APPENDIX B

Boring Logs, Soil Gas Probe Construction Diagrams, and Sampling Logs

BORING LOGS

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DODHF Novato
BORING LOG
PS-1A-1

Permit Number: N/A
Boring Location: DODHF Novato, PS-1A-1
Date Logged: 5/8/08
Logged By: C. Coonfare, P.G.
Total Depth: 15'
Reviewed By: R. Wensink

Drilling Contractor: Precision
Driller: Jose Carranza
Drilling Equipment: GeoProbe 7720DT
Drilling Method: Direct Push
Boring Diameter: 2.5"
Sampler Type: N/A
Hammer Type: N/A

Borehole Abandoned:
Yes No X
Method: Neat Cement Backfill

Monitoring Device Installed:
Yes X No
Type: Temp. Piezometer, Soil Gas Monitoring Point

Depth (feet bgs)	Lithology	USCS	Sample description	Recovery %	Plasticity	Moisture Content	Color Code	Blow Counts	Grading: % Gravel	Grading: % Sand	Grading: % Fines	Grading: Max. Size	Comments
0			1' thick concrete surface (cored 5/7/2008)		N/A	N/A	N/A	N/A					
		SC	Clayey SAND: gray to light brow, dry, 70% sand, 20% fines, 10% gravel no odor. Color change at 4': gray-green	100	NR	Dry	NR	N/A	10	70	20		Sample: 2' - 3'
5		CL	CLAY: gray, dry, 70% fines, 30% sand, no odor. Moist, very slight odor at 8' bgs. Color change at 9' bgs: gray-brown to red-brown, less plastic, no odor.	80	NR	Dry	NR	N/A	0	30	70		Sample: 4' - 5' Sample: 8' - 9'
10		ML	SILT: gray, very slight to no odor. Color change at 12-13' bgs: red brown, increase in sand content	90	NR	NR	NR	N/A					
		CL	SILTY CLAY: red-brown, moist, very slight odor		NR	Moist	NR	N/A					
15		SC	Clayey gravelly SAND: weathered bedrock, mottled red/brown/gray, 50% sand, 30% gravel, 20% fines no odor.		NR	NR	NR	N/A	30	50	20		TD = 15' bgs Microcore with acetate liners from 0-TD Installed temp. pz., 1" PVC, screened from 10-15' bgs 0.01 slot. Groundwater observed at approx. 11' bgs
20													
25													
30													

Novato_5-2008.cdr

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DODHF Novato
BORING LOG
PS-1A-2

Permit Number: N/A
Boring Location: DODHF Novato, PS-1A-2
Date Logged: 5/8/08
Logged By: C. Coonfare, P.G.
Total Depth: 15'
Reviewed By: R. Wensink

Drilling Contractor: Precision
Driller: Jose Carranza
Drilling Equipment: GeoProbe 7720DT
Drilling Method: Direct Push
Boring Diameter: 2.5"
Sampler Type: N/A
Hammer Type: N/A

Borehole Abandoned:
Yes No X
Method: Neat Cement Backfill

Monitoring Device Installed:
Yes X No
Type: Temp. Piezometer, Soil Gas Monitoring Point

Depth (feet bgs)	Lithology	USCS	Sample description	Recovery %	Plasticity	Moisture Content	Color Code	Blow Counts	Grading % Gravel	Grading % Sand	Grading % Fines	Grading Max. Size	Comments
0			1' thick concrete surface		N/A	N/A	N/A	N/A					
		SC	Clayey SAND: light gray - light brown, dry, 60% sands, 20% gravel, 20% fines.	60	NR	Dry	NR	N/A	20	60	20		
5		CL	Sandy CLAY: gray, moist at 4'-4.5' 60% clay, 30% sand, 10% gravel, very slight odor.						10	30	60		Sample: 4' - 5'
			Dry at 4.5'-5' bgs.	90									
			Increasing silt content and very slightly moist at 6'-7' bgs.		NR	V. Sl. Moist to Dry	NR	N/A	10	40	50		Sample: 6' - 7'
10			Color change at 8'-9' bgs: red-brown dry.										
			Increasing sand content at 9'-10' bgs color change at 10' bgs: gray						20	40	40		Sample: 10' - 11'
		SC	Clayey gravelly SAND: weathered bedrock, mottled red/brown/gray, 50% sand, 30% gravel, 20% fines no odor.	100	NR	Sl. Moist to Moist	NR	N/A	10	70	20		
15									10	80	10		TD = 15' bgs Microcore with acetate liners from 0-TD Installed temp. pz., 1" PVC, screened from 10-15' bgs 0.01 slot.
20													
25													
30													

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DODHF Novato
BORING LOG
PS-1A-3

Permit Number: N/A
Boring Location: DODHF Novato, PS-1A-3
Date Logged: 5/8/08
Logged By: C. Coonfare, P.G.
Total Depth: 15'
Reviewed By: R. Wensink

Drilling Contractor: Precision
Driller: Jose Carranza
Drilling Equipment: GeoProbe 7720DT
Drilling Method: Direct Push
Boring Diameter: 2.5"
Sampler Type: N/A
Hammer Type: N/A

Borehole Abandoned:
Yes No X
Method: Neat Cement Backfill

Monitoring Device Installed:
Yes X No
Type: Temp. Piezometer, Soil Gas Monitoring Point

Depth (feet bgs)	Lithology	USCS	Sample description	Recovery %	Plasticity	Moisture Content	Color Code	Blow Counts	Grading % Gravel	Grading % Sand	Grading % Fines	Grading Max. Size	Comments
0			1' thick asphalt surface.	N/A	N/A	N/A	N/A	N/A					
		SW	SAND: light brown, dry, 80% sand, 10% fines,10% gravel, no odor. Decrease in gravel content at 3' bgs.	100	NR	Dry	NR	N/A	10	80	10		Sample: 2' - 3' Possible staining but no odor
5		CL/ SC	Sandy CLAY/clayey SAND: brownish-gray, very slightly moist, 50% sand, 40% fines, 10% gravel, very slight odor.		NR	V. Sl Moist	NR	N/A	10	50	40		Sample: 5' - 6'
		SP	SAND: light brown, dry, 80% sand, 20% fines, no odor.	80	NR	Dry	NR	N/A	0	80	20		
		CL/ ML	Silty CLAY/Clayey SILT: gray, dry 70% fines, 30% sand, no odor. Color change at 9': reddish gray.		NR	Dry	NR	N/A	0	30	70		Sample: 8' - 9'
10		SC	Clayey SAND: gray-brown, moist, 70% sand, 20% fines, 10% gravel, no odor.	100	NR	Moist	NR	N/A	10	70	20		
		GW	GRAVEL: weathered bedrock, mottled red-brown, dry, 50% gravel 30% sand, 20% fines.		NR	Dry	NR	N/A	50	30	20		
15													TD = 15' bgs Microcore with acetate liners from 0-TD Installed temp. pz., 1" PVC, screened from 10-15' bgs 0.01 slot.
20													
25													
30													

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DODHF Novato
BORING LOG
PS-1A-5

Permit Number: N/A
Boring Location: DODHF Novato, PS-1A-5
Date Logged: 5/8/08
Logged By: C. Coonfare, P.G.
Total Depth: 15'
Reviewed By: R. Wensink

Drilling Contractor: Precision
Driller: Jose Carranza
Drilling Equipment: GeoProbe 7720DT
Drilling Method: Direct Push
Boring Diameter: 2.5"
Sampler Type: N/A
Hammer Type: N/A

Borehole Abandoned:
Yes No X
Method: Neat Cement Backfill

Monitoring Device Installed:
Yes X No
Type: Temp. Piezometer, Soil Gas Monitoring Point

Depth (feet bgs)	Lithology	USCS	Sample description	Recovery %	Plasticity	Moisture Content	Color Code	Blow Counts	Grading: % Gravel	Grading: % Sand	Grading: % Fines	Grading: Max. Size	Comments
0			1' thick asphalt surface	100	N/A	N/A	N/A	N/A					
		SW	SAND: light brown to red-brown, dry, 80% sand, 10% gravel, 10% fines, no odor.		NR	Dry	NR	N/A	10	80	10		Sample: 3' - 4'
5		CL/ SC	Sandy CLAY/clayey SAND: brown, very slightly moist to dry, 50% sand, 40% fines, 10% gravel, very slight odor.	75	NR	V. Sl Moist to Dry	NR	N/A	10	50	40		Sample: 5' - 6'
		CL/ ML	Silty CLAY/Clayey SILT: gray, dry 60% fines, 30% sand, 10% gravel, no odor. Color change at 8': reddish. Moisture content change to very slightly moist.		NR	V. Sl Moist to Dry	NR	N/A	10	30	60		Sample: 7' - 8'
10		SW	Gravelly SAND: gray, moist, 70% sand, 30% gravel, 10% fines, no odor.	100	NR	Moist	NR	N/A	30	70	10		
		SP	Gravelly SAND: red, moist, 60% sand 40% gravel, 10% fines no odor		NR	Moist	NR	N/A	40	60	10		
		SP/ GW	Gravelly SAND/ sandy GRAVEL: weathered bedrock, 40% gravel, 40% sand, 20% fines, no odor.		NR	NR	NR	N/A	40	40	20		
15													TD = 15' bgs Microcore with acetate liners from 0-TD Installed temp. pz., 1" PVC, screened from 10-15' bgs 0.01 slot.
20													
25													
30													

