Black
PROJECT NAME Pinted Hills Phase 2
PROJECT NUMBER 2013-026A
PROJECT LOCATION Spokane Valley, WA
DATE STARTED 7/8/15 **COMPLETED** 7/8/15
GROUND ELEVATION 2010.6 ft **HOLE SIZE** 8 inches
DRILLING CONTRACTOR Johnson Exploration Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING 15.00 ft / Elev 1995.60 ft
LOGGED BY SLN **CHECKED BY** PTN
AT END OF DRILLING 11.00 ft / Elev 1999.60 ft
NOTES
AFTER DRILLING 41.00 ft / Elev 1969.60 ft

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		(SM) SILTY SAND, fine to medium grained, with roots, dark brown, moist. (Topsoil)										
		(SM) SILTY SAND, fine grained, brown, moist, loose. (Alluvium)										
5			SS		4-6 (10)							
		(SC-SM) SILTY CLAYEY SAND, very fine to fine grained, brown, wet, loose. (Alluvium)										
10			SS		4-5 (9)							
		(SP) POORLY GRADED SAND, fine to medium grained, brown, moist to 15', then water-bearing, medium dense to dense. (Glacial Outwash)										
15			SS		6-9 (15)							
20			SS		9-9 (18)							
25			SS		12-11 (23)							
30			SS		12-15 (27)							

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BORING NUMBER B-9

CLIENT NAI Black **PROJECT NAME** Pinted Hills Phase 2

PROJECT NUMBER 2013-026A **PROJECT LOCATION** Spokane Valley, WA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
35		(SP) POORLY GRADED SAND, fine to medium grained, brown, moist to 15', then water-bearing, medium dense to dense. (Glacial Outwash) *(continued)*	SS		18-30 (48)							
40		(SP) POORLY GRADED SAND, medium to coarse grained, a trace of Gravel, brown, moist, dense. (Glacial Outwash)	SS		20-25 (45)							
45			SS		26-24 (50)							
50			SS		21-26 (47)							

End of boring.

Groundwater at 15' with 19' of hollow-stem auger in the ground.

Groundwater at 41' with 49' of hollow-stem auger in the ground 3 days later.

Groundwater at 11' immediately after withdrawal of the auger.

Bore hole then grouted to the surface.

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BORING NUMBER B-10

CLIENT NAI Black
PROJECT NAME Pinted Hills Phase 2
PROJECT NUMBER 2013-026A
PROJECT LOCATION Spokane Valley, WA
DATE STARTED 7/8/15 **COMPLETED** 7/8/15
GROUND ELEVATION 2008.4 ft **HOLE SIZE** 8 inches
DRILLING CONTRACTOR Johnson Exploration Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING 28.00 ft / Elev 1980.40 ft
LOGGED BY SLN **CHECKED BY** PTN
AT END OF DRILLING 27.00 ft / Elev 1981.40 ft
NOTES
AFTER DRILLING 48.00 ft / Elev 1960.40 ft

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		(SM) SILTY SAND, fine grained, with roots, dark brown, moist. (Topsoil)										
		(SP) POORLY GRADED SAND, medium to coarse grained, brown, moist, medium dense. (Alluvium)										
5			SS		5-6 (11)							
		(SM) SILTY SAND, fine grained, brown, moist, loose. (Alluvium)										
10			SS		4-5 (9)							
		(SW-SM) WELL GRADED SAND with SILT, fine to medium grained, brown, moist, medium dense. (Glacial Outwash)										
15			SS		9-9 (18)			19				9
20			SS		8-8 (16)							
25			SS		11-15 (26)							
30			SS		11-15 (26)							

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BORING NUMBER B-10

CLIENT NAI Black **PROJECT NAME** Pinted Hills Phase 2

PROJECT NUMBER 2013-026A **PROJECT LOCATION** Spokane Valley, WA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
35		(SW-SM) WELL GRADED SAND with SILT, fine to medium grained, brown, moist, medium dense. (Glacial Outwash) *(continued)*	SS		13-14 (27)							
40			SS		21-25 (46)							
45			SS		21-23 (44)							
50			SS		19-20 (39)							

End of boring.

Groundwater at 28' with 29' of hollow-stem auger in the ground.

Groundwater at 48' with 49' of hollow-stem auger in the ground 3 days later.