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DODHF Novato
BORING LOG
PS-1A-6

Permit Number: N/A
Boring Location: DODHF Novato, PS-1A-6
Date Logged: 5/8/08
Logged By: C. Coonfare, P.G.
Total Depth: 15'
Reviewed By: R. Wensink

Drilling Contractor: Precision
Driller: Jose Carranza
Drilling Equipment: GeoProbe 7720DT
Drilling Method: Direct Push
Boring Diameter: 2.5"
Sampler Type: N/A
Hammer Type: N/A

Borehole Abandoned:
Yes No X
Method: Neat Cement Backfill

Monitoring Device Installed:
Yes X No
Type: Temp. Piezometer, Soil Gas Monitoring Point

Depth (feet bgs)	Lithology	USCS	Sample description	Recovery %	Plasticity	Moisture Content	Color Code	Blow Counts	Grading % Gravel	Grading % Sand	Grading % Fines	Grading Max. Size	Comments
0			1' thick asphalt surface.	N/A	N/A	N/A	N/A	N/A					
		SW	SAND: light brown, dry, 80% sand, 10% fines,10% gravel, no odor. Color change at 3'-4' bgs. gray, decreasing in gravel content, very slight odor.	100	NR	Dry	NR	N/A	10	80	10		Sample: 1' - 2'
5		SC/ CL	Sandy CLAY/clayey SAND: brownish-gray, very slightly moist, 50% sand, 40% fines, 10% gravel, very slight odor.		NR	V. Sl Moist	NR	N/A	10	50	40		Sample: 5' - 6'
		SP	SAND: light brown, dry, 80% sand, 20% fines, no odor.	75	NR	Dry	NR	N/A	0	80	20		
		CL/ ML	Silty CLAY/ clayey SILT: gray-brown, 70% fines, 30% sand, no odor		NR	NR	NR	N/A	0	30	70		
10		CL	Sandy CLAY: brown-gray, dry, 40% fines, 40% gravel, 20% sand, hard at 9'-10' bgs, no odor.		NR	Dry	NR	N/A	40	20	40		Sample: 10' - 11'
		SC	Clayey SAND: brown-gray, very slightly moist, 60% sand, 30% fines, 10% gravel, no odor Transition to weathered bedrock at 12' bgs. Reddish brown to red, dry, 60% sand, 20% gravel, 20% fines.	90	NR	Dry	NR	N/A	10 20	60 60	30 20		
15													TD = 15' bgs Microcore with acetate liners from 0-TD Installed temp. pz., 1" PVC, screened from 10-15' bgs 0.01 slot.
20													
25													
30													

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DODHF Novato
BORING LOG
PS-1A-7

Permit Number: N/A
Boring Location: DODHF Novato, PS-1A-7A
Date Logged: 5/8/08
Logged By: C. Coonfare, P.G.
Total Depth: 15'
Reviewed By: R. Wensink

Drilling Contractor: Precision
Driller: Jose Carranza
Drilling Equipment: GeoProbe 7720DT
Drilling Method: Direct Push
Boring Diameter: 4"
Sampler Type: N/A
Hammer Type: N/A

Borehole Abandoned:
Yes No X
Method: Neat Cement Backfill

Monitoring Device Installed:
Yes X No
Type: Temp. Piezometer, Soil Gas Monitoring Point

Depth (feet bgs)	Lithology	USCS	Sample description	Recovery %	Plasticity	Moisture Content	Color Code	Blow Counts	Grading % Gravel	Grading % Sand	Grading % Fines	Grading Max. Size	Comments
0			TOP SOIL: roots and organics										
		SM	Silty SAND: light brown with some red tint, dry, 80% sand, 20% fines, no odor.	<50	NR	Dry	NR	N/A	0	80	20		Sample: 3' - 4'
5			No Recovery.	0	N/A	N/A	N/A	N/A					Changed Method: leave 4" in ground, 0-7' as conductor casing. Push 2.5" tool with Microcore and acetate liners.
		SC/ CL	Clayey SAND/sandy CLAY: transition from dark brown to reddish gray to reddish with gray, 50% sand, 50% clay, odor	100	NR	NR	NR	N/A	0	50	50		
10		CL	CLAY: gray, dry, 10% sand, 90% fines, slight odor.	100	NR	Dry	NR	N/A	0	10	90		Sample: 9' - 10' Sample: 12' - 13'
		SC	Clayey SAND: slightly moist, 50% sand, 40% fines, 10% gravel, slight odor. Increase in gravel content at 14' bgs. Transition to weathered bedrock. Color change in clay: red, brown, gray.		NR	Sl. Moist	NR	N/A	10 30	50 50	40 20		
15													TD = 15' bgs Microcore with acetate liners from 0-TD Installed temp. pz., 1" PVC, screened from 10-15' bgs 0.01 slot.
20													
25													
30													

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SOIL GAS PROBE CONSTRUCTION LOGS

Battelle

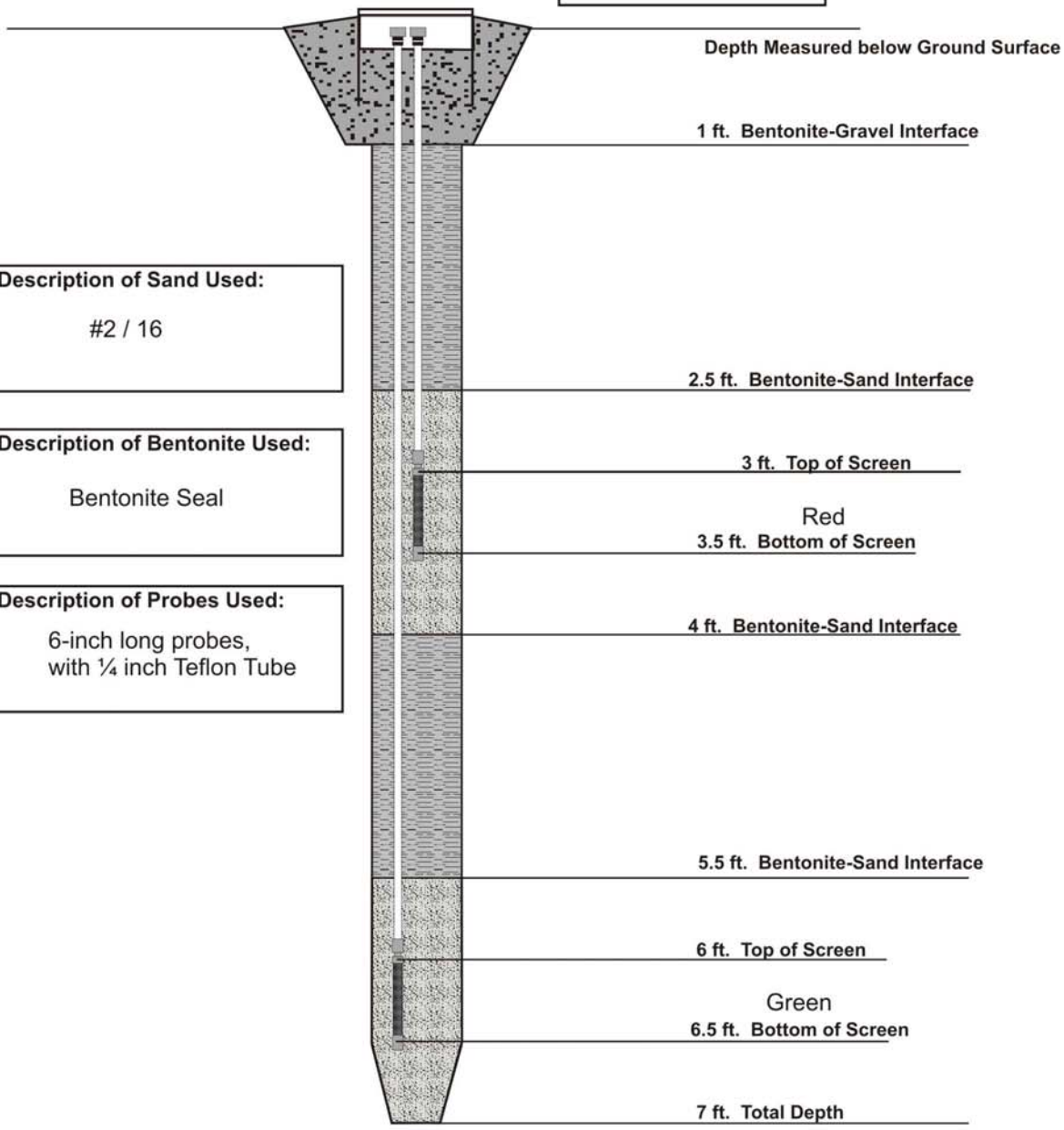
DODHF Novato

Nested Soil Gas Probe Construction LOG

Permit Number: Project Number: Boring Location: PS-1A-1 Date Logged: 5/9/2008 Geologist: Coonfare Total Depth: 7 ft.	Drilling Contractor: Precision Driller: Israel Ramirez Drilling Equipment: Geoprobe Drilling Method: Direct Push Boring Diameter: 2.5-inch

Surface Completion:

flush mount



Description of Sand Used:

#2 / 16

Description of Bentonite Used:

Bentonite Seal

Description of Probes Used:

6-inch long probes,
with ¼ inch Teflon Tube

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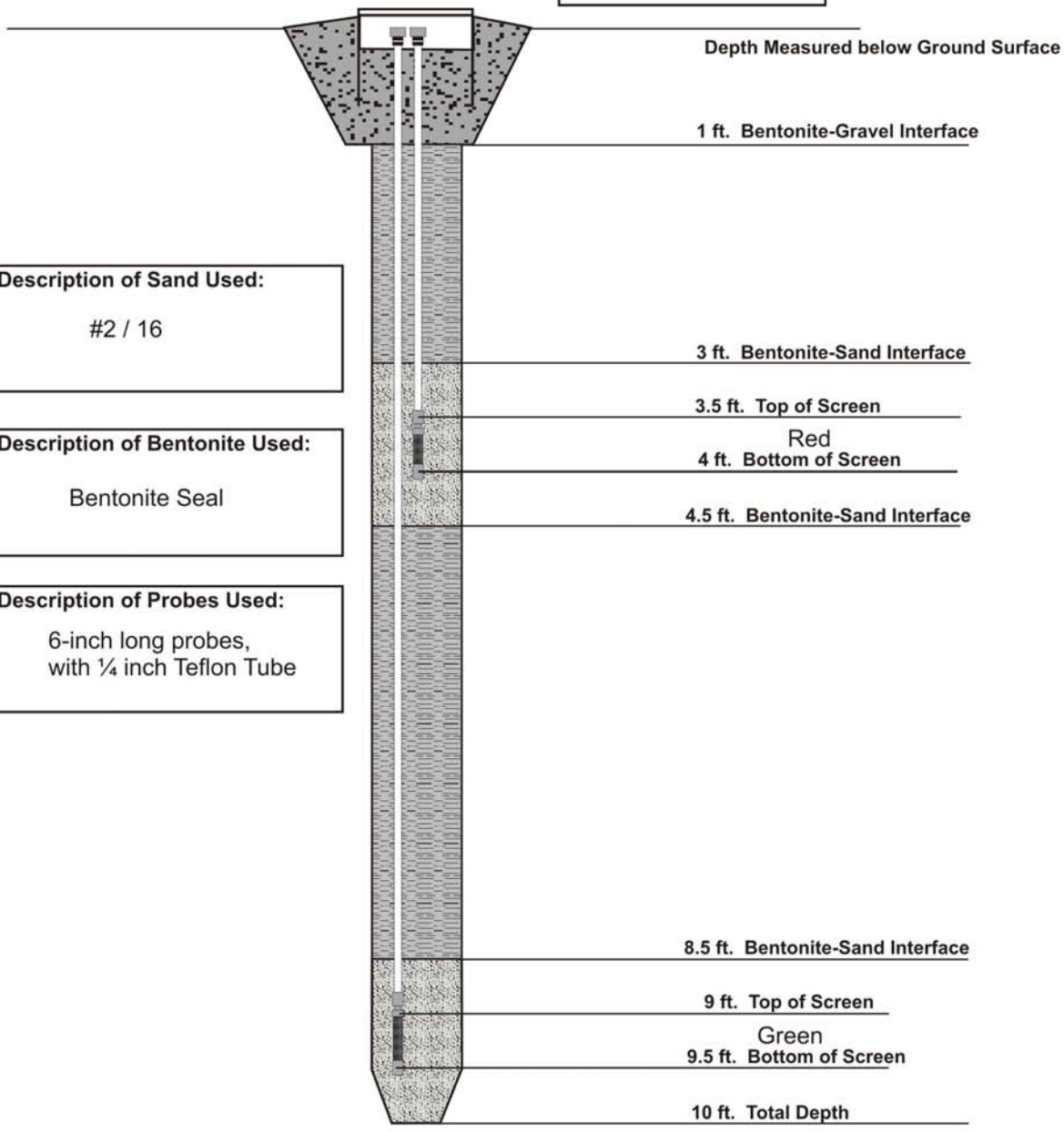
Nested Soil Gas Probe Construction LOG

Permit Number: Project Number: Boring Location: PS-1A-2 Date Logged: 5/9/2008 Geologist: Coonfare Total Depth: 10 ft.	Drilling Contractor: Precision Driller: Israel Ramirez Drilling Equipment: Geoprobe Drilling Method: Direct Push Boring Diameter: 2.5-inch

Surface Completion:

flush mount



Description of Sand Used:

#2 / 16

Description of Bentonite Used:

Bentonite Seal

Description of Probes Used:

6-inch long probes,
with ¼ inch Teflon Tube

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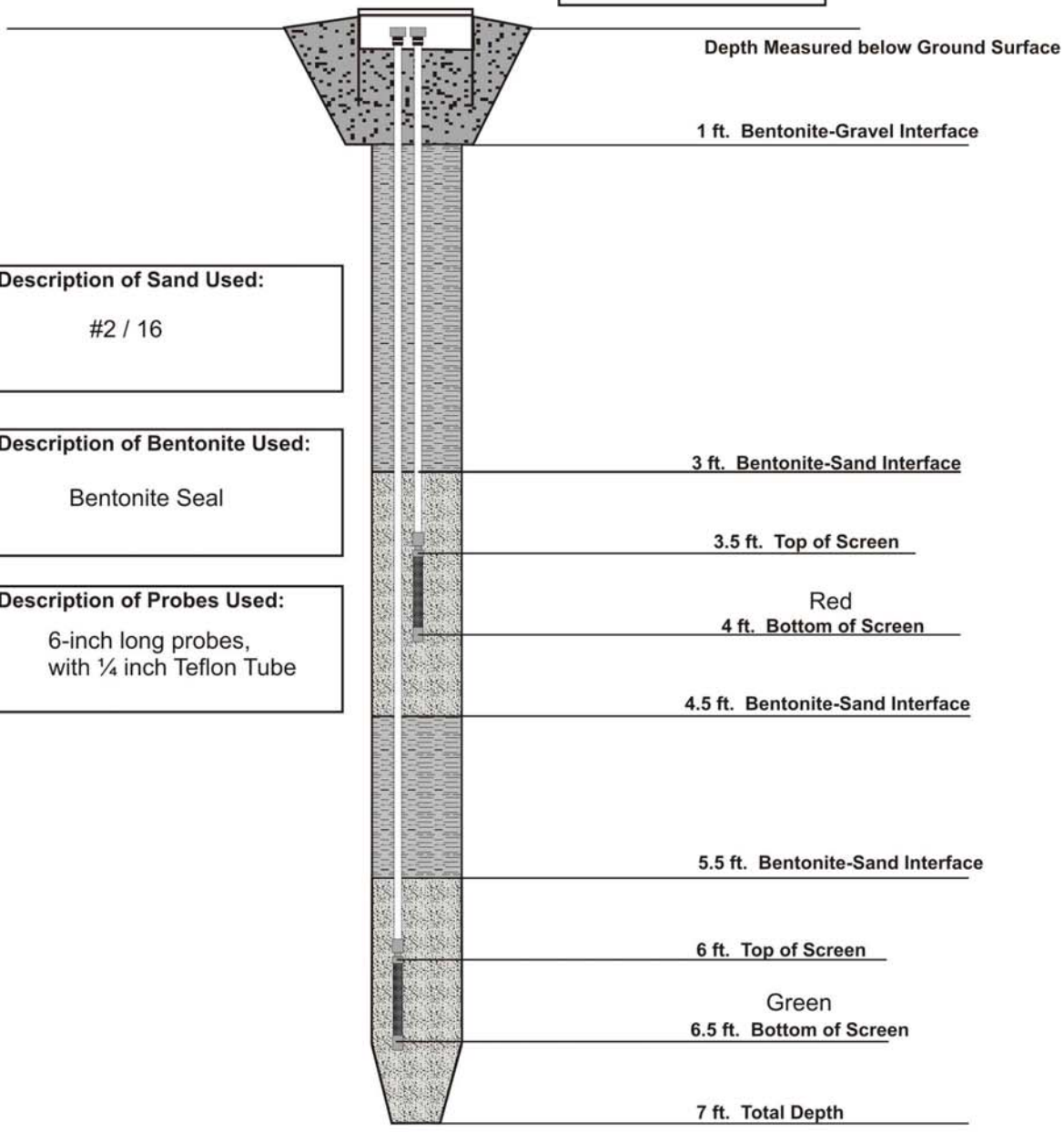
Nested Soil Gas Probe Construction LOG

Permit Number: Project Number: Boring Location: PS-1A-3 Date Logged: 5/9/2008 Geologist: Coonfare Total Depth: 7 ft.	Drilling Contractor: Precision Driller: Israel Ramirez Drilling Equipment: Geoprobe Drilling Method: Direct Push Boring Diameter: 2.5-inch