Groundwater at 27' immediately after withdrawal of the auger.

Bore hole then grouted to the surface.

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Geotechnical Engineering and Consulting

RELATIVE DENSITY OR CONSISTENCY VERSUS SPT N-VALVE			
COARSE-GRAINED SOILS		FINE-GRAINED SOILS	
DENSITY	N(BLOWS/FT)	CONSISTENCY	N(BLOWS/FT)
Very Loose	0 - 4	Very Soft	0 - 1
Loose	4 - 10	Soft	2 - 3
Medium-Dense	11 - 30	Rather Soft	4 - 5
		Medium	6 - 8
Dense	31 - 50	Rather Stiff	9 - 12
		Stiff	13 - 16
Very Dense	> 50	Very Stiff	17 - 30
		Hard	> 30

USCS SOIL CLASSIFICATION					
MAJOR DIVISIONS			GROUP DESCRIPTIONS		
Coarse-Grained Soils	Gravel and Gravelly Soils <50% coarse fraction passes #4 sieve	Gravel (with little or no fines)	GW	Well Graded Gravel	
			GP	Poorly Graded Gravel	
		Gravel (with >12% fines)	GM	Silty Gravel	
			GC	Clayey Gravel	
<50% passes #200 sieve	Sandy and Sandy Soils >50% coarse fraction passes #4 sieve	Sand (with little or no fines)	SW	Well Graded Sand	
			SP	Poorly Graded Sand	
		Sand (with >12% fines)	SM	Silty Sand	
			SC	Clayey Sand	
Fine-Grained Soils	Silt and Clay Liquid Limit < 50		ML	Silt	
			CL	Lean Clay	
			OL	Organic Silt and Clay (low plasticity)	
>50% passes #200 sieve	Salt and Clay Liquid Limit > 50		MH	Inorganic Silt	
			CH	Fat Clay	
			OH	Organic Clay and Silt (med to high plasticity)	
Highly Organic Soils			PT	Peat	Muck

MODIFIERS	
DESCRIPTION	RANGE
Occasional	<5%
Trace	5% - 12%
With	>12%

MOISTURE CONTENT	
DESCRIPTION	FIELD OBSERVATION
Dry	Absence of moisture, dusty, dry to the touch
Moist	Dry of optimum moisture content
Wet	Wet of optimum moisture content

MAJOR DIVISIONS WITH GRAIN SIZE							
SIEVE SIZE							
12"	3"	3/4"	4	10	40	200	
GRAIN SIZE (INCHES)							
12	3	0.75	0.19	0.079	0.0171	0.0029	
Boulders	Cobbles	Gravel		Sand			Silt and Clay
		Coarse	Fine	Coarse	Medium	Fine	