Surface Completion:

flushmount



Description of Sand Used:

#2 / 16

Description of Bentonite Used:

Bentonite Seal

Description of Probes Used:

6-inch long probes,
with ¼ inch Teflon Tube

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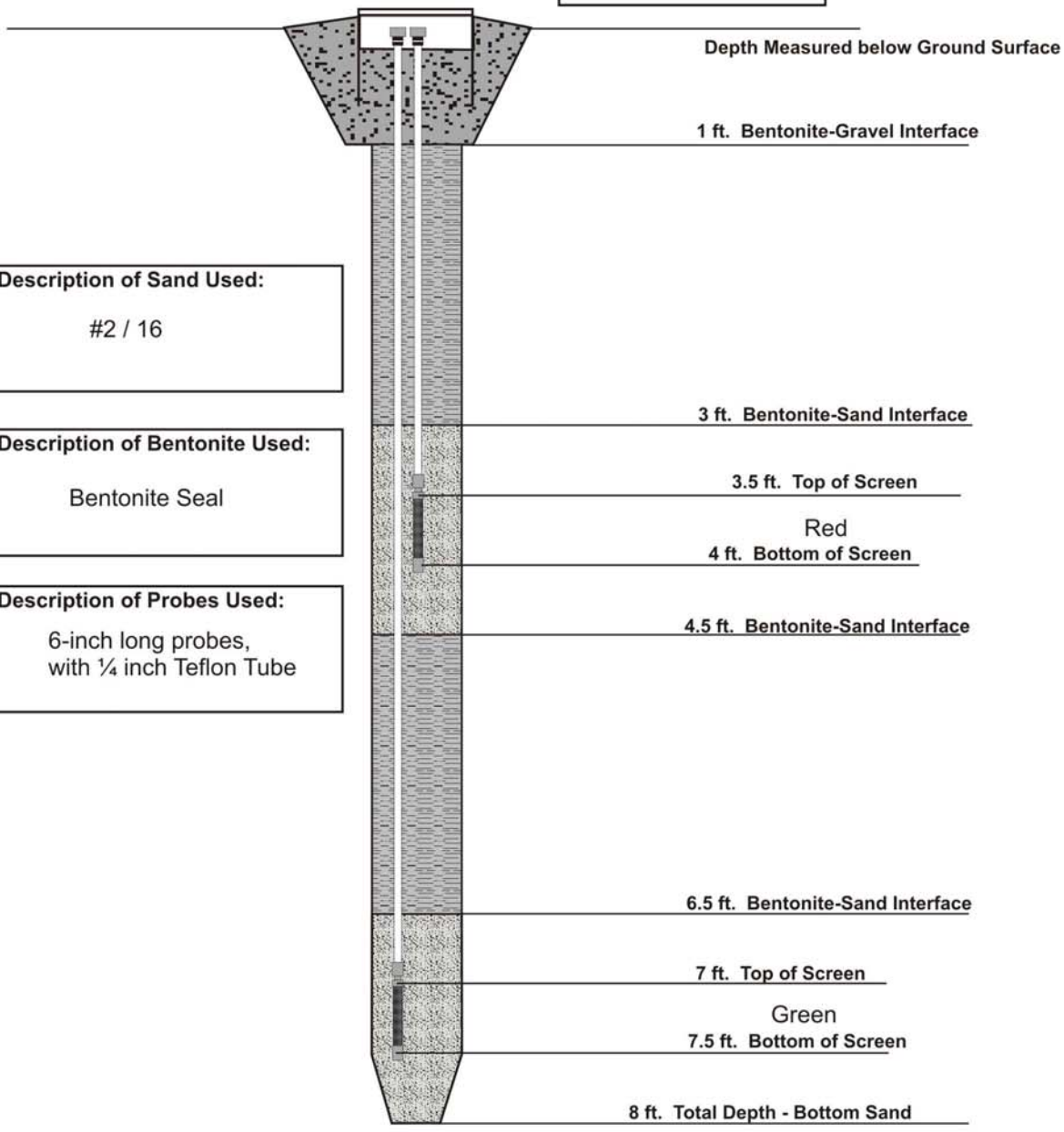
Nested Soil Gas Probe Construction LOG

Permit Number: Project Number: Boring Location: PS-1A-5 Date Logged: 5/9/2008 Geologist: Coonfare Total Depth: 8 ft.	Drilling Contractor: Precision Driller: Israel Ramirez Drilling Equipment: Geoprobe Drilling Method: Direct Push Boring Diameter: 2.5-inch

Surface Completion:

flush mount



Description of Sand Used:

#2 / 16

Description of Bentonite Used:

Bentonite Seal

Description of Probes Used:

6-inch long probes,
with ¼ inch Teflon Tube

Battelle

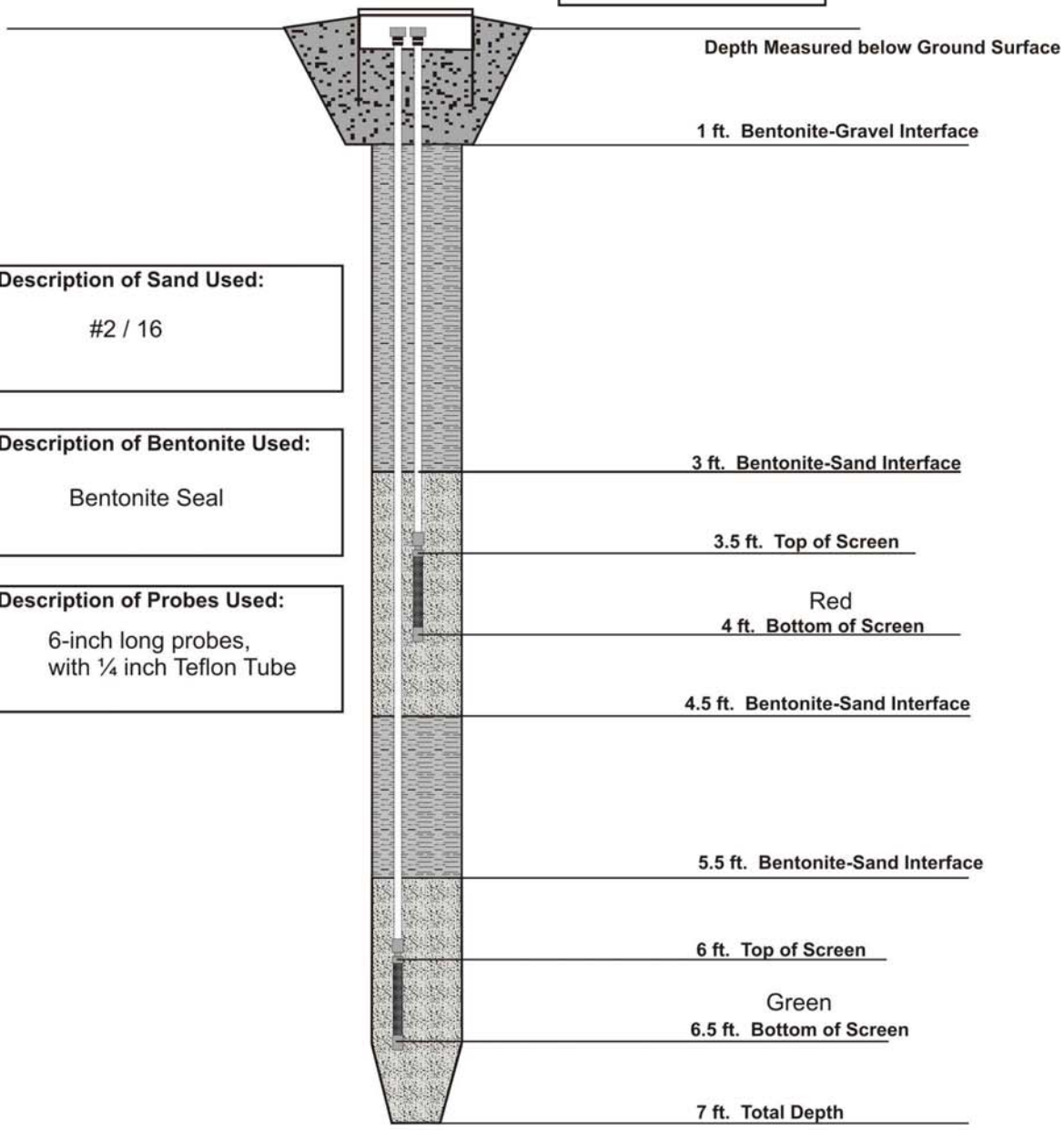
DODHF Novato

Nested Soil Gas Probe Construction LOG

Permit Number: Project Number: Boring Location: PS-1A-6 Date Logged: 5/9/2008 Geologist: Coonfare Total Depth: 7 ft.	Drilling Contractor: Precision Driller: Israel Ramirez Drilling Equipment: Geoprobe Drilling Method: Direct Push Boring Diameter: 2.5-inch

Surface Completion:

flush mount



Description of Sand Used:

#2 / 16

Description of Bentonite Used:

Bentonite Seal

Description of Probes Used:

6-inch long probes,
with ¼ inch Teflon Tube

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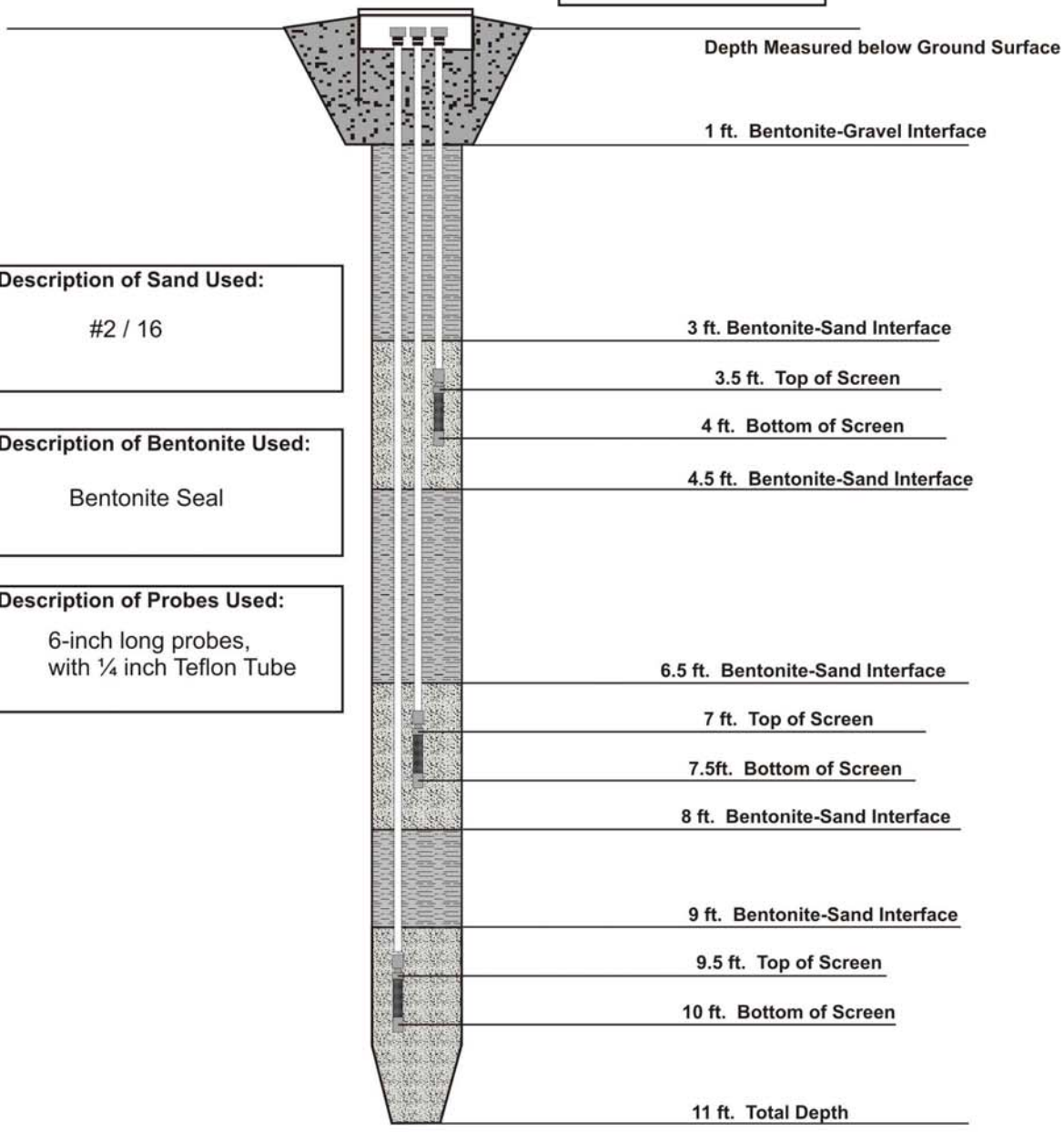
Nested Soil Gas Probe Construction LOG

Permit Number: Project Number: Boring Location: PS-1A-7 Date Logged: 5/9/2008 Geologist: Coonfare Total Depth: 11	Drilling Contractor: Precision Driller: Israel Ramirez Drilling Equipment: Geoprobe Drilling Method: Direct Push Boring Diameter: 2.5-inch

Surface Completion:

flush mount



Description of Sand Used:

#2 / 16

Description of Bentonite Used:

Bentonite Seal

Description of Probes Used:

6-inch long probes,
with ¼ inch Teflon Tube

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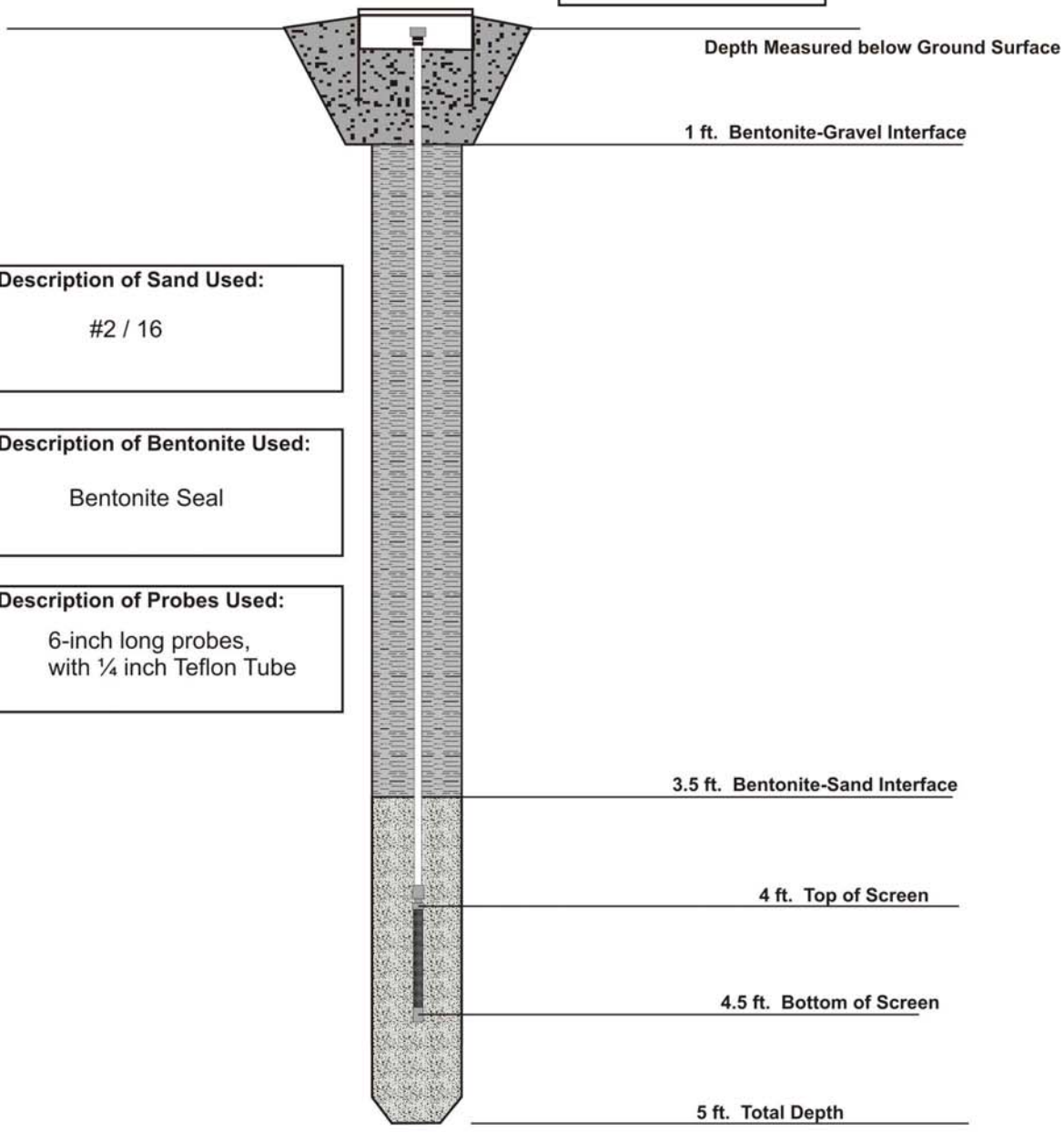
DODHF Novato

Nested Soil Gas Probe Construction LOG

Permit Number: Project Number: Boring Location: PS-1A-8 Date Logged: 5/8/2008 Geologist: Coonfare Total Depth: 5	Drilling Contractor: Precision Driller: Jose Carranza Drilling Equipment: Geoprobe7720DT Drilling Method: Direct Push Boring Diameter: 2.5-inch

Surface Completion:

None



Description of Sand Used:

#2 / 16

Description of Bentonite Used:

Bentonite Seal

Description of Probes Used:

6-inch long probes,
with ¼ inch Teflon Tube

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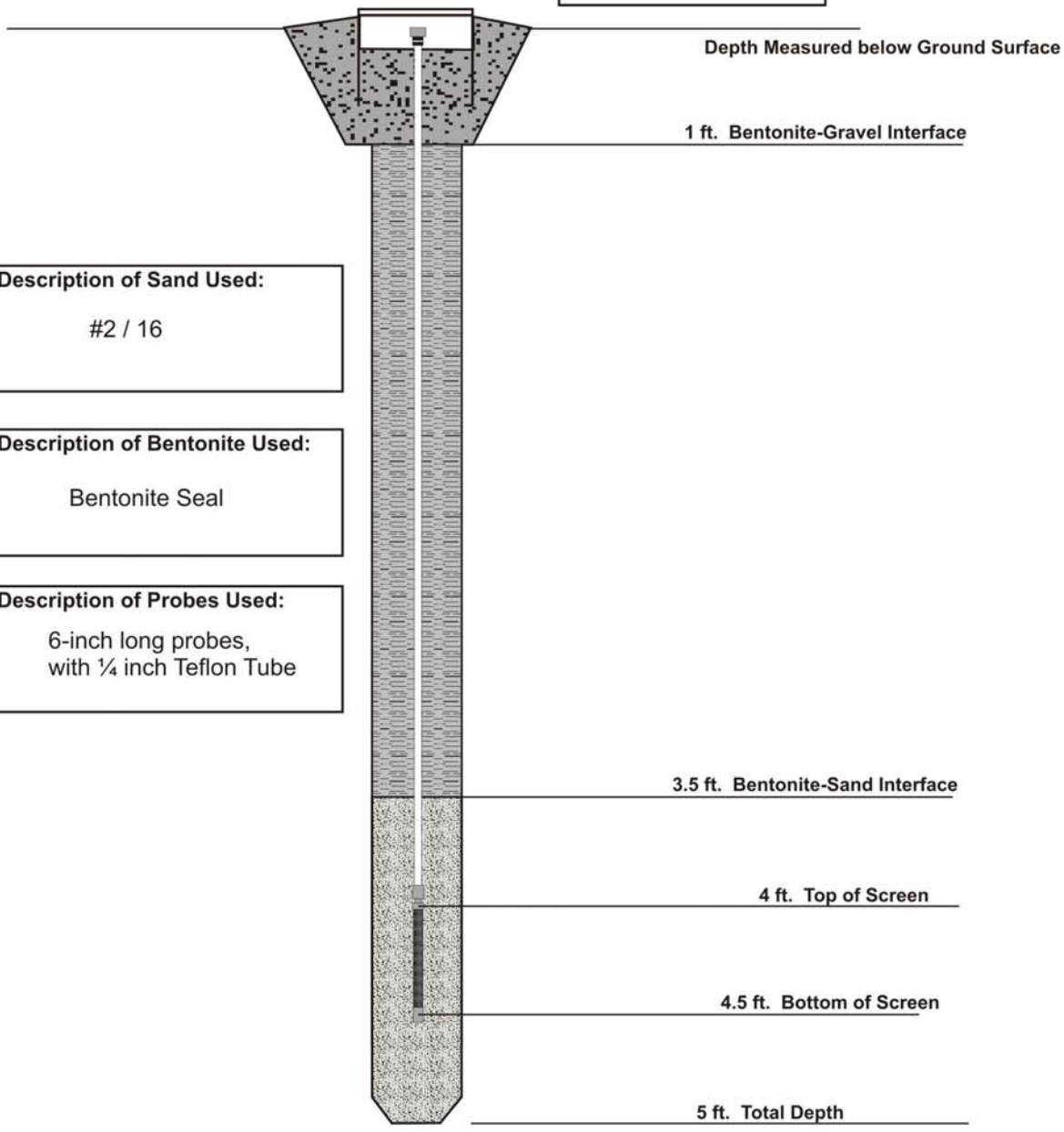
DODHF Novato

Nested Soil Gas Probe Construction LOG

Permit Number: Project Number: Boring Location: PS-1A-9 Date Logged: 5/8/2008 Geologist: Coonfare Total Depth: 5	Drilling Contractor: Precision Driller: Jose Carranza Drilling Equipment: Geoprobe7720DT Drilling Method: Direct Push Boring Diameter: 2.5-inch

Surface Completion:

None



Description of Sand Used:

#2 / 16

Description of Bentonite Used:

Bentonite Seal

Description of Probes Used:

6-inch long probes,
with ¼ inch Teflon Tube

SOIL GAS SAMPLING LOGS

DODHF Novato
Preliminary Sampling
Soil Gas Sampling Log

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Date:	5/18/2008	Sampler:	Ryan Wensink
Project Name:	DODHF Novato	Project Number:	G601518
Sample ID:	PS-1A-1 (Screen 1)		
Weather Conditions:	Warm, Sunny 75^{o}		
Sampling Device:	1 Liter Summa	Purge Voume:	65 mL
Sample Start Time:	1158	Sample End Time:	1208
Canister Start Pressure:	30 psi	Canister End Pressure:	0 psi
Comments:			

Date:	5/18/2008	Sampler:	Ryan Wensink
Project Name:	DODHF Novato	Project Number:	G601518
Sample ID:	PS-1A-1 (Screen 2)		
Weather Conditions:	Warm, Sunny 75^{o}		
Sampling Device:	1 Liter Summa	Purge Voume:	130 mL
Sample Start Time:	1150	Sample End Time:	1200
Canister Start Pressure:	30 psi	Canister End Pressure:	0 psi
Comments:			

Date:	5/18/2008	Sampler:	Ryan Wensink
Project Name:	DODHF Novato	Project Number:	G601518
Sample ID:	PS-1A-2 (Screen 1)		
Weather Conditions:	Warm, Sunny 75^{o}		
Sampling Device:	1 Liter Summa	Purge Voume:	76 mL
Sample Start Time:	1229	Sample End Time:	1241
Canister Start Pressure:	25 psi	Canister End Pressure:	9 psi
Comments: Ending pressure of 9 psi likely indicates the presence of less permeable soil.			

Date:	5/18/2008	Sampler:	Ryan Wensink
Project Name:	DODHF Novato	Project Number:	G601518
Sample ID:	PS-1A-2 (Screen 2)		
Weather Conditions:	Warm, Sunny 75^{o}		
Sampling Device:	1 Liter Summa	Purge Voume:	195 mL
Sample Start Time:	1224	Sample End Time:	1235
Canister Start Pressure:	23 psi	Canister End Pressure:	10 psi
Comments: Ending pressure of 10 psi likely indicates the presence of less permeable soil.			

DODHF Novato
Preliminary Sampling
Soil Gas Sampling Log

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Date:	5/18/2008	Sampler:	Ryan Wensink
Project Name:	DODHF Novato	Project Number:	G601518
Sample ID:	PS-1A-3 (Screen 1)		
Weather Conditions:	Warm, Sunny 75^{o}		
Sampling Device:	1 Liter Summa	Purge Voume:	76 mL
Sample Start Time:	1300	Sample End Time:	1308
Canister Start Pressure:	28 psi	Canister End Pressure:	0 psi
Comments:			

Date:	5/18/2008	Sampler:	Ryan Wensink
Project Name:	DODHF Novato	Project Number:	G601518
Sample ID:	PS-1A-3 (Screen 2)		
Weather Conditions:	Warm, Sunny 75^{o}		
Sampling Device:	1 Liter Summa	Purge Voume:	130 mL
Sample Start Time:	1300	Sample End Time:	1312
Canister Start Pressure:	28 psi	Canister End Pressure:	17 psi
Comments: After 12 minutes, the vacuum was no longer decreasing. This is likely attributable to less permeable soil at PS-1A-3.			

Date:	5/18/2008	Sampler:	Ryan Wensink
Project Name:	DODHF Novato	Project Number:	G601518
Sample ID:	PS-1A-5 (Screen 1) - Duplicate Tee Samples		
Weather Conditions:	Warm, Sunny 75^{o}		
Sampling Device:	1 Liter Summa	Purge Voume:	76 mL (76 mL)
Sample Start Time:	1400 (1400)	Sample End Time:	1406 (1406)
Canister Start Pressure:	30 psi (25 psi)	Canister End Pressure:	5 psi (0 psi)
Comments: As shown above, duplicate summa canisters had a different starting pressure. The sample collection time was based on the time it took for the duplicate summa to reach zero vacuum. A flow regulator was used and the samples were collected over the same time period, therefore, the collected sample volume would be equal.			

Date:	5/18/2008	Sampler:	Ryan Wensink
Project Name:	DODHF Novato	Project Number:	G601518
Sample ID:	PS-1A-5 (Screen 2)		
Weather Conditions:	Warm, Sunny 75^{o}		
Sampling Device:	1 Liter Summa	Purge Voume:	152 mL
Sample Start Time:	1404	Sample End Time:	1420
Canister Start Pressure:	30 psi	Canister End Pressure:	12 psi
Comments: Ending pressure of 12 psi likely indicates the presence of less permeable soil.			