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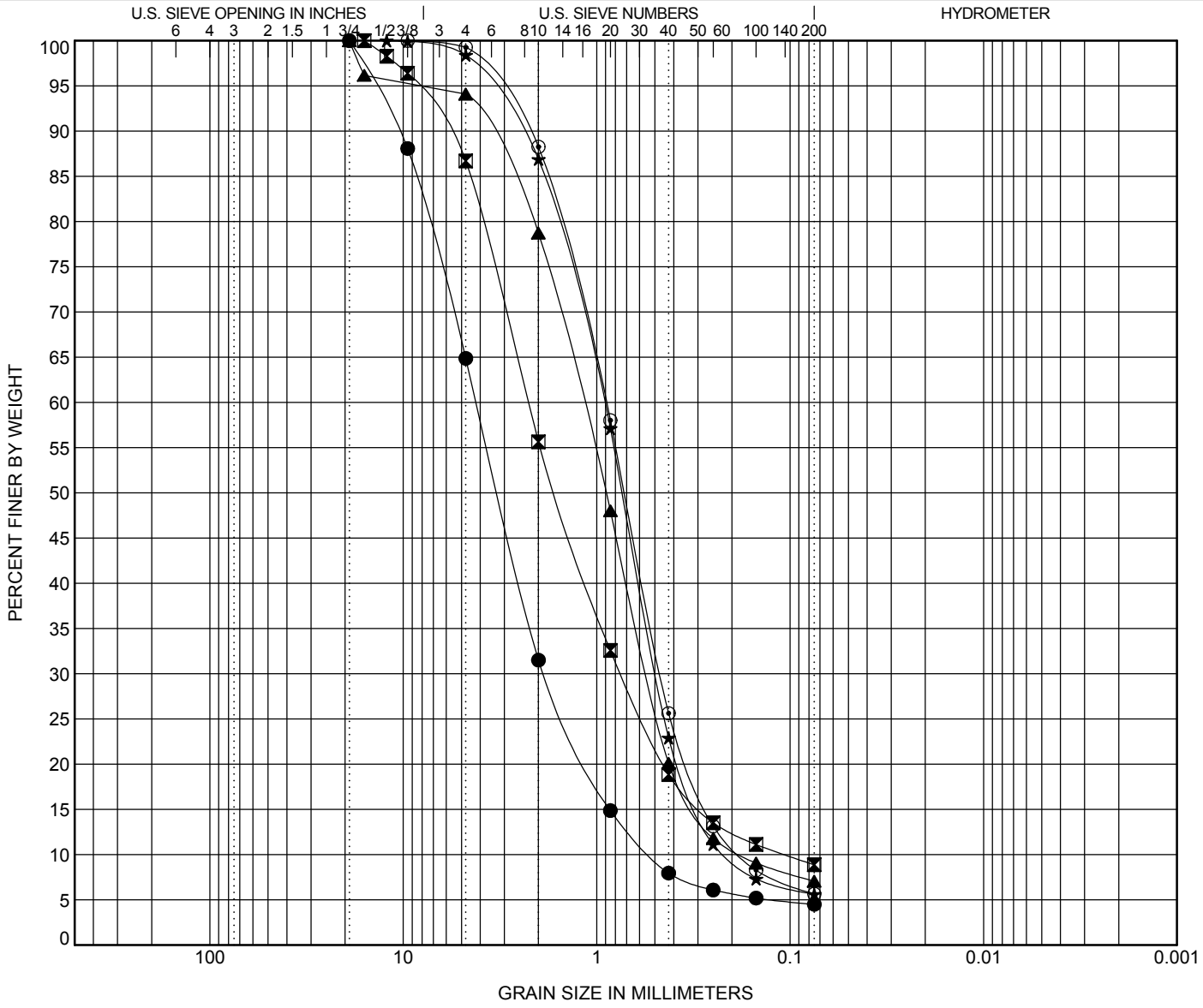
GRAIN SIZE DISTRIBUTION

CLIENT NAI Black **PROJECT NAME** Pinted Hills Phase 2

PROJECT NUMBER 2013-026A **PROJECT LOCATION** Spokane Valley, WA



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● B-2	25.0	SW Well Graded Sand with Gravel				1.57	8.02
⊠ B-4	15.0	SW-SM Well Graded Sand with Silt				2.32	21.25
▲ B-5	25.0	SP-SM Poorly Graded Sand with Silt				1.39	6.64
★ B-6	20.0	SP-SM Poorly Graded Sand with Silt				1.21	4.30
⊙ B-7	20.0	SP-SM Poorly Graded Sand with Silt				1.35	5.00

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-2	25.0	19	4.187	1.851	0.522	35.1	60.4	4.5	
⊠ B-4	15.0	15.9	2.258	0.747	0.106	13.3	77.8	8.9	
▲ B-5	25.0	19	1.187	0.543	0.179	5.9	87.0	7.1	
★ B-6	20.0	12.2	0.923	0.491	0.215	1.6	92.8	5.6	
⊙ B-7	20.0	9.5	0.899	0.467	0.18	0.7	93.6	5.6	

GRAIN SIZE - GINT STD US LAB.GDT - 7/23/15 13:26 - J:_IPEC PROJECTS_2013 PROJECTS\2013-026A PAINTED HILLS PHASE 2\GINT\2013-026A PAINTED HILLS PHASE 2.GPJ

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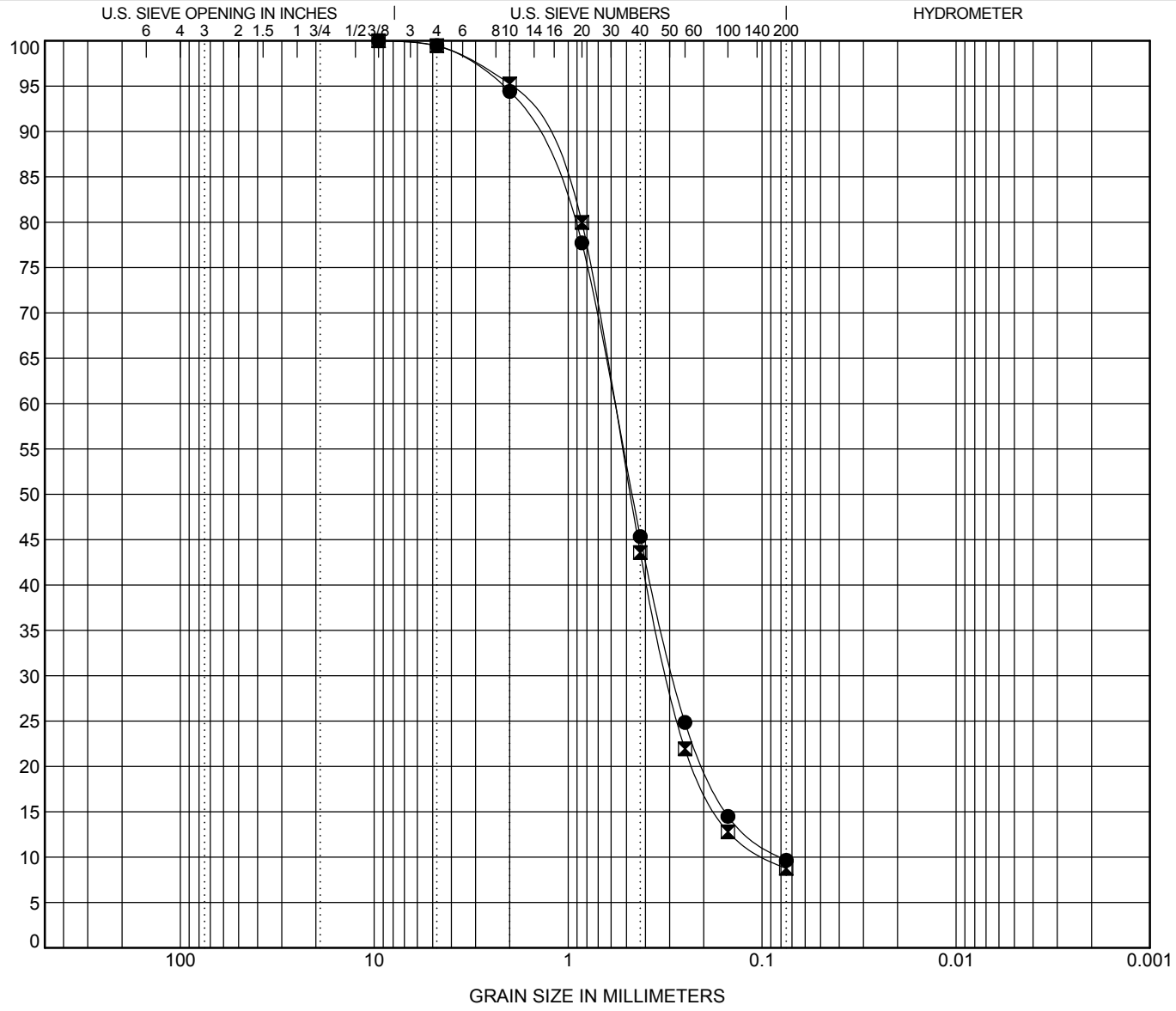
GRAIN SIZE DISTRIBUTION

CLIENT NAI Black **PROJECT NAME** Pinted Hills Phase 2

PROJECT NUMBER 2013-026A **PROJECT LOCATION** Spokane Valley, WA



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**B-8**	**30.0**	**SW-SM Well Graded Sand with Silt**				**1.78**	**7.39**
⊠	**B-10**	**15.0**	**SW-SM Well Graded Sand with Silt**				**1.72**	**6.26**

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-8**	**30.0**	**9.5**	**0.582**	**0.286**	**0.079**	**0.5**	**89.8**	**9.7**	
⊠	**B-10**	**15.0**	**9.5**	**0.581**	**0.305**	**0.093**	**0.5**	**90.7**	**8.8**	