DODHF Novato
Preliminary Sampling
Soil Gas Sampling Log

Battelle
The Business of Innovation

Date:	5/18/2008	Sampler:	Ryan Wensink
Project Name:	DODHF Novato	Project Number:	G601518
Sample ID:	PS-1A-6 (Screen 1)		
Weather Conditions:	Warm, Sunny 75^{o}		
Sampling Device:	1 Liter Summa	Purge Voume:	76 mL
Sample Start Time:	1321	Sample End Time:	1328
Canister Start Pressure:	28 psi	Canister End Pressure:	0 psi
Comments:			

Date:	5/18/2008	Sampler:	Ryan Wensink
Project Name:	DODHF Novato	Project Number:	G601518
Sample ID:	PS-1A-6 (Screen 2)		
Weather Conditions:	Warm, Sunny 75^{o}		
Sampling Device:	1 Liter Summa	Purge Voume:	130 mL
Sample Start Time:	1321	Sample End Time:	1329
Canister Start Pressure:	28 psi	Canister End Pressure:	0 psi
Comments:			

Date:	5/18/2008	Sampler:	Ryan Wensink
Project Name:	DODHF Novato	Project Number:	G601518
Sample ID:	PS-1A-7 (Screen 1)		
Weather Conditions:	Warm, Sunny 75^{o}		
Sampling Device:	1 Liter Summa	Purge Voume:	76 mL
Sample Start Time:	1124	Sample End Time:	1135
Canister Start Pressure:	29 psi	Canister End Pressure:	0 psi
Comments:			

Date:	5/18/2008	Sampler:	Ryan Wensink
Project Name:	DODHF Novato	Project Number:	G601518
Sample ID:	PS-1A-7 (Screen 2)		
Weather Conditions:	Warm, Sunny 75^{o}		
Sampling Device:	1 Liter Summa	Purge Voume:	152 mL
Sample Start Time:	1119	Sample End Time:	1126
Canister Start Pressure:	17	Canister End Pressure:	0
Comments:			

DODHF Novato
Preliminary Sampling
Soil Gas Sampling Log

Battelle
The Business of Innovation

Date:	5/18/2008	Sampler:	Ryan Wensink
Project Name:	DODHF Novato	Project Number:	G601518
Sample ID:	PS-1A-7 (Screen 3)		
Weather Conditions:	Warm, Sunny 75^{o}		
Sampling Device:	1 Liter Summa	Purge Voume:	206 mL
Sample Start Time:	1106	Sample End Time:	1111
Canister Start Pressure:	15 psi	Canister End Pressure:	0 psi
Comments:			

Date:	5/18/2008	Sampler:	Ryan Wensink
Project Name:	DODHF Novato	Project Number:	G601518
Sample ID:	PS-1A-8		
Weather Conditions:	Warm, Sunny 75^{o}		
Sampling Device:	1 Liter Summa	Purge Voume:	87 mL
Sample Start Time:	1442	Sample End Time:	1452
Canister Start Pressure:	30 psi	Canister End Pressure:	0 psi
Comments: The sample tubing had been cut by vandals in between probe installation and sampling. The cut tubing was coupled, purged and sampled.			

Date:	5/18/2008	Sampler:	Ryan Wensink
Project Name:	DODHF Novato	Project Number:	G601518
Sample ID:	PS-1A-9		
Weather Conditions:	Warm, Sunny 75^{o}		
Sampling Device:	1 Liter Summa	Purge Voume:	87 mL
Sample Start Time:	1419	Sample End Time:	1429
Canister Start Pressure:	28 psi	Canister End Pressure:	0 psi
Comments:			

DEPTH TO WATER MEASUREMENTS

Depth to Water Measurements in Temporary Wells

Location ID	Date	Time	Depth to Water (ft bgs)
PS-1A-1	5/8/2008	1452	10.61
PS-1A-2	5/8/2008	1425	10.94
PS-1A-3	5/8/2008	1439	9.91
PS-1A-5	5/8/2008	1436	9.85
PS-1A-6	5/9/2008	725	12.05
PS-1A-7	5/9/2008	720	13.01

HEAD SPACE TESTING RESULTS

Preliminary Sampling Head Space Testing Results (5/8/2008)

PS-1A-1		
Sample Depth	Sample Collection Time	PID Response (PPM)
0-1	Not Sampled	Not Sampled
1-2	1010	613
2-3	1011	1744
3-4	1012	1520
4-5	1013	1086
5-6	1015	672
6-7	1017	259
7-8	1018	47.4
8-9	1021	17.1
9-10	1023	6.0
10-11	1025	27.8
11-12	1027	19.0
12-13	1027	398
13-14	1028	10.2
14-15	1030	3.8

PS-1A-2		
Sample Depth	Sample Collection Time	PID Response (PPM)
0-1	Not Sampled	Not Sampled
1-2	1035	13.2
2-3	1036	1.2
3-4	1037	1
4-5	1038	9.7
5-6	1039	7.9
6-7	1040	5.5
7-8	1041	1.7
8-9	1042	1.2
9-10	1043	0.6
10-11	1044	7.5
11-12	1045	2.4
12-13	1046	3.5
13-14	1047	0.8
14-15	1050	0.6

PS-1A-3		
Sample Depth	Sample Collection Time	PID Response (PPM)
0-1	Not Sampled	Not Sampled
1-2	1048	0.4
2-3	1049	0.6
3-4	1050	0.5
4-5	1050	1.4
5-6	1050	5.6
6-7	1050	0.6
7-8	1055	0.5
8-9	1055	0.4
9-10	1055	0.3
10-11	1056	1.1
11-12	1100	0.5
12-13	1100	0.3
13-14	1105	0.2
14-15	1105	0.2

PS-1A-5		
Sample Depth	Sample Collection Time	PID Response (PPM)
0-1	Not Sampled	Not Sampled
1-2	1134	0.4
2-3	1135	0.3
3-4	1136	1.8
4-5	1137	1.8
5-6	1137	1.3
6-7	1139	1.2
7-8	1139	0.8
8-9	1140	0.5
9-10	1141	0.4
10-11	1142	1.5
11-12	1143	0.9
12-13	1145	0.2
13-14	1146	0.2
14-15	1150	0.3

PS-1A-6		
Sample Depth	Sample Collection Time	PID Response (PPM)
0-1	Not Sampled	Not Sampled
1-2	1110	0.4
2-3	1110	0.3
3-4	1115	1.8
4-5	1115	1.8
5-6	1115	1.3
6-7	1120	1.2
7-8	1120	0.8
8-9	1120	0.5
9-10	1122	0.4
10-11	1122	1.5
11-12	1122	0.9
12-13	1126	0.2
13-14	1126	0.2
14-15	1130	0.3

PS-1A-7		
Sample Depth	Sample Collection Time	PID Response (PPM)
0-1	Not Sampled	Not Sampled
1-2*	1513	0.5
2-3*	1513	0.3
3-4*	1513	0.8
4-5*	1515	0.9
5-6*	1515	1.6
6-7.5	922	154
7.5-8.5	925	1625
8.5-10	928	1706
10-11	933	801.0
11-12	935	359
12-13	937	282.0
13-14	940	30.3

* During the initial direct push boring at PS-1A-7, limited recovery was achieved between the ground surface and 6 ft bgs. As a result, an additional boring was advanced adjacent to the initial boring to collect samples for headspace analysis.

GEOTECHNICAL LABORATORY REPORT

Laboratory Report for
Battelle Environmental Restoration
(Project: DoDHF Novato G601518)

May 29, 2008

Daniel B. Stephens & Associates, Inc.

6020 Academy NE, Suite 100 • Albuquerque, New Mexico 87109

May 29, 2008

Mr. Ryan Wensink
Battelle Environmental Restoration
505 King Avenue
Columbus, OH 43201
(614) 599-2179

Re: DBS&A Laboratory Report for Battelle Environmental Restoration (Project: DoDHF Novato G601518)

Dear Mr. Wensink:

Enclosed is the final report for the Battelle Environmental Restoration (Project: DoDHF Novato G601518) samples. Please review this report and provide any comments as samples will be held for a maximum of 30 days. After 30 days samples will be returned or disposed of in an appropriate manner.

All testing results were evaluated subjectively for consistency and reasonableness, and the results appear to be reasonably representative of the material tested. However, DBS&A does not assume any responsibility for interpretations or analyses based on the data enclosed, nor can we guarantee that these data are fully representative of the undisturbed materials at the field site. We recommend that careful evaluation of these laboratory results be made for your particular application.

The testing utilized to generate the enclosed final report employs methods that are standard for the industry. The results do not constitute a professional opinion by DBS&A, nor can the results affect any professional or expert opinions rendered with respect thereto by DBS&A. You have acknowledged that all the testing undertaken by us, and the final report provided, constitutes mere test results using standardized methods, and cannot be used to disqualify DBS&A from rendering any professional or expert opinion, having waived any claim of conflict of interest by DBS&A.

We are pleased to provide this service to Battelle Environmental Restoration and look forward to future laboratory testing on other projects. If you have any questions about the enclosed data, please do not hesitate to call.

Sincerely,

DANIEL B. STEPHENS & ASSOCIATES, INC.
LABORATORY / TESTING FACILITY

Joleen Hines
Laboratory Supervising Manager

Enclosure

Daniel B. Stephens & Associates, Inc.
6020 Academy NE, Suite 100 505-822-9400
Albuquerque, NM 87109 FAX 505-822-8877

Summaries

Summary of Tests Performed

Laboratory Sample Number	Initial Soil Properties[1] (θ, ρ_d, ϕ)	Saturated Hydraulic Conductivity[2]		Moisture Characteristics[3]					Unsaturated Hydraulic Conductivity	Particle Size[4]			Effective Porosity	Particle Density	FOC	1/3, 15 Bar Points and Water Holding Capacity	Atterberg Limits	Proctor Compaction
		CH	FH	HC	PP	TH	WP	RH		DS	WS	H						
Soil Core #1	X												X		X			
Soil Core #2	X												X		X			

[1] θ = Initial moisture content, ρ_d = Dry bulk density, ϕ = Calculated porosity

[2] CH = Constant head, FH = falling head

[3] HC = Hanging column, PP = Pressure plate, TH = Thermocouple psychrometer, WP = Water activity meter, RH = Relative humidity box

[4] DS = Dry sieve, WS = Wet sieve, H = Hydrometer

Summary of Initial Moisture Content, Dry Bulk Density Wet Bulk Density and Calculated Porosity

Sample Number	Moisture Content				Dry Bulk Density (g/cm^3)	Wet Bulk Density (g/cm^3)	Calculated Porosity (%)
	As Received		Remolded				
	Gravimetric (%, g/g)	Volumetric (%, cm^3/cm^3)	Gravimetric (%, g/g)	Volumetric (%, cm^3/cm^3)			
Soil Core #1	11.0	19.2	---	---	1.75	1.94	33.9
Soil Core #2	20.4	31.6	---	---	1.55	1.87	41.5

NA = Not analyzed

--- = This sample was not remolded

Summary of Effective Porosity Tests

Sample Number	Effective Porosity (% cm^3/cm^3)
Soil Core #1	24.9
Soil Core #2	26.4

Summary of Fractional Organic Carbon Tests

Sample Number	Fractional Organic Carbon (%)
Soil Core #1	0.24
Soil Core #2	0.39

*Comments:*ND-not detected at the reporting limit of 0.1% C*

Analysis provided by Hall Environmental, Albuquerque, NM.

Laboratory Data and Graphical Plots

Initial Properties

Summary of Initial Moisture Content, Dry Bulk Density Wet Bulk Density and Calculated Porosity

Sample Number	Moisture Content				Dry Bulk Density (g/cm^3)	Wet Bulk Density (g/cm^3)	Calculated Porosity (%)
	As Received		Remolded				
	Gravimetric (%, g/g)	Volumetric (%, cm^3/cm^3)	Gravimetric (%, g/g)	Volumetric (%, cm^3/cm^3)			
Soil Core #1	11.0	19.2	---	---	1.75	1.94	33.9
Soil Core #2	20.4	31.6	---	---	1.55	1.87	41.5

NA = Not analyzed

--- = This sample was not remolded

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: Battelle Environmental Restoration
Job Number: LB08.0096.00
Sample Number: Soil Core #1
Project : DoDHF Novato
Depth: 3'-4'

	As Received	Remolded
Test Date:	28-May-08	---
Field weight of sample* (g):	340.32	
Tare weight, ring (g):	0.00	
Tare weight, pan/plate (g):	181.18	
Tare weight, other (g):	0.00	
Dry weight of sample (g):	143.42	
Sample volume (cm^3):	81.84	
Assumed particle density (g/cm^3):	2.65	
Gravimetric Moisture Content (% g/g):	11.0	
Volumetric Moisture Content (% vol):	19.2	
Dry bulk density (g/cm^3):	1.75	
Wet bulk density (g/cm^3):	1.94	
Calculated Porosity (% vol):	33.9	
Percent Saturation:	56.7	

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded

Daniel B. Stephens & Associates, Inc.

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: Battelle Environmental Restoration
Job Number: LB08.0096.00
Sample Number: Soil Core #2
Project : DoDHF Novato
Depth: 8'-9'

	As Received	Remolded
Test Date:	28-May-08	---
Field weight of sample* (g):	438.63	
Tare weight, ring (g):	0.00	
Tare weight, pan/plate (g):	223.17	
Tare weight, other (g):	0.00	
Dry weight of sample (g):	178.94	
Sample volume (cm^3):	115.46	
Assumed particle density (g/cm^3):	2.65	
Gravimetric Moisture Content (% g/g):	20.4	
Volumetric Moisture Content (% vol):	31.6	
Dry bulk density (g/cm^3):	1.55	
Wet bulk density (g/cm^3):	1.87	
Calculated Porosity (% vol):	41.5	
Percent Saturation:	76.2	

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded

Effective Porosity

Summary of Effective Porosity Tests

Sample Number	Effective Porosity (% cm^3/cm^3)
Soil Core #1	24.9
Soil Core #2	26.4

Effective Porosity Data

Job Name: Battelle Environmental Restoration
Job Number: LB08.0096.00
Sample Number: Soil Core #1
Project : DoDHF Novato
Depth: 3'-4'

Test Date: 15-May-08

*Sample Dry Weight** (g): 135.85
Tare Weight (g): 111.90
Bulk Density (g/cm^3): 1.75
Calculated Porosity (% cm^3/cm^3): 33.9

Pressure plate potential (-bars): 15.0
Sample weight at -15.0 bars (g):* 137.1

Moisture content (% g/g): 5.1
Moisture content (% cm^3/cm^3): 9.0
Matric potential (-cm): 15,297

***Moisture content at -15 bars* (% cm^3/cm^3): 9.0**

***Effective porosity* (% cm^3/cm^3): 24.9**

Comments:

* Weight including tares

Laboratory analysis by: T. Mendez/C. Krous
Data entered by: T. Mendez/C. Krous
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Effective Porosity Data

Job Name: Battelle Environmental Restoration
Job Number: LB08.0096.00
Sample Number: Soil Core #2
Project : DoDHF Novato
Depth: 8'-9'

Test Date: 15-May-08

*Sample Dry Weight** (g): 150.84
Tare Weight (g): 117.58
Bulk Density (g/cm^3): 1.55
Calculated Porosity (% cm^3/cm^3): 41.5

Pressure plate potential (-bars): 15.0
Sample weight at -15.0 bars (g):* 154.1

Moisture content (% g/g): 9.8
Moisture content (% cm^3/cm^3): 15.1
Matric potential (-cm): 15,297

***Moisture content at -15 bars* (% cm^3/cm^3): 15.1**

***Effective porosity* (% cm^3/cm^3): 26.4**

Comments:

* Weight including tares

Laboratory analysis by: T. Mendez/C. Krous
Data entered by: T. Mendez/C. Krous
Checked by: J. Hines

Fractional Organic Carbon

Summary of Fractional Organic Carbon Tests

Sample Number	Fractional Organic Carbon (%)
Soil Core #1	0.24
Soil Core #2	0.39

*Comments:*ND-not detected at the reporting limit of 0.1% C*

Analysis provided by Hall Environmental, Albuquerque, NM.

QA/QC SUMMARY REPORT

Client: Daniel B. Stephens & Assoc.
Project: Battelle (5-08) **Work Order:** 0805182

Analyte	Result	Units	PQL	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: Walkley-Black Method: FOC									
Sample ID: MB-15966		*MBLK*			Batch ID:	**15966**	Analysis Date:		5/16/2008
FOC	ND	% C	0.10						
Sample ID: LCS-15966		*LCS*			Batch ID:	**15966**	Analysis Date:		5/16/2008
FOC	2.160	% C	0.10	103	80	120			

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Date: *22-May-08*

CLIENT: Daniel B. Stephens & Assoc.
Project: Battelle (5-08)

Lab Order: 0805182

Lab ID: 0805182-01 **Collection Date:** 5/13/2008 2:00:00 PM
Client Sample ID: Soil Core #1 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
WALKLEY-BLACK METHOD: FOC						Analyst: **TAF**
FOC	0.24	0.10		% C	1	5/16/2008

Lab ID: 0805182-02 **Collection Date:** 5/13/2008 2:00:00 PM
Client Sample ID: Soil Core #2 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
WALKLEY-BLACK METHOD: FOC						Analyst: **TAF**
FOC	0.39	0.10		% C	1	5/16/2008

Qualifiers:

*	Value exceeds Maximum Contaminant Level
E	Value above quantitation range
J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit
S	Spike recovery outside accepted recovery limits
B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
MCL	Maximum Contaminant Level
RL	Reporting Limit

Laboratory Tests and Methods

Tests and Methods

Dry Bulk Density:	ASTM D6836
Moisture Content:	ASTM D2216; ASTM D6836
Calculated Porosity:	ASTM D6836
TOC/FOC:	Page, A. L. 1982 Chp. 19-3, pp. 570-571, in A. L. Page (ed), Methods of Soil Analysis American Society of Agronomy, Madison, WI; Walkley Black
Effective Porosity:	Corey, A. T. 1994, Reprinted 2003, Chp. 2.3.3, pp. 41-42, in A. T. Corey, Mechanics of Immiscible Fluids in Porous Media, Water Resources Publications, LLC., Highlands Ranch, Colorado, U.S.A.; Stephens, D.B.,1997, Hydrology Journal (1998) 6:6156-165, A Comparison of Estimated and Calculated Effective Porosity.